D4.3: Survey of REC approaches and codes for Artificial Intelligence & Robotics

[WP4 – Artificial Intelligence & Robotics: ethical, legal and social analysis]

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Abstract

This report describes the outcome of task 4.3, Current coverage of ethical guidelines by professional organisations, ethics advisory groups, and research ethics committees for Artificial Intelligence and Robotics (AI&R). For this task, the SIENNA partners searched for documents which could give normative guidance (excluding legislation) for stakeholders in AI&R. Three kinds of documents were searched in different EU countries and internationally:

1. professional ethics codes
2. documents from professional groups and ethics advisory groups, and
3. guidance documents on how to write research ethics protocols in different EU countries and internationally.

Furthermore, representatives of research ethics committees have been asked for the following information in an online survey:

- to what extent are they aware of AI&R developments and ethical issues associated with them?;
- how do they currently approach these issues and do they have plans to more explicitly feature them?

Document history

Version	Date	Description	Reason for change	Distribution
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V1.0	28.09.2018	Final Version	Addressing Review comments and comments from the consortium	Coordinator for submission to H2020

Information in this report that may influence other SIENNA tasks

Linked task	Points of relevance
Task 2.3, Task 3.3 – Current coverage by research ethics committees and in ethical codes	Tasks 2.3 and 3.3 are strongly connected to task 4.3. The same methodology for the national and international searches was used and the opinions and knowledge of REC members was examined via one online survey for all three SIENNA areas.
Task 2.2, 3.2, 4.2 – Analysis of legal and human rights requirements in and outside the EU	Ethical frameworks or normative rules are sometimes regulated as soft law. Therefore, there might be overlapping's between the X.3 and the X.2 tasks. Although the X.2 tasks focused only on normative frameworks (not on legal binding documents).

Task 2.4, 3.4, 4.4 – Analysis of current and future ethical issues	The results of the X.3 tasks will also be useful for the X.4 tasks in which partners will conduct a review existing ethical theories and approaches regarding the three fields.
WPX.7	The outcome of the X.3 task will help us develop the ethical frameworks.
WP5	The outcome of the X.3 tasks will be the basis for the work in WP5, in which operational guidelines, ethics codes and proposals for improved ethical and legal frameworks will be developed.

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Executive summary

This report has been written for the SIENNA project, a European Union (EU) funded project which is part of the Horizon 2020 research and innovation programme. SIENNA aims to develop ethical frameworks, operational guidelines for research ethics committees, codes of responsible conduct and policy recommendations for new technologies with high socio-economic and human rights. It also aims to develop general methods for the ethical and legal assessment of emerging technologies, and for the implementation of ethical frameworks and the development of policy recommendations.

SIENNA focuses in particular on an assessment of three technology areas: (1) artificial intelligence and robotics; (2) human enhancement; and (3) human genomics. This report is the second deliverable completed for Work Package (WP) 4 which addresses ethical, legal and social aspects of AI and robotics (AI&R). We report herein how and to what extent different ethical normative documents explicitly or implicitly address developments in AI&R. In particular we studied normative documents issued by three different types of groups: i) professional organisations, ii) (ethical) advisory groups, and iii) research ethics committees. The same research has been conducted for Human Genetics and Genomics (WP2, D323) and HE (WP3, D3.3). Since task 4.3 is strongly connected with task 2.3 and 3.3 this report contains text modules which are also used in D3.3 and D4.3.

Objectives and structure of the report

As part of the SIENNA project this report surveys research ethics protocols and professional ethics codes in different EU countries and internationally, the aim of the report is to identify professional ethics codes, national advisory / ethics groups, international national advisory / ethics groups, and relevant guidance documents on how to write research ethics protocols. The report aims to determine to what extent and how these documents refer explicitly or implicitly to AI & robotics. This report also informs about the results of an online survey completed by representatives of research ethics committees (RECs) in Europe.

The survey was conducted to determine to what extent the representatives of RECs are aware of the three SIENNA areas of technologies and ethical issues associated with them, how they currently approach them, and if there are plans to more explicitly feature them. Based on the findings of this report, the partners will decide which elements should be part of ethical frameworks and which are missing. That means, that this report can be used to conduct the work in WP5, e.g. the development of elements that complement operational guidelines for research ethics committees, the development of central elements of a code of responsible conduct for researchers in AI&R.

Methodology

The report on the national searches were perfumed following a semi-structured methodology. We gave our partners a plan on how to proceed with the search and reporting, although we informed them, that this methodology can be changed. The suggested methodology consisted of two steps:

1) Search via national associations/societies to identify national professional associations for the area of technology. Find national advisory groups, or national ethics groups that offer ethical guidance for these areas of technology

2) Search via Google/Database search using predefined list of keywords.

The partners who conducted the national searches decided for the country about the most relevant documents. For those documents which are very relevant for the SIENNA work the following

questions were answered (in some countries only one relevant document was identified, in others five or more):

- Who is the stated audience?
- What definition of AI&R is used in the document?
- What forms of AI&R are described/covered in the document?
- Which ethical issues are addressed in the document?
- Format of the document (checklist, continuous text, other)?
- How is the document structured?
- Why is the document important/useful for your country?
- Is the document useful for the development of the SIENNA codes and other ethical frameworks?
- Optional step was contacting experts in each partners' country who work in each field to find out if they are aware of any ELSI guidance documents from: national professional organisations and/or from national ethics groups, and/or if they know of guidance docs for research ethics protocols in your country.

International search methodology included the search on the websites of relevant organisations i.e. IEEE, AAAI, ACM, SIGKDD, International Association for AI & Law, and the archives of the International Informatics Institute. Second step included online search using the prescribed search terms, i.e., artificial intelligence/AI/robotics/drones+professional+ethics+international/ European+codes/guideline. The search was carried out only in English and used the following inclusion/exclusion criteria:

- Ethics or ELSI had to be in it (but it could be more applied).
- Anything that did not address ethical aspects (i.e., was in the nature of practical standard operating procedures) was excluded.
- Articles written by individual authors who are not part of an official/recognised group/professional organisation/advisory body were excluded (unless commissioned by the relevant body/group/authority).

Main findings

In the national and International searches, we found codes and documents from national ethics groups that focus on specific areas of application, especially the following:

1) AI&R in the health sector
2) AI&R in military
3) Intelligent systems and products
4) Use of algorithms
5) Use of machine learning

In the documents identified in the national and in the international search, the following ethical values and principles were identified: accountability; accuracy and data integrity; assistance to colleagues; avoidance of conflict of interest; fairness and non-discrimination; health and well-being; honesty and truth; privacy; professionalism; respect for the environment/avoidance of such harm; responsibility; safety (avoidance of harm/do no harm); scientific and research integrity; shared benefits; transparency; trust.

The top three most repeated ones in the international search were: safety, health and well-being and privacy.

While we found a lot of relevant professional codes and documents from ethics advisory bodies, we found fewer guidance documents on how to write research ethics protocols for researchers doing research in AI&R. Our online survey with REC representatives showed that most RECs address or offer no special guidance for researchers working in AI&R. Although most REC members think there is a need to close this gap. Most codes tend to have a very broad focus, and generally professional codes of conduct are lacking specific AI focus. These also tend to include very broad definitions of algorithms, automation and autonomous systems. There is only a handful of documents focused on robotics ethics which engage with the topic with a precision and depth, providing both general guidance and applied recommendations.

Most documents analyzed in the report aim to map values, norms, and ethical principles relevant to the field of AI&R. Few documents go beyond formulation of general principles and aim to address potential value conflicts, There is a noticeable variation in the level of development in terms of depth and practical applicability between general AI&R normative documents and sector specific guidelines. Some more detailed recommendations and principles can be found in guidelines focusing on the ethics of self-driving vehicles and medical sector applications.

Most of the proposed measured tend to fall into the two different types of approaches. First one is a mitigation approach that focuses on value conflicts and public acceptance and ultimately enabling of positive benefits of AI&R. Second one is a prohibition (constraining) approach including proposals on the sector-wide (autonomous weapons) and purpose prohibitions (algorithmic discrimination) of AI&R technologies, focusing on the fundamental human rights and corresponding values. This distinction can also traced in the mapping of values and ethical principles found in the analyzed documents

National documents

One of the main challenges in the national searches was that it was not always clear what a professional organisation is or rather what counts as a valid group or organisation. This was partially difficult for HG, but especially for HE and AI&R, since in these fields it is not really clear what a professional group might be. Another challenge occurred during the search for guidance documents from research ethics committees (GDREPs), since it turned out that in all three SIENNA areas there are very few such documents available. In some countries the search showed no results.

Brazil

Although there is an increasing interest for the use of robotics and AI systems both in the public and in the private sector, and despite public awareness of some ethical relevant issues at stake here, there are not many normative documents or general guidelines for the use of new technologies in Brazil. Researchers and entrepreneurs have to rely on pieces of legislation that are often out of pace with recent advancements in the domain of robotics and AI.

China

In recent years, there are four professional organizations and three related national departments in China that are either focused on professional ethics codes related to AI and/or robotics. Two of these documents put forward suggestions and requirements for practitioners and related personnel in these field specifically on AI&R, and their development.

France

Over the past few years, there have been a number of high level initiatives in France with regards to AI&R. All these initiatives and reports note the need to encourage the development of an increased ethical vigilance as well as training and oversight. Following the document search conducted for this report, one can note a particular focus on the field of application of health in relation to AI &R in France.

Germany

There are different German national advisory groups, ethics groups and professional groups, which have influence on the public and political debate on AI & Robotics. Some of them have legal power, others do not. Recommendations developed by professional organisations are very broad and have no direct use for the development of the SIENNA codes. We also found in our search documents which are developed by governmental institutions and have direct influence on the development of legal instruments.

Greece

In Greece there is very limited information on ethics and AI&R. The Greek Association for AI has not produced a Code of Ethics. Some Universities teach AI&R and there is an Academy of Robotics in the University of Macedonia in Thessaloniki, but they do not operate under any code of ethics.

The Netherlands

There are five professional organisations in the Netherlands that are either focused on AI and/or robotics or have some relation to these fields. There seem to be no Dutch professional organisations with a primary focus on robotics. There are three main organisations that provide policy-makers and the general public with information, ethical guidelines and other (policy) recommendations regarding the development and application of a variety of AI&R technologies.

Poland

In Poland, there is one professional organisation that has some relation to AI. No professional organisations for robotics could be identified No AI or Robotics-relevant documents on writing ethical codes nor policy statements regarding these domains have been found in the course of this search.

South Africa

Whilst there are a few examples of successful companies that have used AI&R, this has not led to a societal discussion about the ethics of these technologies. With exception of the few newspaper and website articles above, very little has been published in the country on this topic, including in terms of codes of conduct or ethics codes.

Spain

The search in more than 40 research groups' web pages in order to find out if they have anything related to the project showed out only one declaration about the topic.

Sweden

There were many documents on AI&R in general developed by different commercial and professional organisations, however, in most of them ethical issues seem to be an afterthought and lacked grater details. The search identified and analysed three documents relevant to AI&R. One issued by the parliamentary advisory body to the government, focused on the specific area of medical care. Other one issued by the Ministry of enterprise and Innovation is a general review on the ethical issues and solutions associated with AI. The third one is code of conduct published by the engineering association focused on professional principles.

UK

There are three national professional associations related to AI&R in the UK. In the search for professional ethics codes, we found eight relevant documents (including two general ones that might apply) for the period 2005-2018. The Codes identified do not define AI&R but mention or cover various terms related to them. NAEG documents have been produced by various organisations amounting to the guidance documents that cover variety of topics.

USA

Although there are no professional organizations in the United States devoted exclusively to AI and/or robotics, ("AI&R"), there are a wide variety of professional organizations whose focus overlaps to some degree, sometimes strongly, with the AI&R fields. Additionally, there are professional organizations that have either a general and comprehensive ethical code with an exclusive focus on principles of professional conduct, or a document specifically targeted to AI&R, or both. There is an even wider variety of governmental bodies, academic and policy research centres, and advocacy groups dedicated to providing policy-makers, the private sector, and the general public with information, ethical guidelines and other (policy) recommendations regarding the development and application of a variety of AI&R technologies.

International documents

In our literature review, and using the prescribed search terms we found a number of relevant documents from a variety of international and European professional organisations ranging from 1992 to present (some were undated). Some of these are presented as 'Codes of ethics', 'codes of conduct' (covering ethical principles), some as 'ethics statements', 'Declarations', 'Guidelines' and others in terms of 'Principles'. Using the SIENNA methodological guidance provided, we analysed 15 such documents relevant to AI&R, to understand them better.

In terms of nature, most of the Codes are voluntary and aspirational (and not all have monitoring or enforcement mechanisms). Some documents broadly covered technologies/emerging technologies/ computing technologies (while mentioning machine learning and other aspects of AI&R) or AI, others focussed more on specifics, e.g., Simulationist Code of Ethics, the Humanitarian UAV Code of Conduct & Guidelines. The length and structure of such documents also varies (the shortest one analysed was one page) – this depends on their aims (intent), focus and nature of their presentation (statements and declarations were shorter).

Our search for documents from international advisory groups led us to find seven key documents related to AI&R: one at the more global level and the others at the European level. We did not find any relevant international guidance documents on how to write research ethics protocols relevant to AI&R.

Online survey

The online survey was developed with Google forms in June/July 2018 and distributed by EUREC to its members in August 2018 by sending a link via email. The mail was sent to 30 EUREC members and 13 respondents completed the online survey (after a reminder). The majority of the respondents were slightly aware of technologies in Human Genomics, Human Enhancement and AI & Robotics. A few REC members indicated they were fully aware of technologies in HG. No one was more than slightly aware of technologies in HE and AI&R. Furthermore, the majority of respondents were slightly aware of the ELSI relating to HG, HE and AI. Only a few of the REC members who participated described themselves as experts in all three SIENNA areas. Furthermore, our last set of questions showed us that almost all respondents think that there is a need to offer additional education and training for REC members to learn more about the ELSI in HG, HE and AI&R.

Conclusion

Based on the preceding, it can be concluded that the development of SIENNA codes and guidelines for AI&R should be guided by the following criteria:

- The focus of the SIENNA codes and recommendations for AI&R needs to be clear. One possibility is to develop codes and guidelines with a broad focus, another possibility is to develop codes and guidelines for different application areas.
- Codes and guidelines need clear objectives. To have a positive effect, a code or a recommendation must be precise and useful.
- A code or a recommendation must be pragmatic. In the international search, codes were found that are not pragmatic enough and might present several difficulties in implementation.
- Ethical principles should be used. Although the use of these principles in codes and recommendations needs to be clear in terminology. There should be no room for varying interpretations of terminology.
- The codes and recommendations must entail a plan on sustainability. In the search codes were found that have provisions for feedback and revision, in different formats. A similar plan could be considered.

List of tables

List of acronyms/abbreviations

Abbreviation	Explanation
AI & R	Artificial Intelligence & Robotics
D	Deliverable
DoA	Description of Action
ELSI	Ethical, Legal and Social Implications
EU	European Union
GDPR	General Data Protection Regulation
HE	Human Enhancement
HG	Human Genomics
IAEG	International Advisory/Ethics group
NAEG	national advisory/ethics groups
PEC	professional ethics codes
REC	Research Ethics Committee
REP	Research Ethics Protocol
SOP	Standard Operating Procedure
WP	Work package

Table 1: List of acronyms/abbreviations

Glossary of terms

Term	Explanation
Artificial Intelligence	The science and engineering of machines with capabilities that are considered intelligent (i.e., intelligent by the standard of human intelligence).
Ethics advisory bodies	"Ethics Advisory bodies" can be defined as independent groups of ethics experts giving advice to a researcher, or research group on specific ethical, regulatory, social or philosophical issues raised by science.
Professional ethics codes	Guidelines to help members, workers, management or researchers conduct themselves in accordance with common values and/or ethical standards.
Professional organizations/groups	Professional organizations or groups usually bring together people working for a special profession to represent their interests.
Research ethics committees	Committees that review research applications and give opinions about whether research is ethical.
Research ethics protocols	Sets out how a study or project will deal with issues that are challenging from an ethical perspective.
Robotics	The field of science and engineering that deals with the design, construction, operation, and application of robots.

Table 2: Glossary of terms

1. Introduction

1.1 Background and objectives

One of the main goals of SIENNA is the development of ethical frameworks (WPX.7) and codes (WP5.2-4) for the three technology areas. As a basis for this work, we need to have a good overview of already existing relevant documents. We need to understand to what extent human genomics (HG), human enhancement (HE) and artificial intelligence and robotics (AI&R) are already addressed by guidance documents for research ethics protocols and by professional organisations and by national ethics' groups, e.g., the (ethics) codes they have developed, in different EU countries and internationally.

To get an overview of already existing relevant documents, we took the following steps:

1. **National search**: With the help of our partners we conducted a national search in 13 countries Every partner searched in his/her country and in his/her language for three types of documents:
   - professional ethics codes
   - guidance documents or recommendations from professional groups and ethics advisory groups, and
   - guidance documents on how to write research ethics protocols.
2. **International search**: We searched for the same three kind of documents internationally for all three SIENNA fields. This work was conducted by UU for HG (task 2.3), by EUREC for HE (task 3.3) and by TRI for AI & Robotics (task 4.3).
3. **Online survey with REC representatives**: Via a survey UU and EUREC addressed representatives of research ethics committees (RECs) to determine to what extent they are aware of these technologies and ethical issues associated with them, how they currently approach them, and if there are plans to more explicitly feature them. The EUREC network served as basis for this. REC members from 11 different countries responded.

1.2 Structure of the report

This report informs in its main part about the research questions, which guided our work and about the methodology and key results of our surveys (national, international and online surveys). The key results are described in section 3. In the three annexes the reader will find detailed information on our methodology and on the results. In annex 1 the reader can find the methodology which we gave our partners to assist them in doing the survey and detailed results from the national searches. In annex 2 we listed all relevant international documents for AI&R and gave further information on these documents. In annex 3 we give an detailed overview of the online survey (questions and detailed answers).

1.3 Scope and limitations

We aimed to obtain a wide range of normative documents to capture as much of the (types) of the salient normative statements as possible. This goal along with the time allotted to this task mean that we cannot claim to have conducted a strictly systematic search nor that we retrieved all existing normative documents. However, our search approach should have revealed the most important/influential documents, and we are confident that the material is sufficient to guide us further in tasks WPX.7 and WP5.

2. Research questions

The work for the X.3 tasks was guided by the following types of questions (their development, innovation and use, depends on the area of technology).

A. Are there professional organisations that have developed professional ethics codes (PECs) that specifically address the three areas of technology/research?
B. Are there documents from *national advisory/ethics groups* (NAEGs) that address specifically the three areas?
C. Are there *guidance documents on research ethics protocols* (GDREP) that specifically address research in the three areas?
    a. HG:
        i. research using HG?
        ii. research developing technologies in the three areas?
    b. HE:
        i. research that explicitly focuses on HE?
        ii. research that can have HE as side effect (as many clinical studies do) – how is that mirrored in guidance documents, if at all?
    c. AI&R:
        i. research that focuses on development and/or use of AI?
        ii. research that focuses on development and/or use of Robotics?
D. How is genomics/HE/AI&R addressed in these documents?
    a. in professional ethics codes (PECs)?
    b. in documents from national advisory/ethics groups (NAEGs)*?*
    c. in guidance documents on how to write research ethics protocols (*GDREPs)?*
E. If the specific area (HG, HE, AI&R) is not addressed specifically, how could existing guidance documents also apply to these areas of technologies?
F. To what extent are REC representatives aware of these technologies?
G. To what extent are REC representatives aware of ethical issues associated with technologies developed in the three areas?
H. How do REC representatives think/know/are aware that the ELSI of tech X is currently approached?
I. Do REC representatives think/know/are aware of plans to more explicitly feature ethical issues in the three areas?

Based on these questions we developed the methodology for the national search, the international search and the online survey with REC members.

3. Findings

In this chapter, the reader finds an information about the methodology and key results of the national search, the international search and the online survey. Detailed results and information on this can be found in the annexes 1, 2 and 3.

3.1 Key results

The main objective of the actions carried out for task 4.3 (national search, international search, online survey with REC members) was to find out about the existence of professional ethics codes, documents from ethics advisory bodies and guidance documents on how to write research ethics protocols with relevance to AI&R that might be helpful for the development of codes and other ethical frameworks for SIENNA.

In the national searches, we found codes and documents from national ethics groups that focus on specific areas of application, especially the following:

I. AI&R in the health sector
- AI&R in Medicine
- telemedicine (medicine through interactive methodologies of communication mediated by audio-visual data)
- robotic surgery
- mobile phone apps for the purpose of telemedicine
- intelligent healthcare
- neural network chips and brain computer interfaces
- medical imaging aided diagnosis systems
- care robots, robots in the care of older

II. AI&R in military
- robots in defence and security
- autonomous weapon systems
- autonomous weaponised drones

III. Intelligent systems and products
- intelligent manufacturing
- intelligent finance (the use of AI for credit scoring)
- intelligent education
- intelligent transportation
- intelligent security
- intelligent logistics
- autonomous vehicles
- intelligent network vehicles
- intelligent service robots
- intelligent unmanned aircraft systems
- intelligent video image identification systems
- intelligent voice interaction system
- intelligent translation systems
- smart home products
- industrial robots and service robots, agricultural robots and family service robots
- robots providing assistance to individuals or groups

- chatbots
- robots that interact with people and groups

IV. Use of algorithms

V. Use of machine learning
- machine image recognition
- natural language processing

The same aspects of AI&R were mentioned in the documents we found via the international search.

In the documents identified in the national and in the international search, the following ethical issues and challenges of AI&R applications and developments were mentioned:

- ethical issues relating to safety, privacy, justice, well-being, responsibility
- impacts on the productivity, social relations, ethical thoughts, life style and other aspects of human society (instability of society and family), danger of social discrimination through AI systems, de-socialization in humans resulting from the use of private entertainment robots
- ethical issues with regard to big data
- various issues with (child-)sex robots
- issues with healthcare robots (e.g., loss of autonomy, loss of contact with others, loss of privacy, objectification, loss of human dignity, deception)
- issues with automation in automobiles (e.g., driver safety, privacy, responsibility and accountability)
- issues with law enforcement robots (e.g., surveillance society, privacy vs. security, skilling vs. deskilling, erosion of responsibility),
- issues with autonomous military weapons systems (e.g., erosion of the proportionality principle, responsibility of the “cubicle warrior”, insufficient ability of robots to discriminate, proliferation of autonomous weapons)
- ethical issues caused by novel AI&R technologies in relation to various human rights and ethical principles, such as: the right to the protection of personal data, the right to respect for private life, the right to respect for family life, human dignity, the right to the peaceful enjoyment of possessions, safety, responsibility and liability, the right to freedom of expression, the prohibition of discrimination, access to justice and the right to a fair trial, the right to not be measured, analysed or coached, and the right to meaningful human contact
- ethical issues in relation to government use of AI technologies: privacy, safety, justice, human dignity, autonomy, and control over the technology
- impacts of use of algorithms on human rights and human dignity
- ethical issues a scientist might face, from plagiarism to human subjects to the treatment of data- along with how to handle them.
- impacts on public-well-being, fairness, transparency, safety, consumer and social acceptance

Common values and principles:

- accountability
- accuracy and data integrity
- assistance to colleagues
- avoidance of conflict of interest

- fairness and non-discrimination
- health and well-being
- honesty and truth
- privacy
- professionalism
- respect for the environment/avoidance of such harm
- responsibility
- safety (avoidance of harm/do no harm)
- scientific and research integrity
- shared benefits
- transparency
- trust

The top three most repeated ones in the international search were: safety, health and well-being and privacy.

All relevant documents that were found in the national search and in the international are listed in annex 1 of this report. The partners who conducted the national searches decided for the country about the most relevant documents. For those documents which are very relevant for the SIENNA work the following questions were answered (in some countries only one relevant document was identified, in others five or more):

- Who is the stated audience?
- What definition of AI&R is used in the document?
- What forms of AI&R are described/covered in the document?
- Which ethical issues are addressed in the document?
- How are the ethical issues addressed? Are solutions offered? If so, which ones?
- Format of the document (checklist, continuous text, other)?
- How is the document structured?
- Why is the document important/useful for your country?
- Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.

From all these documents, which are (in view of the partners who conducted the search) very relevant, we selected a few and listed information about those below. Further relevant documents and further information on these documents can be found in annex 1.

Ethics of research in robotics
published by CERNA (France)
This document was developed by CERNA: Research Ethics Board of Allistene, the Digital Sciences and Technologies Alliance (a national advisory group in France) in 2014. This document seeks to cover all ethical issues that robotics imply. It introduces them by presenting the context through a focus on "robots in the society" (Ch 3) CERNA's recommendations fall into four categories:

- a general one (9 recommendations)
- autonomy and decisional capacities (7 recommendations)
- imitation of life and affective and social interaction with human beings (6 recommendations)
- reparation and augmentation of the human by the machine (4 recommendations)

It is an important document for France as it is developed by an important group bringing together a number of French research institutions. It is one of the rare documents engaging with such precision with robotics ethics.
It will certainly be useful for the development of SIENNA codes and framework in relation to robotics as it proposes very precise and thoughtful ethical recommendations on this technology.
Unfortunately there is no English version available.

Research Ethics in Machine Learning
published by CERNA (France)
This document is also developed by CERNA: Research Ethics Board of Allistene, the Digital Sciences and Technologies Alliance (a national advisory group in France). It was published in 2017 in French and English. Ethical issues related to machine learning are described, especially in context of chatbots, autonomous vehicles and robots that interact with people and groups. "For any digital system, the aim should be to embody the properties described in III.1. However, machine learning systems possess certain specificities, described in III.2, which come into conflict with those general properties." (p. 17)
Recommendations are proposed in 6 different themes:

- learning system data (4 recommendations)
- autonomy of machine learning systems (2 recommendations)
- explain ability of learning methods and their assessment (3 recommendations)
- decision-making by machine learning-system (2 recommendations)
- consent to machine learning (3 recommendations)
- responsibility in human-machine learning system interaction (2 recommendations)

It is an important document for France as it is developed by an important group bringing together a number of French research institutions. It engages with great precision in ethical issues related to machine learning and provides detailed and informed recommendations.

Automated and connected driving
published by the Ethics Commission on Automated Driving (Germany)
The Federal Ministry of Transport and Digital Infrastructure in Germany established a Ethics Commission on Automated Driving and published a Code for self-driving computers in 2017. In this code ethical issues related to autonomous driving cars are discussed. The Ethics Commission's report comprises 20 propositions. The key elements are:

- Automated and connected driving is an ethical imperative if the systems cause fewer accidents than human drivers (positive balance of risk).
- Damage to property must take precedence over personal injury. In hazardous situations, the protection of human life must always have top priority.
- In the event of unavoidable accident situations, any distinction between individuals based on personal features (age, gender, physical or mental constitution) is impermissible.
- In every driving situation, it must be clearly regulated and apparent who is responsible for the driving task: the human or the computer.
- It must be documented and stored who is driving (to resolve possible issues of liability, among other things).
- Drivers must always be able to decide themselves whether their vehicle data are to be forwarded and used (data sovereignty).

The Federal Ministry of Transport and Digital Infrastructure's Ethics Commission comprises 14 academics and experts from the disciplines of ethics, law and technology. Among these are transport

experts, legal experts, information scientists, engineers, philosophers, theologians, consumer protection representatives as well as representatives of associations and companies. The Ethics Commission on Automated and Connected Driving has developed initial guidelines for policymakers and lawmakers that will make it possible to approve automated driving systems but that set out special requirements in terms of safety, human dignity, personal freedom of choice and data autonomy. This code is a good example for a code dealing with one specific AI&R field of application and might be helpful for the work in SIENNA.

Robots and surveillance in the care of older - ethical aspects
published by the Swedish National Council on Medical Ethics (Sweden)
"The Swedish National Council on Medical Ethics has, on its own initiative, prepared this report on the ethical aspects of robots and monitoring in the care of elderly people. The aim of the report is to encourage public debate and provide support ahead of decisions on the use of robots and monitoring in health and medical care, and care provided by social services, to elderly people." (p. 1). The Swedish National Council on Medical Ethics is a national advisory group. The document was published in 2014. Questions about what good quality good care and quality care means are discussed and further more:

- fair distribution of resources
- society's interest
- self-determination
- privacy

"The following are the ethical issues highlighted by the Council regarding health robots and monitoring:

- When is it ethically acceptable to use robots and monitoring technology in care of the elderly?
- Relevant issues here include what is meant by quality health and social care, and human needs such as social stimulation.
- How can it be ensured that resources are distributed fairly so that those who are in need of the new technology gain access to it?
- How is the right to self-determination ensured so that people with impaired decision-making abilities receive the care they need and that account is taken of their wishes?
- Can a balance be struck between the invasion of the individual's privacy and the benefit of the technology, and if so, how?
- How can it be ensured that research and development of new technologies is evaluated from an ethical perspective and that ethical assessments are made ahead of the introduction of robots in health and medical care, and care provided by social services?" (p. 2)

The following recommendations are made in the document:

- "The Council considers that robotics has great potential to improve the quality of health and social care. However, the Council considers that there is a need for more research on how different health robots affect people and important values in health and social care."
- "The Council wishes to emphasise the importance of always making an assessment of a health robot's impact on ethical values before beginning to use it in health and medical care, and social services."
- Balance between benefit and invasion of privacy is necessary.

This document is very relevant for SIENNA.

Human Rights in the Robot Age: Challenges Arising from the Use of Robotics, Artificial Intelligence, and Virtual and Augmented Reality

published by the Rathenau Institute (Netherlands)
The Rathenau Institute (a Dutch technology assessment organisation) developed this document in 2017. The report outlines ethical issues caused by novel AI&R technologies in relation to various human rights and ethical issues. The document offers a number of recommendations in terms of policy steps for the ethical issues related to these rights. Its focuses on the impact of various AI&R technologies on human rights and its argument for two novel human rights:

- the right to not be measured, analysed or coached, and
- the right to meaningful human contact.

This document very relevant for SIENNA.

Statement of Ethical Principles
published by the Engineering Council and the Royal Academy of Engineering (UK)
This document was developed in 2005 and revised in 2017. It sets out four fundamental principles for ethical behaviour and decision-making:

1. Honesty and integrity
2. Respect for life, law, the environment and public good
3. Accuracy and rigour
4. Leadership and communication

The four fundamental principles for ethical behaviour and decision-making are supported by examples of how each should be applied. This document is a good example of a well-recognised and accepted Code and is very useful for SIENNA.

Code Of Conduct For BCS Members/BCS Code of Conduct
published by the British Computer Society (UK)
The British Computer Society (known as BCS, the Chartered Institute for IT) published this document in 2015. The BCS is widely recognised as a professional body for IT professionals and computer engineers in the UK. As of 30 July 2018, it has 112 regional and specialist groups, 70,000+ members in its global network, and has 151 countries with members. The Code sets out the professional standards required by BCS as a condition of membership and applies to all members, irrespective of their membership grade, the role they fulfil, or the jurisdiction where they are employed or discharge their contractual obligations. Topics are public interest, professional competence and integrity, duty to relevant authority, and duty to profession. The code prescribes professional standards for IT (information technology) professionals and might be relevant for SIENNA.

The National Artificial Intelligence Research and Development strategic plan (NAIRDSP)
developed by the National Science and Technology Council (USA)
In the document (developed in 2016) machine and deep learning, and a variety of AI implementations, including image recognition and language processing are discussed. Ethical issues regarding design and implementation of AI systems are addressed. Furthermore: research aimed at understanding ethical implications; fairness, transparency and accountability by design; public safety.
See especially “Strategy 3: Understand and Address the Ethical, Legal, and Societal Implications of AI“ (pp.26, 27).
This is a document created by an advisory body of the government aimed at a governmental audience. Its goal is to define a high-level framework that can be used to identify scientific and technological needs in AI. It proposes: further multi-disciplinary research; explicit attention to ethics in design of AI systems and research protocols; developing acceptable ethics frameworks; proactive transparency and explain ability.

Although commissioned by the prior administration, this is a comprehensive and thorough document drawing on a wide range of other sources that seeks to describe a national strategic plan for AI. In a more favourable climate for scientific research, it will undoubtedly be a template for any future U.S government sponsored research effort in the AI field, and is likely an input for ongoing private sector research. This document represents the so-far most developed thinking of the U S government on AI research and national strategy to date.

3.2 National search

3.2.1 Methodology used for the national searches

The national search was conducted by the individual partners. The task leaders from UU and EUREC worked out a guidance document on how to conduct the search in collaboration with TRI and UT (the guidance instructions for the national search can be found in annex 1). This document was developed for the search in all three SIENNA areas (HG, HE and AI&R). We followed a semi-structured methodology in that we gave our partners a plan on how to proceed with the search and reporting, although we informed them, that this methodology can be changed (given that all changes, e.g. change of keywords for the search etc., have to be documented). We prepared presentation which we showed in a Skype call with the partners, to give an overview what we expect from them for the X.3 tasks. During the whole working time on the X.3 tasks UU and EUREC as task leaders answered questions via email and phone. In a second Skype call partners exchanged their experiences with the tasks and had the possibility to clarify their questions. The detailed guidance on how to proceed for the national search can be found in annex 1 of this document

The national search was conducted in 13 countries by 13 different SIENNA partners (in alphabetical order):

- Brazil
- China
- France
- Germany
- Greece
- Japan
- Netherlands
- Poland
- South Africa
- Spain
- Sweden
- UK
- USA

Every partner wrote A summary on his/her findings for HG/HE/AI&R. The summaries were guided by the following questions: What are the most important “take-away” lessons from your search? What are the gaps? These summaries are listed above. In the annex the reader will find tables of all relevant documents the partners identified in their searches and further information and tables in which the most relevant documents are described in more detail (see annex 1).

3.2.2 Summaries of the national searches

Country	Institution	Contruíbutor(s)
Brazil	Universidade Federal do Rio de Janeiro (UFRJ)	Marcelo de Araujo, Clara Dias
China	Dalian University of Technology (DUT)	LIU Hongzuo
France	Sciences Po Paris	Anaïs Rességuier
Germany	European Network of Research Ethics Committees (EUREC)	Lisa Tambornino, Dirk Lanzerath
Greece	Ionian University	Maria Bottis
Japan	Chuo	Hiroshi Miyashita
Netherlands	University of Twente (UT)	Philip Jansen
Poland	Helsinki Foundation for Human Rights (HFHR)	Zuzanna Warso
South Africa	University of Cape Town (UCT)	Jantina de Vries
Spain	University of Granada (UGR)	Javier Valls
Sweden	University of Uppsala	Heidi Howard, Emilia Niemiec
UK	Trilateral Research Ltd (TRI)	Rowena Rodrigues, David Wright
USA	Berkman Klein Center	Adam Holland, Christopher Bavitz

Table 3: List of contributors for the national searches

3.2.2.1 Brazil

For the purpose of this report, the authors gathered some information on current research projects and services that involve the use of robotics and AI systems in Brazil. One team at the Federal University of São Carlos, for instance, has developed an autonomous car.[1] Another team has been working on the use of an AI system to speed up court cases at the Brazilian Supreme Court.[2] The Judiciary itself has also fostered a couple of similar AI projects in order to improve the work delivered by other courts in Brazil.[3] A different team has developed a chatbot that has been adopted by the state of São Paulo in order to provide information on a variety of public services in a quicker and friendly way.[4] The company Portal Telemedicina, founded in 2013, has been using AI systems in order to provide remote medical services and to generate faster and more accurate diagnoses.[5] Although there

[1] BIBLIOTECA VIRTUAL DA FAPESP. "Projeto CARINA - Carro Robótico Inteligente para Navegação Autônoma", available at: http://www.bv.fapesp.br/pt/auxilios/45200/projeto-carina-carro-robotico-inteligente-para-navegacao-autonoma/ [acessed 24 July 2018]. See also program broadcast by GLOBO.COM (15 March 2018), available at: https://www.youtube.com/watch?v=I1TZMVE1UmI [acessed 24th July 2018].

[2] NOTÍCIAS STF. (30 May 2018). "Inteligência artificial vai agilizar a tramitação de processos no STF", available at: http://www.stf.jus.br/portal/cms/verNoticiaDetalhe.asp?idConteudo=380038 [acessed 24th July 2018].

[3] AJUFE – ASSOCIAÇÃO DOS JUÍZES FEDERAIS DO BRASIL. (2 May 2016). "Juízes premiam projeto que propõe criar robôs para analisar petições", available at: https://www.ajufe.org.br/imprensa/ajufe-na-imprensa/6669-juizes-premiam-projeto-que-propoe-criar-robos-para-analisar-peticoes [acessed 24th July 2018].

[4] The chatbot was developed by NAMA (https://nama.ai). The chatbot developed for the government is at: https://www.poupatempo.sp.gov.br [acessed 24th July 2018].

[5] PORTAL TELEMEDICINA: "Inteligência Artificial na medicina: como o TensorFlow é usado", available at: http://portaltelemedicina.com.br/inteligencia-artificial-na-medicina-tensorflow/ [acessed 24th July 2018].

is an increasing interest for the use of robotics and AI systems both in the public and in the private sector, and despite public awareness of some ethical relevant issues at stake here, there are not many normative documents or general guidelines for the use of new technologies in Brazil. Researchers and entrepreneurs have to rely on pieces of legislation that are often out of pace with recent advancements in the domain of robotics and AI[6] And only quite recently (in July 2018) has the Brazilian Senate approved a data protection law. The law has yet to be approved by the President (as of 24 July 2018).

3.2.2.2 China

In recent years, there are four professional organizations and three related national departments in China that are either focused on professional ethics codes related to AI and/or robotics. Two of these documents put forward suggestions and requirements for practitioners and related personnel in these field specifically on AI&R, and their development. Chinese Association for AI makes reference to effects of robots for human society and effects of philosophy for robotics, and General Office of National Health and Family Planning Commission of the People's Republic of China puts forward the minimum requirements for medical institutions and medical personnel to use AI aided diagnosis technology and AI aided treatment technology. Without specific reference to AI or robotics, other documents list some academic norms and some principles for relevant professionals, and also some norms and requirements for intellectual property and for regulating conducts of information processing.

Meanwhile, there are more than a dozen relevant departments and organizations in China have provided policy-makers and the general public with a variety of plans, provisions, guidance's, declarations of ethics, principles for development, relevant laws and regulations, etc. Many documents have put forward corresponding guidance's, provisions or specifications on the specific aspects such as aspects of Internet, big data, intelligent driving vehicles, unmanned aircraft, etc. But the specific policies, regulations, ethical norms and standard systems in accordance with AI&R development still need be improved urgently. China attaches great importance to the risks and challenges that AI&R may bring, actively strengthening proactive precautions and constraint guidance's, minimizes risks, and ensuring the safe, reliable and controllable development of AI&R. In Development Plan for New Generation of AI, the State Council of the People's Republic of China specifically makes a specific time plan. China plans to preliminarily establish AI ethical norms, policies and regulations in some areas by 2020. By the beginning of 2025, laws and regulations, ethical norms, and the political system of AI will be preliminarily established, and the security evaluation and control capacity of AI will be formed. And by 2030, more complete laws and regulations, ethical norms and the political system of AI will be built. And in the aspect of ethics, traditional Chinese culture may be more conducive to the development of Chinese intelligent manufacturing with science, technology and humanity.

In addition, China is actively establishing AI technical standard systems, taking security/ethics standards into the framework of AI standard system, and advising to improve the legal policies related

[6] SENADO NOTICÍAS. (11 July 2018). "Projeto de lei geral de proteção de dados pessoais é aprovado no Senado", available at: https://www12.senado.leg.br/noticias/materias/2018/07/10/projeto-de-lei-geral-de-protecao-de-dados-pessoais-e-aprovado-no-senado [acessed 24th July 2018]. See aslo COUNCIL ON FOREIGN RELATIONS. (30 May 2018). "Brazil Needs a Twenty-First Century Data Protection Strategy. The European Union's General Data Protection Regulation is putting pressure on Brazilian authorities to adopt similar legislation to protect Brazilians' digital privacy", available at: https://www.cfr.org/blog/brazil-needs-twenty-first-century-data-protection-strategy [acessed 24th July 2018].

to security, ethics and privacy, which may be useful in the development of the SIENNA codes and other ethical framework.

3.2.2.3 France

Over the past few years, there have been a number of high level initiatives in France with regards to AI&R. This interest is exemplified by FranceIA, "An artificial intelligence strategy for France" (Synthesis report of the strategy: https://www.economie.gouv.fr/files/files/PDF/2017/Rapport_synthese_France_IA_.pdf) and the 2016 Digital Republic Act. As part of this trend, a number of major reports have been commissioned by the government. Two noteworthy reports are: the 2017 study the Parliamentary Office for the Evaluation of Scientific and Technological Choices (OPECST) entitled "Towards a controlled, useful, and demystified artificial intelligence", the report prepared by the Parliamentary Mission led by the deputy Cédric Villani entitled "Making sense of AI. For a national and European strategy". There is the sense that the country would greatly benefit from this technology economically and scientifically and that it is urgent that it develops its capacity in this direction. All these initiatives and reports note the need to encourage the development of an increased ethical vigilance as well as training and oversight. In that regard, it is important to note the intention to create a national ethics committee for IA in the same way that such committee exists for the health and life sciences (this is one of the proposition from the Villani report). France's Digital Council (CCNum) (https://cnnumerique.fr) is also being given a role increasingly important in relation to the regulation of IA.

Following the document search conducted for this report, one can note a particular focus on the field of application of health in relation to AI &R in France. This is exemplified by the inclusion of IA within the public consultation that took place for the revision of the Law of bioethics shows (https://etatsgenerauxdelabioethique.fr/pages/intelligence-artificielle-et-robotisation). Another important recent development in relation to IA and health data is the creation in 2016 of the SNDS, the National System of Health Data (https://www.snds.gouv.fr/SNDS/Accueil). It brings together the main public health databases and seeks to improve research and medical practice thanks to the use of these data. The CNIL (France's data protection authority) ensures protection of data contained in this database. As part of these development should also be noted the creation of a national collaborative scientific platform "TransAlgo" that seeks to ensure algorithms and data transparency and accountability (https://www.transalgo.org). As it can be observed from the document search conducted for this report, the main groups leading on the ethical aspects of AI & R in France are the following:

- the CERNA (Research Ethics Board of Allistene, the Digital Sciences and Technologies Alliance),
- the CCNE (National Ethics Consultative Committee for Life Sciences and Health), in particular for AI&R in relation to life sciences and health
- the CNIL (National Commission Information Technologies and Liberties), in particular in relation to data protection (Digital Republic Act gave the CNIL responsibility over the ethical issues raised by digital technology).

Finally, it might be important to highlight a research project on ethics and autonomous agents funded by the French Research Agency (ANR): eThicaa (http://ethicaa.org). It started beginning 2014 and is due to run for 55 months. List of deliverables and publications in journals are accessible on the webpage of the project.

3.2.2.4 Germany

There are different German national advisory groups, ethics groups and professional groups, which have influence on the public and political debate on AI & Robotics. Some of them have legal power, others do not. E.g. the German Ethics Council (Deutscher Ethikrat) published recommendations on "big data and health" in 2017. These recommendations may influence the political debate, although they have no direct legal influence. The same applies for documents published by AI & robotics specific professional organisations, e.g. the German Electrical and Electronic Manufacturers' Association (ZVEI) developed a Code of Conduct for Corporate Social Responsibility in 2017. The German Association of mechanical engineering (VDMA) published a position paper on „Security in human-robot-collaboration" in 2016. The German Association for IT, Telecommunications and New Media (Bitkom) developed recommendations for responsible research on AI. These recommendations developed by professional organisations are very broad and have no direct use for the development of the SIENNA codes. Furthermore, a statement published by the German science academy Leopoldina and the G7 academies in 2018 on "Realizing our digital future and shaping its impact on knowledge, industry, and the workforce" might be interesting for the development of the SIENNA codes and other ethical frameworks. In this statement Leopoldina or rather the G7 academies propose principles of actions[7]

There are also relevant professional organisations in Germany, which published no ethical guidelines or codes yet, e.g. the German Association for Robotics (Deutsche Gesellschaft für Robotik) and the German Research Centre for Artificial Intelligence (Deutsches Forschungszentrum für künstliche Intelligenz).

Furthermore, we found in our search documents which are developed by governmental institutions and have direct influence on the development of legal instruments. E.g. the Ethics Commission on Automated Driving, which is part of the Federal Ministry of Transport and Digital Infrastructure, published guidelines for autonomous driving cars in 2018. And the committee for digital issues at the German Bundestag published opinions on AI research.

Unfortunately, no documents were found which could give special guidance on how to write research ethics protocols for research with AI & robotics.

3.2.2.5 Greece

In Greece there is very limited information on ethics and AI&R. The Greek Association for AI has not produced a Code of Ethics. Some Universities teach AI&R and there is an Academy of Robotics in the University of Macedonia in Thessaloniki, but they do not operate under any code of ethics. The Code of Ethics for Computer Scientists is a text of a general nature, whose main principles are applicable also in AI&R.

3.2.2.6 Netherlands

There are five professional organisations in the Netherlands that are either focused on AI and/or robotics or have some relation to these fields. There seem to be no Dutch professional organisations with a primary focus on robotics. Out of the five professional organisations, four make mention of an ethical code or code of conduct, and just three actually have one publicly available on their websites.

[7] https://www.leopoldina.org/uploads/tx_leopublication/2018_G7_Digital_EN.pdf

Two of the codes are by professional organisations for information professionals and one is by a professional organisation for engineers of all disciplines. All of the codes studied have an almost exclusive focus on principles of professional conduct, and they make no explicit mention of either AI or robotics. Just one of the codes makes a reference to the potential effects of members' actions on the common good.

There are three main organisations that provide policy-makers and the general public with information, ethical guidelines and other (policy) recommendations regarding the development and application of a variety of AI&R technologies. The most prolific of these organisations is the Rathenau Institute, which has published reports on the ethical implications of automation in road transportation, the impact of AI&R technology on human rights, and the government use of AI technology, amongst other topics. Many of Rathenau's reports on AI&R contain some ethical guidelines and policy recommendations that could be of use in the development of SIENNA's ethical codes for both fields. Two other advisory organisations, the Netherlands Scientific Council for Government Policy and the Social and Economic Council of the Netherlands, have each published one report that was deemed relevant in this search. Both reports focus on the effects of robotization (and digitisation more broadly) on the future of work and its social and ethical implications.

This search has not turned up any guidance documents on research ethics protocols that address issues in AI&R.

3.2.2.7 Poland

In Poland, there is one professional organisation that has some relation to AI. No professional organisations for robotics could be identified (besides the Polish Society of Robotic Surgery, who however has not published any documents online). The Polish Information Processing Society has adopted an ethics code that contains general ethical principles and guidelines, but no AI-specific provisions. However, it is noteworthy, that according to the ethics code, the purpose of informatics should be to serve other disciplines. Moreover, the document mentions the need to act with respect to human rights. No AI or Robotics-relevant documents on writing ethical codes nor policy statements regarding these domains have been found in the course of this search.

There are advisory groups working at the Ministry of Digitalization on ethical guidelines for AI, however at the time of writing the report no results have been presented.

3.2.2.8 South Africa

Lesson 1 is that there is as of yet very little thinking about or development in AI&R in the country. Whilst there are a few examples of successful companies that have used AI&R, this has not led to a societal discussion about the ethics of these technologies. With exception of the few newspaper and website articles above, very little has been published in the country on this topic, including in terms of codes of conduct or ethics codes.

The SIENNA partner, who worked out the country report for South Africa, spoke to the directors of the Centre for Artificial Intelligence Research or CAIR and they outlined the broad ethical concerns also outlined by Hamman in The Conversation, namely concerns that AI would widen social inequality by increasing wealth in the hands of a few powerful stakeholders. At the same time, they mentioned several examples of how AI can be used to strengthen resource-poor clinics by facilitating diagnosis, predicting non-adherers (e.g. including predicting those mothers who are unlikely to attend prenatal

clinics), and predicting adverse drug responses. Those would all strengthen healthcare and possibly help reduce socio-economic inequality in the country. A second concern they strongly emphasized is the risk that AI would incorporate existing biases and prejudices, including racial and gender bias.

The most important questions surrounding AI in South Africa are to do with harnessing the technologies' potential to reduce health and other socio-economic inequality

3.2.2.9 Spain

Spain has different Royal Academies. The Royal Academy for Morals and Political Sciences published no documents related to AI&R. The SIENNA partner, who developed the country report for Spain, send emails to some of the members with no answer. The same procedural has been done with the Royal Academy for Natural Sciences with the same result. The third attempt was with the Royal Academy for Medicine and one of the members answered saying that is not the duty of the Royal Academies to do this kind of task.
A part of that the National Association of AI and one of the sterling Committee have been contacted and answered that they have not discussed the topic.
For the Google search, the following keywords were used:

- Códigos éticos robot / inteligencia artificial / robótica / aprendizaje automático
- Códigos deontológicos robot / inteligencia artificial / robótica / aprendizaje automático

Using the different combination of the terms by all the 50 first entries and removing the links related to South America, only one result was important to the project.

The search in more than 40 research groups' web pages in order to find out if they have anything related to the project showed out only one declaration about the topic. As the search in data bases and in Google was unsuccessful, emails were send to all relevant research groups. Around 15 answers came back, with the same information but all have the same information: They do not have any code or guideline in their work with AI&R.

3.2.2.10 Sweden

We analysed three documents relevant to AI&R. First one titled "Robots and surveillance in the care of elderly - ethical aspects" was issued by SMER - the Swedish National Council on Medical Ethics, which is a parliamentary advisory body to the government. The document provides relatively detailed description of the types of robots used in the care of elderly, discusses related ethical issues and outlines recommendations. For example in the context of monitoring elderly, the authors suggest, among others: that the individual's consent is obtained voluntarily and that full information is provided on how the monitoring is conducted, who which is authorized to access the information that is registered.

The second document – "Code of honor" issued by "Swedish engineers" provides principles which should be followed by engineers in their work, for example: avoiding harmful effects of tech, transparency of their knowledge.

"National orientation for artificial intelligence" by the Swedish Ministry of Enterprise and Innovation mentions some ethical issues and suggests some solutions which take into account/address these

ethical aspects. These seem to be rather general, for example: it is important that the AI system is carefully designed to prevent malicious behaviour.

There were many documents on AI&R in general developed by different commercial and professional organisations, but most of these addressed the need to promote research and innovation of the field, and any mention of doing this responsibly seemed to have been an afterthought and not presented in any great detail.[8]

3.2.2.11 UK

Using the SIENNA prescribed steps, we researched professional codes and documents from national advisory and ethics bodies in the UK to find relevant documents in AI&R. We first searched for professional organisations, national advisory bodies and ethics bodies using specified search terms[9] using search engines such as DuckDuckGo and Google. Next, we searched[10] the websites of the relevant organisations for ethics codes and guidance documents. Search terms included ethics or ELSI[11]. Articles written by individual authors not part of an official or recognised group or professional organisation or advisory body were excluded.

Three national professional associations related to AI&R in the UK include: the British Computer Society (BCS), the Royal Academy of Engineering and the Institution of Engineering and Technology (IET). National advisory groups and national ethics groups that have offered guidance for AI&R (or technology in general) covering ethical issues include the British Standards Institution (BSI), Engineering and Physical Sciences Research Council (EPSRC), the Engineering Council, the HM Government Digital Service, UK Government (Department for Business, Energy and Industrial Strategy), HM Government Department for Digital, Culture, Media & Sport (DCMS), Parliamentary Office of Science and Technology (POST), House of Lords Select Committee on Artificial Intelligence, British Academy and Royal Society.

We searched for national professional ethics codes using the key words: AI/artificial intelligence/machines/drones/driverless+Codes, Principles/Guidelines, Guidance+UK [England, Scotland, Northern Ireland, Wales], and found eight relevant documents (including two general ones that might apply) for the period 2005-2018. The codes that we found and that target professionals in different disciplines are not restricted by 'who' has created them, i.e., some of the Codes are relevant to professionals and practitioners but were developed by government departments (e.g., Data Ethics Framework, Technology Code of Practice), or by a research funding body, (i.e., EPSRC Principles of robotics, applicable to those who design, sell and use robots), or a regulatory body, e.g., the Engineering Council's Statement of Ethical Principles applicable to engineering professionals. The two codes developed by professional organisations are the BCS Code of Conduct and the IET Rules of Conduct. We also found two general guidelines that are applicable, i.e., BERA's Ethical Guidelines for Educational Research and the Academy of Social Sciences Five Ethics Principles for Social Science Research, applicable to social science researchers.

[8] E.g. https://www.vinnova.se/contentassets/55b18cf1169a4a4f8340a5960b32fa82/vr_18_08.pdf
[9] Search terms: UK+professional organisation/national advisory body/ethics body/ethics council+artificial intelligence/robotics/technology/computers
[10] Search terms: artificial intelligence/AI/robots/automation/machine/unmanned/smart systems/big data+Code/Guidance/Guidelines/Recommendations/Policy
[11] Ethical, Legal and Social Implications.

The Codes identified do not define AI&R but mention or cover various terms related to them.[12] Addressees of the Codes also vary, ranging from information technology professionals, engineers, government departments to anyone working directly or indirectly with data in the public sector.

NAEG documents have been produced by various organisations such as the Parliamentary Office of Science and Technology (POST), The British Standards Institution (BSI), HM Government Department for Business, Energy and Industrial Strategy, Department for Digital, Culture, Media & Sport, House of Lords Select Committee on Artificial Intelligence, British Academy, Royal Society, and the Royal Academy of Engineering. The 12 guidance documents identified cover a variety of topics[13] and related ethical issues. Their addressees include academia, app developers, healthcare professionals, industry, mathematics and computing communities, parliamentarians, policy-makers, regulators, robot designers, and the general public. The most significant document is the House of Lords Select Committee on AI Report, AI in the UK: Ready, willing and able[14], outlines five overarching principles for an AI Code.

In our search for guidance on writing research ethics protocols, we found no guidance specific to AI&R. However, we found a lot of general guidance on writing research ethics protocols at the national level some of which might broadly apply to researchers in AI&R such as the Ethics review the Social Research Association (SRA)'s Ethical Guidelines, and the Scottish Government's Social Research Ethics Guidance and Sensitivity checklist. There is general and discipline-specific institutional guidance on research ethics protocols and templates, but these are not specific to AI and/or robotics.[15]

Gaps, challenges and opportunities

The House of Lords Select Committee on AI report recognises one of the key challenges in relation to multiple ethical codes of conduct is the "lack of wider awareness and co-ordination where the government could help".[16] It recommends, "Consistent and widely-recognised ethical guidance, which companies and organisations deploying AI could sign up to" and a "cross-sector ethical code of conduct, or 'AI code', suitable for implementation across public and private sector organisations which are developing or adopting AI to be drawn up and promoted by the Centre for Data Ethics and Innovation, with input from the AI Council and the Alan Turing Institute, with a degree of urgency 'sector-specific variations using similar language and branding".[17] The Government's response to the Committee's recommendation indicates "high level themes emerging around the ethical and innovative uses of data and AI are not inherently new or unique, but are being amplified through the use of data-driven and AI-based technologies and without committing to an AI code, and it hopes to

[12] E.g., such as new data and techniques, data science, data processors, data science models, machine learning, synthetic data, algorithms, science, engineering and technology, equipment intended for the defence of a nation' physical and cyber-security and data protection , technology, technology projects or programmes, infrastructure and systems, cloud, data and software components, technological developments, procedures and standards.

[13] E.g., artificial intelligence, algorithms in decision-making, automation and the workforce, autonomous systems, biometric technologies, data governance, health and wellness apps, machine learning, robots and robotic devices.

[14] https://publications.parliament.uk/pa/ld201719/ldselect/ldai/100/100.pdf

[15] E.g., Lancaster University, "How to write a research protocol", Undated. http://www.lancaster.ac.uk/shm/study/doctoral_study/dclinpsy/onlinehandbook/how_to_write_a_research_protocol/ ; University of Portsmouth, "Application for Ethics Review – Staff and Postgraduate Students", Undated. http://www2.port.ac.uk/research/ethics/

[16] https://publications.parliament.uk/pa/ld201719/ldselect/ldai/100/100.pdf

[17] https://publications.parliament.uk/pa/ld201719/ldselect/ldai/100/100.pdf

identify measures needed "to strengthen and improve the way data and AI is used by drawing on evidence and insights from across regulators, academia, the public and business and translate these into actions that deliver direct, real world impact on the way that data and AI is used".[18] It would be good for SIENNA to be able to contribute to such efforts and share its research results and findings.

Thus, while we see significant developments in terms of the UK leading its way in discussions on ethical AI and adopting various measures to promote and facilitate ethical AI, it still remains to be seen whether a general/cross-sector ethical code of conduct for AI will see the light of day, though it might be possible with the right political and industry incentives.

3.2.2.12 USA

Although there are no professional organizations in the United States devoted exclusively to AI and/or robotics, ("AI&R"), there are a wide variety of professional organizations whose focus overlaps to some degree, sometimes strongly, with the AI&R fields. For example, the American Association for the Advancement of Science, the National Research Council of the National Academies of Science, Engineering and Medicine, and the Ethics and Emerging Sciences Group, to name only a few, have all begun to devote significant organizational resources to examining the spectrum of issues, including ethics, relevant to AI&R. There are also organizations with a narrower focus, such as the Data Science Association and the Association for Computing Machinery, whose scope will clearly overlap with aspects of AI&R.

Additionally, there are professional organizations such as the American Medical Association and the American Bar Association which, despite having conceptual foci nominally quite different from AI&R, will nevertheless unquestionably have to address AI&R questions as a matter of practice; for example, with robotic surgery and algorithmic sentencing, respectively. Each of these organizations has either a general and comprehensive ethical code with an exclusive focus on principles of professional conduct, or a document specifically targeted to AI&R, or both, as is the case with the American Medical Association. The University of Illinois maintains a comprehensive database of over 2500 ethical codes, searchable by organizational type, of which it is nearly certain many will come to address AI&R (both specifically or by implication) as those fields become more ubiquitous in professional practice.

There is an even wider variety of governmental bodies, academic and policy research centres, and advocacy groups dedicated to providing policy-makers, the private sector, and the general public with information, ethical guidelines and other (policy) recommendations regarding the development and application of a variety of AI&R technologies. Key organizations of this type include: the National Science and Technology Council (NSTC) Select Committee on Artificial Intelligence; the National Science Foundation; the Institute of Electrical and Electronics Engineers ("IEEE"), which has a US branch; the Computing Community Consortium; the Association for the Advancement of Artificial Intelligence; the Belfer Centre for Science and International Affairs; and the Future of Life Institute. There are also various organizations in the AI&R space, such as the AI Now Institute and the Berkman Klein Center and MIT Media Lab's Ethics and Governance of Artificial Intelligence Initiative, that are working on ethics and governance, and that have not yet produced final ethical guidelines or other policy documents, but intend to do so in the near future. Also of note is the fact that there are a few key scholars at institutions in the United States, such as Ryan Calo at the University of Washington,

[18] https://www.parliament.uk/documents/lords-committees/Artificial-Intelligence/AI-Government-Response2.pdf

Kate Crawford at New York University's AI Now and Kate Darling at MIT's Media Lab, among others, who have devoted the bulk of their work to AI&R-related topics, and who are seen as reliable and salutary authorities on these topics.

Several United States academic research centers and governmental organizations have drafted general guideline documents for the creation of ethical guidelines. The National Institutes of Health has released "Guiding Principles for Ethical Research" while the National Academies have published "Identifying and Promoting Best Practices for Research Integrity." The Markkula Center for Applied Ethics and the IEEE have created guidance documents specific to ethical technology practice and to AI&R, respectively, with the Markkula Center producing a suite of tools and documents addressing integrating ethics into virtually all potential areas of practice. Finally, the authors mentioned above, as well as others, have written individually on the topic of ethical design for AI&R at some length.

3.2.3 Challenges during the national searches

In our methodology we defined that we exclude documents written by single authors or author groups. Included were only documents from professional organisations or groups and/or national (ethics) advisory groups. One of the main challenges in the national searches was that it was not always clear what a professional organisation is or rather what counts as a valid group or organisation. This was partially difficult for HG, but especially for HE and AI&R, since in these fields it is not really clear what a professional group might be. We recommended the partners to make use of the column "comments" in these cases and write down their uncertainties regarding these issues there.

Another challenge occurred during the search for guidance documents from research ethics committees (GDREPs), since it turned out that in all three SIENNA areas there are very few such documents available. In some countries the search showed no results.

3.3 International search

3.3.1 Methodology

This section presents the results of the international (including European-level search) for (a) professional ethics codes (b) for AI&R. The review was carried out in July 2018 by Trilateral Research. The review followed the below steps:

1. Search via Google/database search or directly by looking at professional organisations websites such as those of the AAAI, IEEE, ACM, IFR, ACL, and the archives of the International Informatics Institute. For Google searches, we looked at the first 25 results and only looked at documents from a formal body/recognised group or organisation or advisory bodies. The time period covered in the search was 1990's to current. The search terms used in the review were:

    - for Robotics: "robotics" or "robot" or "robots" or "automation" or "machine" or "machines" or "unmanned" or "driverless" or "pilotless" or "drones" AND "recommendations" or "points to consider" or "guidelines" or "guidance" or "code" or "policy" or "ethics protocol" AND international/European

    - for Artificial intelligence: "AI" or "artificial intelligence" or "intelligent agents" or "automation" or "smart systems" or smart information systems" or "big data" AND "recommendations" or "points to consider" or "guidelines" or "guidance" or "code" or "policy" or "ethics protocol" or AND international/European

The search was carried out only in English and used the following inclusion/exclusion criteria:

- Ethics or ELSI had to be in it (but it could be more applied).

- Anything that did not address ethical aspects (i.e., was in the nature of practical standard operating procedures) was excluded.

- Articles written by individual authors who are not part of an official/recognised group/professional organisation/advisory body were excluded (unless commissioned by the relevant body/group/authority).

Tables 1, 2 and 3 in annex 2 present the results of the search.

2. All the documents found were saved on SharePoint (SIENNA project shared space) as PDF documents with the document author, title and year. Document analysis was carried out on the most relevant documents (presented in annex 2, tables 4).

3. A summary was prepared.

3.3.2 Summary of the international search

International professional ethics codes

In our literature review (desktop research[19]), and using the prescribed search terms[20], i.e., artificial intelligence/AI/robotics/drones+professional+ethics+international/European+codes/guidelines, we found a number of relevant documents from a variety of international and European professional organisations ranging from 1992 to present (some were undated). Some of these are presented as 'Codes of ethics', 'codes of conduct' (covering ethical principles), some as 'ethics statements', 'Declarations', 'Guidelines' and others in terms of 'Principles'. Using the SIENNA methodological guidance provided, we analysed 15 such documents relevant to AI&R, to understand them better.

In terms of nature, most of the Codes are voluntary and aspirational (and not all have monitoring or enforcement mechanisms). Some such as the Charter on Robotics and Code of Ethical Conduct for Robotics Engineers which is part of a European Parliament Resolution will have greater influence and potential for impact.[21] In terms of foci, the subject area of each varied: Some documents broadly covered technologies/emerging technologies/computing technologies (while mentioning machine learning and other aspects of AI&R) or AI, others focussed more on specifics, e.g., Simulationist Code of Ethics, the Humanitarian UAV Code of Conduct & Guidelines. The length and structure of such documents also varies (the shortest one analysed was one page) – this depends on their aims (intent), focus and nature of their presentation (statements and declarations were shorter). Some documents were presented in short and long-form. The documents cover topics such as ethics, ethical decision-making, professional conduct, responsible development and use of AI, data and worker rights, data management, robotics engineering etc. Some documents are not 'AI' and 'robotics-specific', but relevant nonetheless, as they are generally applicable and in use (e.g., AoIR Guidelines). Many of the Codes are available in multiple languages (e.g., IEEE-CS & ACM Joint Code of Ethics and Professional Practice for Software Engineering, Asilomar Principles, Humanitarian UAV Code of Conduct).

Aspects of AI&R covered or mentioned include: algorithms, armed autonomous unmanned systems, armed robots, artificial agents, artificial intelligence, AI chat-bots, AI systems, automated systems data, autonomous robots, autonomous system, autonomous weapons, big data, changing technologies, computing, computer system, data, data and machine learning, data-driven AI, emerging technologies, games consoles, identification technologies and applications, intelligent computer systems, intelligent systems, knowledge-based AI military robotics, modelling and simulation products, mobile devices, non-human, autonomous and intelligent agents, smart devices, software systems, machine learning systems, robot space weapons, robotics, self-driving cars, software, systems engineering, tele-operated and autonomous systems, uninhabited systems, unmanned aerial vehicles (UAVs), unmanned aircraft systems (UAS).

[19] We searched the websites of relevant organisations such as the IEEE, AAAI, ACM, SIGKDD, Asian Robotics Society Union (ARSU), International Association for AI & Law, Confederation of Laboratories for Artificial Intelligence Research in Europe (CLAIRE), Association for Computational Linguistics (ACL). The International Federation of Robotics (IFR), SPECIES — the Society for the Promotion of Evolutionary Computation in Europe and its Surroundings, European Association for Artificial Intelligence, European Society for the Study of Cognitive Systems (ESSCS), International Neural Network Society (INNS), European Neural Network Society (ENNS) and the Robotics Industries Association.

[20] Various combinations of the search terms were used.

[21] http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+TA+P8-TA-2017-0051+0+DOC+XML+V0//EN

Common values and principles (those that resonate in three or more of the analysed documents) include:

- accountability
- accuracy and data integrity
- assistance to colleagues
- avoidance of conflict of interest
- fairness and non-discrimination
- health and well-being
- honesty and truth
- privacy
- professionalism
- respect for the environment/avoidance of such harm
- responsibility
- safety (avoidance of harm/do no harm)
- scientific and research integrity
- shared benefits
- transparency
- trust

The top three most repeated ones were: **safety, health and well-being** and **privacy.**

Gaps and challenges

The very existence of multiple international professional ethics codes (while not taking away from the many positive benefits they bring and the values and commitments they represent from their subscribers/followers), presents several challenges.

Codes need clear objectives – in some of the analysed documents, these are explicit, in some less so.

Further, some of the stated objectives are not supported well-enough by means or pointers to interpret or help in their achievement. A Code should not be lengthy but must be clear, precise and useful so that can have a positive effect and application. Codes such as those of the ACM have been recognised as "extensive and well-crafted" and for instance, "among the best-articulated and most relevant to professional involvement with Big Data"[22]. These present good models for emulation.

Another issue is that some Codes are not pragmatic enough and might present several difficulties in implementation. Some codes seem over-ambitious, while others are understated or muted on essential aspects.

Varying interpretations of terminology or ethical principles embedded in Codes is also a recognised challenge.[23]

One of the main challenges for a Code is its continued relevance and sustainability. Many Codes have provisions for feedback and revision, in different formats. For example, the Montreal Declaration embeds an *'I want to share my thoughts'* link, which enables interested parties to provide their opinion

[22] Tractenberg, R.E., A.J., Russell, G.J. Morgan, et al., "Using Ethical Reasoning to Amplify the Reach and Resonance of Professional Codes of Conduct in Training Big Data Scientists", *Science and Engineering Ethics*, Vol. 21, Issue 6, Dec 2015, pp. 1485-1507. https://doi.org/10.1007/s11948-014-9613-1

[23] This point is noted, for example, in the INCOSE Code of ethics. https://www.incose.org/about-incose/Leadership-Organization/code-of-ethics

on one or more of the ethical questions relating to the responsible development of artificial intelligence.[24] Changes to the IEEE Code of Ethics can be made upon meeting of prescribed conditions.[25]

Another challenge and gap are the diversity in monitoring and enforcement. Some Codes, such as the ACM Code of ethics, have well-defined procedures in place for enforcing the Code.[26]

Documents from international advisory/ethics groups (IAEGs)

Our search for documents from international advisory groups led us to find seven key documents related to AI&R: one at the more global level (i.e., COMEST robotics ethics[27]) and the others at the European level (Opinions of the EDPS and the EGE).

These documents focus on various aspects such as: online manipulation and personal data, robotics ethics, coherent enforcement of fundamental rights in the age of big data, personal information management systems, digital ethics (data, dignity and technology), ethics of security and surveillance technologies, ethics of information and communication technologies.

A variety of forms and terms of AI&R are used in the guidance documents, e.g., algorithms, ambient computing, artificial intelligence, automated mechanisms, autonomous drones, autonomous machines, autonomous robotics, autonomous technology, autonomous vehicles, big data applications, data and self-learning algorithms, deepfakes, driverless cars, drones, future internet, internet of things, machine-learning algorithms, new technologies and ecosystems, predictive analytics, robotics applications, robots, statistics, web-based service algorithms etc.

Ethical issues covered include: challenges to the concept of identity, privacy, security, discrimination, control over personal information, transparency and accountability, freedom of expression, responsibility and liability, safeguarding of intellectual property, consumer protection, sustainable and ethical use of big data, information asymmetry between service providers and users, authenticity and integrity of data and processing, concentration and monopoly power (in digital markets), freedom to innovate amid concentration of profit and market power, trust deficit, etc.

Ethical principles highlighted include: accountability, autonomy, beneficence, human dignity, do-no-harm, fairness, privacy and freedom, responsibility, welfare, well-being and/or human flourishing, justice, transparency, efficacy and proportionality.

Relevant international guidance documents on how to write research ethics protocols

We did not find any relevant international guidance documents on how to write research ethics protocols relevant to AI&R.

[24] https://www.montrealdeclaration-responsibleai.com/the-declaration Link to feedback page: https://docs.google.com/forms/d/e/1FAIpQLScuyHQGTrwVEVMu5vxvUpQ5TxJzMPopVyy6PJR6lA2nH-Y8eQ/viewform
[25] https://www.ieee.org/about/corporate/governance/p7-8.html
[26] ACM Code of Ethics Enforcement Procedures. https://www.acm.org/code-of-ethics/enforcement-procedures
[27] http://unesdoc.unesco.org/images/0025/002539/253952E.pdf

3.4 Online survey with REC members

To determine to what extent representatives of RECs are aware of the three SIENNA areas of technologies and ethical issues associated with them, how they currently approach them, and if there are plans to more explicitly feature them (in guidelines for researchers), we developed and sent out an online survey. We decided to develop one survey for all three SIENNA areas together and worked out 18 questions. Most of them could be answered by multiple choice. The full list of questions and answers can be found in this document in annex 3.

Based on the experience that there is a much higher response rate by online surveys, compared to questions send via email or in a document, we created an online survey via google forms. With the time allotted to this task in view, we decided to send the online survey first only to the members of the European network of research ethics committees (EUREC). EUREC members have a broad expertise in research ethics and come from different European countries, which guarantees a good geographic distribution. Although the RECs represented in EUREC are all focused on medical and bioethics. Sending the survey to the EUREC members can be seen as a first round. At a later point we may send this survey, or a revised version, to members of other research ethics committees or experts, which focus also on other research fields.

The online survey was developed with Google forms in June/July 2018 and distributed by EUREC to its members in August 2018 by sending a link via email. Unfortunately, August is for many people summer holiday time, which is likely to have impacted on the response rate. However, due to the deliverable deadline of 1st October, we were not able to send out the survey earlier or later. The mail was sent to 30 EUREC members and 13 respondents completed the online survey (after a reminder).

The majority of the respondents were slightly aware of technologies in Human Genomics, Human Enhancement and AI & Robotics. A few REC members indicated they were fully aware of technologies in HG. No one was more than slightly aware of technologies in HE and AI&R. Furthermore, the majority of respondents were slightly aware of the ELSI relating to HG, HE and AI. Only a few of the REC members who participated described themselves as experts in all three SIENNA areas. The answers to the question “Does your REC address or offer any special guidance for researchers working in HG/HE/AI&R” showed that most RECs offer no special guidance (HG: 75% no, HE: 93% no, AI&R: 86% no).

One REC member stressed that guidance documents on how to assess research ethics protocols are not needed, since general principles of research ethics would apply in any case Other members pointed to specific documents that have been developed by (national) committees on genomics.

To the question if there are any future plans to deal with the ELSI of HG, HE and AI&R we received the following answers. Please note that identifying details such as locations have been coded:

Human Genomics:

- “RECs normally have limited control on the researches submitted to them. The region around the [X] presents itself as the [important health area]. This is therefore likely that there will be increased research activities in this field. The REC will then adapt itself to this evolution (see remarks above).”
- “we have published guidelines”
- “We plan to help researchers to balance health needs and risks of high expectations, exploitation”

Human Enhancement:

- "It all depends on what is meant by human enhancement. Advance research is done on exoskeleton and repairing brain damages. There is also a lot of activities around doping. This is therefore likely that there will more activities in this field in the future (see remark on human genomics)."

AI & Robotics:

- "RECs normally have limited control on the researches submitted to them. The region around the [X] presents itself as the "important health area". This is therefore likely that there will be increased research activities in this field. The REC will then adapt itself to this evolution (see remarks above)."
- "[Y] is organising a symposium, specifically designed for members of the [country] ethics committees, on ethical, legal and social issues of artificial intelligence, in [Z] in 2018"
- "Topics like data protection and validation of research are more important in big data"

To the question if the REC members think there is a need to offer additional guidance for people doing research in HG/HE/AI&R we received the following feedback:

Human Genomics:

- *"As recent (and past) history, most abuses do not happen due to a lack of norms but rather a lack of consideration for them and their underlying principles. Producing more norms has been a trend in research ethics and regulation since WWII. As Jay Katz said in 1969: "The proliferation of such codes testifies to the difficulty of promulgating a set of rules that does not immediately raise more questions than it answers. At this stage of our confusion, it is unlikely that codes will resolve many of the problems, though they may serve a useful function later. Even the much endorsed Declaration of Helsinki – praised, perhaps, because it is the newest and therefore the least examined – will create problems for those who wish to implement it".* There has been limited progress in raising the ethical mentality within research institutions. Of course, this would be less lucrative for ethics centers as the industry and others are less likely to finance virtues behaviour rather than workshops and other publications."
- "There is a need for the informed consent in this field"
- "risk management, realistic expectations"
- "Ethically difficult issue with rapid development"

Human Enhancement:

- "Not only the same remarks apply than for human genomics, but the very concept of "human enhancement" is at best confusing, at worst the entry door to totalitarism. The very idea that humans need to be enhanced is worrying, especially if you refer to the previous time in history when similar proposals were formulated and, even worst, tested. As Hans Jonas said in 1969 (again), ""Let us not forget that progress is an optional goal, not an unconditional commitment, and that its tempo in particular, compulsive as it may become, has nothing sacred about it". The best guidance in fact would be to explain to researchers why "human enhancement" should be banned as a concept."
- "a guide for REC members regarding the ethical concerns such research projects may raise and possible approaches to deal with them could be useful"
- "The knowledge about these issues and their development is scarce. Identifying the ethical problems they pose is the first step"
- "risk Management, use and abuse,"
- "It is neccesary to draw a line between ehancement and mere addiction to anything new"

AI & Robotics:

- “a guide for REC members regarding the ethical concerns such research projects may raise and possible approaches to deal with them could be useful”
- “The knowledge about these issues and their development is scarce. Identifying the ethical problems they pose is the first step”
- “consequences of automated decision support”
- “Quite dangerous research with unpredcitable progress”

Furthermore, our last set of questions showed us that almost all respondents think that there is a need to offer additional education and training for REC members to learn more about the ELSI in HG, HE and AI&R.

4. Conclusion

This report surveyed research ethics protocols and professional ethics codes in different countries and internationally, and determined to what extent and how they refer explicitly or implicitly to AI & robotics. The national and international search for professional ethics codes and documents from ethics advisory bodies brought many results. We also interviewed representatives of research ethics committees to determine to what extent they are aware of these technologies and ethical issues associated with them, how they currently approach them, and if there are plans to more explicitly feature them. The analysis of survey results informed many of the finings in the current report, however, this is still an ongoing work and further results are expected. The relevant documents and their usability for SIENNA will be analysed in more detail as well. At the moment it can be concluded that the following findings provide immediate relevance to the development of criteria on SIENNA guidelines and codes for AI&R.

Document analysis findings

In the national search and in the international search a number of relevant codes from a variety of national, European and international professional organisations could be identified. These documents were not all titled as 'Codes of ethics' or 'codes of conduct', some were named as 'ethics statements', 'Guidelines' or 'Declarations'. While we found a lot of relevant professional codes and documents from ethics advisory bodies, we found fewer guidance documents on how to write research ethics protocols for researchers doing research in AI&R. Our online survey with REC representatives showed that most RECs address or offer no special guidance for researchers working in AI&R. Although most REC members think there is a need to close this gap.

There is also a noticeable correlation between the amount of ethics codes and governmental initiatives on the national level. Such initiatives also stimulate the production of ethical guidelines focusing on results relevant to policy guidelines and regulations. China, France, The Netherlands, UK, US. Most of the codes that were found are not legally binding, although some of them have potential to become law or at least influence the law, e.g. the *Charter on Robotics and Code of Ethical Conduct for Robotics Engineers* which is part of a European Parliament Resolution, found in our international search

In the national searches a lot of codes and documents from national ethics groups could be identified that are in some sense relevant for AI&R, although have a merely broad focus, e.g. in Brazil there is a Code of conduct developed by the *Brazilian Association of Software Companies*, the Chinese partner found a *White Paper on the Development of New Generation of Artificial Intelligence* and the *German Electrical and Electronic Manufacturers' Association* published a Code of Conduct for Corporate Social Responsibility· These are examples for codes with a very broad focus, and generally professional codes of conduct are lacking specific AI focus. Despite a noticeable appreciation of different applications in sector specific solutions, definitions of AI tend to be intentionally broad 'catch all' terminology.

Examples of these are very broad definitions of algorithms, automation and autonomous systems. Such an approach tends to result in a tension between attempts to ensure longevity of definitions and specificity of recommendations that is likely to persist. This may also present certain obstacles in the realization of ethical guidelines on the education of policy makers and general public on specific technical aspects of AI and robotics. There is only a handful of documents focused on robotics ethics

which engage with the topic with a precision and depth, providing both general guidance and applied recommendations.

Most documents analyzed in the report aim to map values, norms, and ethical principles relevant to the field of AI&R. Few documents go beyond formulation of general principles and aim to address potential value conflicts, focusing on such measures as increased transparency in research and development; interdisciplinary studies; risk forecasting; broader public deliberations on the development of AI&R. Overarching topic recurring both in sector specific and general normative documents is a set of data-centred concerns. These include such issues as: collection of personal data; accuracy of data models; ethical issues of data interpretation; data ownership; data use fairness. Other overarching set of concerns found in most of the analyzed documents regards the issues of autonomy: desirable and acceptable levels of machine autonomy; preservation of human autonomy; responsibility distribution in autonomous systems.

The key distinction between ethical approaches the analysed documents lies on the spectrum of recommendations ranging from general to sector-specific guidelines and codes. There is a noticeable variation in the level of development in terms of depth and practical applicability between general AI&R normative documents and sector specific guidelines. Some more detailed recommendations and principles can be found in guidelines focusing on the ethics of self-driving vehicles that look beyond the mapping of relevant ethical issues and propose principles aimed at value conflict resolutions such as positive balance of risks, prioritization of human life and health, liability attribution tools.

Some of the most in-depth guidelines are found in medical sector. These recommendations largely aim to incorporate medical applications of novel technological solutions within the existing ethical frameworks focusing on such issues as consent, privacy, human autonomy. There are fewer normative documents in medical sector aiming to translate ethical guidelines into wider technological contexts such as digitization of healthcare, automation. Some noticeable exceptions present considerations on how duty of care can be translated into telemedicine contexts and robotic carers, giving rise to novel ethical concerns such as ethics of automated care as a substitution for human care. Robots and surveillance in the care of older - ethical aspects published by the Swedish National Council on Medical Ethics (Sweden). Latter concern is also mirrored in a more general context of AI applications formulated as a right for a meaningful human contact. Human Rights in the Robot Age (The Netherlands).

Another key distinction can be drawn between the different types of approaches to the mitigation of ethical issues. Most of the proposed measured tend to fall into the two different types of approaches. First one is a mitigation approach that focuses on value conflicts and public acceptance and ultimately enabling of positive benefits of AI&R. Second one is a prohibition (constraining) approach including proposals on the sector-wide (autonomous weapons) and purpose prohibitions (algorithmic discrimination) of AI&R technologies, focusing on the fundamental human rights and corresponding values. This distinction can also traced in the mapping of values and ethical principles found in the analyzed documents.

Principles and values

Given that many of the analysed documents do not explicitly specify the use moral terminology, often using moral terms as a broad labels, it is helpful here to provide some basic distinctions. Often such labels serve as a placeholders denoting broad areas of interrelated ethical concerns, encompassing corresponding values, principles and norms. Broadly, the findings of the report can be placed in the two groups of ethical concerns characterized in moral theoretical frameworks as

patient-based and agent-based. Focus of patient-based approaches lies with the rights that ought to be preserved or protected, and corresponding values i.e. privacy, freedom, autonomy. These approaches have direct relevance to the development of policy proposals and relevant legislation. Agent base approaches on the other hand focus on the values mapping to the duties of moral agents, their responsibilities and obligations, such as honesty, integrity, accuracy etc.

Moral values as general abstractions of goodness or rightness also need to be distinguished from principles which are prescriptive statements, often derived from values. And both of these also need to be separated from the ethical issues that sometimes can be highlighted with the same labels as values and principles. For instance privacy as moral value is distinct from specific principles of privacy protection that can vary across technological and situational contexts. Accordingly, taken as an even broader label for a set ethical concerns privacy can encompass moral hazards and risk such as data breaches, profiling, surveillance etc that ought to be prevented. Nevertheless, provided a broad conceptual overlap and cross-references between the use of terminology it was possible to highlight key types of moral concerns including respective values and sets of principles.

Rights focused values

The report has identified three most often cited values among all types of ethical concerns corresponding to the relevant rights and principles:

- **Safety** as a value and a fundamental human right includes a right to life, a right to the integrity of the person, and a right to security and prevention of harm;

- **Health and well-being** is a closely related area of ethical concerns including rights to physical and mental health as well as broader value of well-being as a morally desirable condition;

- **Privacy** as a human right and a moral value in the context of referenced documents primarily concerns informational privacy and associated right to private data protection, but it also includes right to bodily privacy in particular contexts;

Other values identified in this report that fall into the group of rights focused approaches include:

- **Fairness and non-discrimination** as values and principles do non necessarily correspond to specific rights but concern with fair and equal distinction of rights;

- **Shared benefits** is a closely related set of concerns regarding respect for different values that can be at stake for the different actors affected by the development and application of technologies;

- **Respect for environment** is a broad moral value and a moral goal corresponding to the prevention of environmental harm or active promotion of environmental well-being;

Apart from these particular interest presents arguments for two novel human rights: **the right to not be measured**, analysed or coached, and **the right to meaningful human contact**.

Agent focused values

Two key moral values identified in the analyzed documents that fall into the set of agent based ethical concerns:

- **Responsibility** is a key moral value and also a set expectation for moral agents to perform certain actions towards entities they bear responsibility for;

- **Accountability** is a related value that translating into the principles that can help to hold to account the decision making process, an issue crucial in the context of AI;

- **Transparency** refers to the broad value and obligations of moral agents to ensure that the inputs, operations, and purposes of AI applications should be knowable and understandable to the affected parties and stakeholder;

Other identified values falling into the scope of agent centered ethical concerns present overlapping but distinguishable sets:

- **Accuracy** mostly refers to duties and obligations of researcher regarding good data governance practices (i.a. accurate data model representations);

- **Assistance to colleagues** is a set of responsibilities relevant in a wide range of technological contexts;

- **Avoidance of conflict of interests** mostly refers to undesirable conflicts between moral values and other interests of different stakeholders involved (i.e. economic consideration);

- **Honesty and truth** are important moral values translating into professional obligations;

- **Professionalism** as a value and set of principles encompass both general professional obligations and sector specific ones;

- **Scientific and research integrity** refers to the commitment of moral agents to moral values carrying key importance in the context of scientific work;

- **Trust** is a broad and multifaceted moral value in the context of AI&R refers mostly to the criteria of trustworthiness for the technological applications and responsibilities of relevant moral agents to deliver these criteria;

Some implications for ethical guidelines

On the basis of report analysis it has been concluded that the development on the SIENNA codes and guidelines for AI&R should be guided by the following criteria. These are not value specific approaches but meta level guidelines that should help to mitigate identified gaps and challenges in the analysed normative documents:

1. The focus of the SIENNA codes and recommendations for AI&R needs to be clear. One possibility is to develop codes and guidelines with a broad focus, another possibility is to develop codes and guidelines for different application areas, e.g. AI&R in health/medicine, AI&R in military or AI&R in everyday life. This also requires clear choice of the level of abstraction in the definitions of technology and clear justifications for the choice of terminology in the specific code and guidelines.

2. Codes and guidelines need clear objectives. To have a positive effect, a code or a recommendation must be precise and useful. This means that codes and guidelines should go beyond mere mapping of relevant values but also anticipate potential values conflicts and present specific principles aimed at the resolution of value conflict.

4. Ethical principles should be used. The use of these principles in codes and recommendations needs to be clear in terminology. There should be no room for varying interpretations of terminology. Some preliminary mapping of values, principles and key moral concerns is provides in the current conclusion. Future guidelines need not only to ensure clarity of moral terminology but also aim to avoid potential conceptual slippage that may occur the interdisciplinary studies.

4. A code or a recommendation must be pragmatic. In the international search, codes were found that are not pragmatic enough and might present several difficulties in implementation. Pragmatism in this context does not mean lowering of moral standards for the purpose of the ease of their implementation. This principle rather requires a sober assessment of the constraints and affordances of concrete technological solutions, necessary for the pragmatic ethical evaluation.

5. The codes and recommendations must entail a plan on sustainability. In the search codes were found that have provisions for feedback and revision, in different formats. This approach aims to ensure relevance and longevity of the normative documentation in the context of rapid technological changes. Secondly, this criterion ensures adherence to the principles of wider stakeholder participations highlighted in this report.

Annex 1: National search

4. Guidance for the national search

The national search was guided by the following phases and steps, which were shared with the partners.

Persons conducting the search who are not familiar with each area of technology were asked to do some preparatory work before starting with the search: they may want to re-read part of the Deliverables 2.1, 3.1, 4.1 (State-of-the-art review of the three SIENNA areas), as needed and/or use Wikipedia in the country's language(s) and in English to help with the translation of some of the key words mentioned below.

The following methodology was suggested to all partners:

PHASE 1: Conduct the search for **professional ethics codes** and documents from **national advisory/ethics groups** and identify the most relevant documents. From these documents you will fill in the tables at the end (in this report we will present the results documented in the tables).

#	Step name	Details
Step 1	Search via national associations/societies Note to all: This approach may be best suited to Genomics. So, if you find nothing for HE or AI& R, please move on to Step 2 (search via Google/Database)	A. Find national professional associations for the area of technology ▪ for HG see national associations here: https://www.eshg.org/76.0.html (choose 1-3 groups depending on how many exist) ▪ for HE: none per se, but if you like, you can look at National Neuroscience groups etc. ▪ for AI&R: see SATORI reports on how ethics assessment is carried out in different countries: http://satoriproject.eu/work_packages/comparative-analysis-of-ethics-assessment-practices/ (Annex 4) or see The European Association of AI: https://eurai.org/organisation/member-societies or see the International Federation for Robotics: https://ifr.org/members-list
		B. Find national advisory groups, or national ethics groups that offer ethical guidance for these areas of technology i. For example, in Sweden, there is "SMER" The Swedish National Council on Medical Ethics which puts out guidance documents. http://www.smer.se/ ii. You can find these in different ways:

		1. Search for "name of country + national + group or council or synonym + ethics or advisory or synonym"
		C. Once at the website look for documents for each field of technology
		D. If you don't find anything through A or B, go directly to Database search below in Step 2
		E. For all documents, save all relevant documents (up to 10 per tech) as PDF or word file in a folder (which we will ask you to place on SharePoint once you are done), save as Name of doc + organisation, topic, year. List all Professional Ethics Codes (PECs) documents you find in TABLE 2
Step 2	Search via Google/Database search	A. Databases to search: ▪ Google as main database (use google.com or your national google page) ▪ Log out of your personal google account ▪ Use specific databases if available ○ e.g. specific database for genetics is POPGEN http://www.popgen.info/ ○ e.g. in Sweden we also have CODEX, which is a compilation of important ELSI guidelines and laws. You may have something similar in your country? http://www.codex.vr.se/en/index.shtml ▪ pages/search results to be read: Look at first 50 results ▪ exclude individual authors, the documents must be from a formal/recognized group or organization. ▪ Time period: No time period restrictions but for Genomics and HE focus on 1998-2018, for AI/R focus on most recent ▪ Keywords: make sure to note these in your report in your language □ HG: → genomics or Genetics or biobanks or registries or pharmacogenomics or pharmacogenetics, or genetic patents or gene editing AND "recommendations" or "points to consider" or

		“guidelines” or “guidance” or “code” or “policy” AND your country → only if you find no documents with the above searches, then use “biomedicine” or “biomedical research” HE: → “enhancement” or “human enhancement” or “neuro-enhancement” or “human augmentation” AND “recommendations” or “points to consider” or “guidelines” or “guidance” or “code” or “policy” AND your country → “lifestyle drugs” or “biohacking” or “non-therapeutic” or “beyond therapy” or “physical performance enhancement” or “image and performance enhancing drugs” or “nootropics” or “smart-drugs” or “designer drugs” → if none, then use “biomedical research” and check whether there is implicit mentioning AI&R: → for Robotics: “robotics” or “robot” or “robots” or “automation” or “machine” or “machines” or “unmanned” or “driverless” or “pilotless” or “drones” AND “recommendations” or “points to consider” or “guidelines” or “guidance” or “code” or “policy” AND your country → for Artificial intelligence: “AI” or “artificial intelligence” or “intelligent agents” or “automation” or “smart systems” or smart information systems” or “big data” AND “recommendations” or “points to consider” or “guidelines” or “guidance” or “code” or “policy” AND your country ▪ Languages: local (only English if needed) ▪ inclusion/exclusion criteria: o inclusion: any ELSI (ethics must be in it, but it can be more applied) o exclude anything that does not address ELSI, e.g. just practical SOPs

		○ exclude articles that are written by individual authors who are not part of an official /recognised group/professional organisation/advisory body. If, in your country, individual author recommendations are important, you can include these but flag them and explain why they are important.
		B. Save all relevant documents in SharePoint (max 15 per tech) as PDF or word, save as Document name + organisation, topic, year.
		C. List all PECs in TABLE 2 and all NAEGs in TABLE 3, and if, per chance, you found any guidance documents on how to complete an ethics application for a research ethics committee you would put these in TABLE 4 (GDREC). Estimated time allotted per tech: roughly half a day
Step 3 **OPTIONAL**	Contact experts in your country who work in each field (PLEASE NOTE THAT THIS STEP IS OPTIONAL)	A. If you decide to do this step, you can also do this step in parallel with steps 1 and 2 above. B. Via a search of the literature, or Google, or your professional contacts, contact via email or phone, researchers in your country who work on the ELSI of the different areas of technologies C. Ask them if they are aware of any ELSI guidance documents from: national professional organisations and/or from national ethics groups, and/or if they know of guidance docs for research ethics protocols in your country. D. Indeed, we should not get too bogged down with categories of documents, if the source is too complicated to explain/understand, you may want to simply ask for any important ELSI guidance in your country on each area of tech. E. See example email on the last page of this document. F. Again, save all documents, see how above. G. Fill in the appropriate table based on document type.
Step 4	Document Analysis	A. Choose for each area 5-15 document that is specific for the area (PEC or NAEG) a. If you need to select from a large number of documents, we would like you to select based on the importance of the document in addressing issues

	Note to all: we allot on average 1.5 - 2 hours per document to analyse. If you deem more time needed to analyse more general documents this is fine to have less documents analysed, just explain it. For example, we expect more specific docs for HG where it may be easier to grasp the scope faster than more general documents addressing larger areas.	that are particularly relevant in your country for that area of technology. b. For Genomics, we ask you to choose one document each for: genetic testing, genetic screening, pharmacogenetics/pharmacogenomics, databases/bioabanks, patents, and gene editing etc…. See instructions for tables 5 B. Answer for these documents the questions asked in the TABLES 5-7.

Phase 2: Conduct the search for documents for **guidance on writing research ethics protocols (REPs)** and identify the most relevant documents

#	Name	Description
Step 1	Find national REC in your country	– if it is a European country, you can use: http://www.eurecnet.org/information/index.html – read on the REC system(s) in your country. – Based on that, choose a REC that is national or most over-reaching/influential. – If your country does not have national RECs, then you can choose a regional REC. Please note that. – for non EU countries (or in case you found nothing on the EUREC page, you will have to search via Google and/or ask someone at your university to explain a bit more about the RECs in your country.
Step 2	Search for guidance on national REC page	Look for documents that offer guidance/information on how to fill out an ethics application.
Step 3	Document Analysis	Choose for each area one document that is specific for the tech area + ELSI.

		For each relevant REC doc, keep doc as word or PDF, REC name+ year + subject and list it in TABLE 4 Answer for these three documents the questions asked in the TABLE 5-7

5. Detailed results of the national search in the different countries

In the following you find the detailed results of the national search as they were prepared by the SIENNA partners.

5.1 Brazil

TABLE 1: INDIVIDUAL AND COUNTRY INFORMATION

Names and emails of persons who did the work (if different from above)	Dr. Marcelo de Araujo / Dr. Maria Clara Dias
Your organisation	UFRJ – Universidade Federal do Rio de Janeiro
Your country (again)	Brazil
Search conducted in which language	Portuguese
Acknowledgements (any researcher who helped you to complete this task)	Fabiana Pompermayer (UFRJ, Doctoral Candidate in Bioethics & Health Policy)

TABLE 2: LIST OF ALL RELEVANT PROFESSIONAL ETHICS CODES

SIENNA area	Title of document (original + English translation)	URL	Year	Author/organisation	Stated audience	comments
HG / HE / AI&R	Rigor e Integridade na Condução da Pesquisa Científica - Guia de Recomendações de Práticas Responsáveis (Rigour and Integrity in the Pursuit of Scientific Research. A Guide with Recommendations for Responsible Practices)	http://www.abc.org.br/IMG/pdf/doc-4559.pdf [13p.]	2013	ABC – Academia Brasileira de Ciências http://www.abc.org.br (Brazilian Academy of Sciences)	Researchers; doctoral and postdoctoral students	Very general. The document does not address specific question relative to the responsible use of HG, HE, AI&R.

AI&R	Código de Conduta (Code of Conduct)	http://abep-tic.org.br/codigo-de-conduta/ [5p.] [There is no direct link to the PDF file]	not informed	ABEP – Associação Brasileira de Entidades Estaduais de Tencologia da Informação e Comunicação http://abep-tic.org.br (Brazilian Association of State Entities for Technology, Information and Communication) NB: the word "state" refers here to the unities of the federation, and not to the Brazilian state as a whole.	Computer scientists; researchers; entrepreneurs	Very general. The association promotes the use information technology for the purpose of public policies, but does not specfically address AI&R.
AI&R	Código de Ética e Conduta (Code of Ethics and Conduct)	http://central.abessoftware.com.br/Content/UploadedFiles/Arquivos/codigo-de-etica-e-conduta-da-abes.pdf [20p.]	2018	ABES – Associação Brasileira das Empresas de Software http://www.abessoftware.com.br (Brazilian Association of Sofware Companies)	Computer scientists; researchers; entrepreneurs	The code is very comprehensive, but does not address specific issues relative to the responsible use of AI&R.
AI&R	Código de Ética e Conduta (Code of Ethics and Conduct)	http://assespro.org.br/biblioteca/documentos/2016-10-26-codigo-de-conduta-das-empresas-	2011	ASSESPRO – Associação das Empresas Brasileiras de Software e Serviços de Informática	Affiliated members	The code is very general.

		de-brasileiras-de-tecnologia-da-informacao/ [6p.]		http://assespro.org.br (Brazilian Association of Information Technology Companies)		
HG / AI&R	Código de Conduta (Code of Conduct)	https://www.abimed.org.br/files/etica/abimed_codigo_conduta_2018_pt.pdf [21p.] [Text in Portuguese] https://www.abimed.org.br/files/etica/abimed_codigo_conduta_2018_en.pdf [21p.] [Text in English]	2018	ABIMED – Associação Brasileira da Indústria de Alta Tecnologia de Produtos para Saúde https://www.abimed.org.br (Brazilian Association of of Industries of High Technlogy Health Products)	Computer scientists; telemedicine professionals; researchers; entrepreneurs	The code is quite comprehensive and shows some concern over the storage of personal data, but does not specifically address AI&R.
AI&R	Código de Ética (Code of Ethics)	https://brasscom.org.br/wp-content/uploads/2017/02/C%C3%B3digo-de-%C3%89tica-Brasscom-v20-site.pdf [7p.]	2017	BRASSCOM – Associação Brasileira das Empresas de Tecnologia da Informação e Comunicação https://brasscom.org.br (Brazilian Association of Companies of Information and Communication Technology)	Computer scientists; researchers; entrepreneurs	The code is rather general and does not address AI&R.

AI&R	Código de Ética Profissional da Engenharia, da Agronomia, da Geologia, da Geografia e da Meteorologia (Professional Ethics Code of Engineering, Agronomy, Geology, Geography and Meteorology)	http://www.confea.org.br/media/codigo_etica_sistemaconfea_8edicao_2015.pdf	2014	CONFEA – Conselho Federal de Engenharia e Agronomia (Federal Council of Engineering and Agronomy)	Engineers	The document is very general.
AI&R / HE	Código de Ética dos Profissionais das Técnicas Radiológicas (Code of Ethics of Radiology Professionals)	http://conter.gov.br/uploads/legislativo/codigodeetica.pdf [14p.]	2011	CONTER – Conselho Nacional de Técnicos em Radiologia http://conter.gov.br (National Council of Radiology Professionals)	Radiology professionals	The document is very general and does not mention, for instance, fMRI or its possible use in the domain of brain machine interface research.
AI&R	[document 1] Comissão de Ética Profissional. Regimento 15 de julho de 2013 (Board of Professional Ethics. By-Law 15 July 2013) and Código de Ética do Profissional de Informática, 15 de julho de 2013 [document 2] (Code of Ethics of the Informatics Professionals)	http://www.sbc.org.br/2-uncategorised/1280-sociedade-brasileira-de-computacao-apresenta-a-criacao-de-codigo-e-da-comissao-de-etica [this page leads to 2 documents] [document 1] http://www.sbc.org.br/jdownloads/03.regimento_da_comissao_de_etica.pdf [3p.]	2013	SBC – Sociedade Brasileira de Computação http://www.sbc.org.br (Brazilian Computer Society)	Computer and information research scientists; computer technicians	Very general.

		[document 2] http://www.sbc.org.br/jdownloads/02.codigo_de_etica_da_sbc.pdf [1p.]				
HG / AI&R	O Código de Ética da IMIA para Profissionais de Informática em Saúde (The Code of Ethics of the IMIA for Health Information Professionals)	http://sbis.org.br/images/ProTics/Codigo_Etica_IMIA_Brasil.pdf [11p.] NB: This document is the Brazilian version of this international ethics code: The IMIA Code of Ethics for Health Information Professionals http://imia-medinfo.org/wp/wp-content/uploads/2015/07/IMIA-Code-of-Ethics-2016.pdf	not informed	SBIS – Sociedade Brasileira de Informática em Saúde http://www.sbis.org.br/index.php (Brazilian Society of Informatics and Health)	Health professionals; computer scientists; physicians; telemedicine professionals	The document is very general.

TABLE 3: LIST OF ALL RELEVANT DOCUMENTS FROM NATIONAL ADVISORY/ETHICS GROUPS

SIENNA area	Title of document (original + English translation)	URL	Year	Author/organization	Stated audience	comments
HE	Código Brasileiro Antidopagem	http://www.abcd.gov.br/arquivos/Cdigo_Brasileiro	2016	ABCD – Autoridade Brasileira Controle de Dopagem	Professional athletes; sport	Forbids the use of performance enhancing

	(Brazilian Anti Doping Code)	_Antidopagem_Retificado (1).pdf [94p.]		http://www.abcd.gov.br/legislacao (Brazilian Anti Doping Authority)	associations, coachers, etc.	substances. Athletes who need substances that have the potential for performance enhancement must apply for a TUE (Therapeutic Use Exemption).
AI&R	Requisitos Gerais para Aeronaves não Tripuladas de uso Civil (General requirements for the operation of unmanned aircrafts for civil use)	http://www.anac.gov.br/assuntos/legislacao/legislacao-1/rbha-e-rbac/rbac/rbac-e-94-emd-00/@@display-file/arquivo_norma/RBACE94EMD00.pdf [26p.] Source page: http://www.anac.gov.br/assuntos/legislacao/legislacao-1/rbha-e-rbac/rbac/rbac-e-94-emd-00	2017	ANAC – Agência Nacional de Aviação Civil http://www.anac.gov.br/ (National Civil Aviation Agency of Brazil)	Drone pilots	This document rules the use of drones in Brazil. The operation of autonomous drones is forbidden (p. 8, iv, c).
AI&R	Resolução CFM nº 2.178/2017 (Resolution CFM nº 2.178/2017)	https://sistemas.cfm.org.br/normas/visualizar/resolucoes/BR/2017/2178 [4p.]	2017	CFM – Conselho Federal de Medicina http://portal.cfm.org.br (Brazilian Federal Council of Medicine)	App developers; physicians; telemedicine professional organizations	The document establishes general ethical guidelines for the use of mobile phone apps that offer health consulting services. But it does not specifically address AI.
AI&R	Processo-Consulta CFM nº 31/2017 –	https://sistemas.cfm.org.br/normas/arquivos/pareceres/BR/2017/41_2017.pdf	2017	CFM – Conselho Federal de Medicina http://portal.cfm.org.br	App developers; physicians; telemedicine professionals	Report on the ethics of using robot Da Vinci Surgical System (built and sold by Intuitive Surgical) for

	Parecer CFM nº 41/2017 (CFM-commissioned report. CFM nº 31/2017 – Opinion CFM nº 41/2017)			(Brazilian Federal Council of Medicine)		thyroidectomy. The report suggest it is unethical to employ a procedure that has not been approved in its country of origin (USA). For other kinds of surgeries, Da Vinci has been operating in Brazil since 2008.
AI&R	Resolução CFM nº 2.107/2014 (Resolution CFM nº 2.107/2014)	http://www.portalmedico.org.br/resolucoes/CFM/2014/2107_2014.pdf	2014	CFM – Conselho Federal de Medicina http://portal.cfm.org.br (Brazilian Federal Council of Medicine	App developers; physicians; telemedicine professional organizations	The document defines and rules the practice of teleradiology in Brazil.
AI&R	Resolução CFM nº 1.643/2002 (Resolution CFM nº 1.643/2002)	https://sistemas.cfm.org.br/normas/visualizar/resolucoes/BR/2002/1643	2002	CFM – Conselho Federal de Medicina http://portal.cfm.org.br (Brazilian Federal Council of Medicine	App developers; physicians; telemedicine professional organizations	The document defines and rules the use of technologies for telemedicine in Brazil.
AI&R	Resolução CNS/MS nº 510, de 07 de abril de 2016 (Resolution CNS/MS nº 510, April 2016)	http://andromeda.ensp.fiocruz.br/etica/sites/default/files/documentos/Reso510_2016_CHS.pdf [10p.]	2016	CNS – Conselho Nacional de Saúde http://conselho.saude.gov.br (Brazilian National Council of Medicine)	Researchers in the domains of social sciences and humanities	The document establishes ethical guidelines in for research in the social sciences and in the humanities. Increasingly, researchers in these fields have been using big data, data mining, search algorithms and online tools. But the document does not address this issue.

AI&R	Resolução nº 717, de 30 de novembro de 2017 (Resolution nº 717, 30 November 2017)	https://www.denatran.gov.br/images/Resolucoes/Resolucao7172017.pdf [6p.]	2017	CONTRAN – Conselho Nacional de Trânsito http://www.denatran.gov.br/contran (Brazilian National Traffic Council)	Policy makers; traffic regulators	This document establishes a work schedule for the regulation of autonomous vehicles in Brazil. The study must be concluded within 48 months of the publication of the document. See p. 6, Annex, line 37.
AI&R	Regimento Interno do Centro de Tecnologia da Informação Renato Archer (By-Law of the Renato Archer Center of Technology Information)	https://www.cti.gov.br/sites/default/files/images/portaria_5146_2016_-_regimento_interno_cti.pdf [29p.]	2016	CTI – Centro de Tecnologia da Informação Renato Archer https://www.cti.gov.br/pt-br (Renato Archer Center of Technology Information)	Members of the Renato Archer Center of Technology Information	Very general.
HG / AI&R	Amicus curiae: Coleta de Material Genético no STF (Amicus Curiae at STF [Brazilian Supreme Federal Court]: Collection of DNA sample)	https://itsrio.org/wp-content/uploads/2018/05/Petição-Memorial_Amicus_PerfisGeneticos250917_final.pdf [27p.] Source page: https://itsrio.org/pt/publicacoes/amicus-curiae-	2017	ITS Rio – Institute for Technology and Society of Rio de Janeiro https://itsrio.org/pt/home/	Brazilian Supreme Federal Court (also known as STF)	Amicus Curiae on Federal Law nº 12.654 (http://www.planalto.gov.br/ccivil_03/_Ato2011-2014/2012/Lei/L12654.htm#art3) on forced collection and electronic storage of DNA samples of convicted criminals. The document does not directly address AI.

		coleta-de-material-genetico-no-stf/				
AI&R	Transparência e Governança nos algoritmos: um estudo de caso sobre o setor de birôs de crédito (Transparency and Governance in Algorithms: A case study on the credit bureau sector)	https://itsrio.org/wp-content/uploads/2017/05/algorithm-transparency-and-governance-pt-br.pdf	2017	ITS Rio – Institute for Technology and Society of Rio de Janeiro https://itsrio.org/pt/home/	Policy makers	Case study on the use of algorithms for credit scoring in Brazil.

TABLE 4: LIST OF ALL RELEVANT GUIDANCE DOCUMENTS ON HOW TO WRITE RESEARCH ETHICS PROTOCOLS

Name of national REC	Title of document (original + English translation)	Ethical issues addressed in which SIENNA area (HG, HE, AI&R)?	URL	Stated audience	comments
Sistema CEP-CONEP http://plataformabrasil.saude.gov.br/login.jsf (CEP-CONEP-System) **CEP = Comitê de Ética na Pesquisa (Research Ethics Committee)**	Norma Operacional nº 001/2013 (Operational Norm nº 001/2013)	http://conselho.saude.gov.br/Web_comissoes/conep/aquivos/CNS%20%20Norma%20Operacional%20001%20-%20conep%20finalizada%2030-09.pdf [17p.]	2013	CNS – Conselho Nacional de Saúde http://conselho.saude.gov.br (Brazilian National Council of Health)	This document describes procedures that govern work performed within the CEP-CONEP-System as a whole. This document builds on Resolution nº 446, August, 2011, which is listed below.

CONEP = Comissão Nacional de Ética em Pesquisa (National Board for Research Ethics) **The local CEPs are ruled by CONEP, which is a section of the CNS – Conselho Nacional de Saúde http://conselho.saude.gov.br (Brazilian National Council of Health)** **CNS is a section of the "Ministério da Saúde"** **(Ministery of Health) http://portalms.saude.gov.br** **An updated directory of current RECs in Brazil can be accessed by following the link "Consultar Comitê de Ética em Pesquisa" at: http://plataformabrasil.saude.gov.br/login.jsf**	Manual Operacional para Comitês de Ética em Pesquisa (Operational Handbook for Research Ethics Committees)	http://conselho.saude.gov.br/biblioteca/livros/manual_operacional_miolo.pdf [138p.]	2007	CNS – Conselho Nacional de Saúde http://conselho.saude.gov.br (Brazilian National Council of Health)	This document is a handbook of principles and procedures for writing ethics protocols.
	Resolução CNS nº 441, de 12 de maio de 2011. (Resolution CNS nº 441, May 2011)	http://conselho.saude.gov.br/resolucoes/2011/Reso441.pdf [4p.]	2011	CNS – Conselho Nacional de Saúde http://conselho.saude.gov.br (Brazilian National Council of Health)	This document establishes ethical guidelines for the ethical assessment of research projects that involve the use of biobanks.
	Resolução nº 446, de 11 de agosto de 2011 (Resolution nº 446, August, 2011)	http://plataformabrasil.saude.gov.br/login.jsf [6p.] [There is no direct link to the PDF file. Please follow link for "Resolução e Normativas]	2011	CNS – Conselho Nacional de Saúde http://conselho.saude.gov.br (Brazilian National Council of Health)	This document describes procedures that govern work performed within the CEP-CONEP-System as a whole.
	Resolução nº 340, de 8 de julho de 2004	http://plataformabrasil.saude.gov.br/login.jsf	2004	CNS – Conselho Nacional de Saúde	This document establishes ethical guidelines for the ethical

	(Resolution nº 340, de 8 de julho de 2004)	[5p.] [There is no direct link to the PDF file. Please follow link for "Resolução e Normativas]		http://conselho.saude.gov.br (Brazilian National Council of Health)	assessment of research projects in genomics.

TABLE 7: MOST RELEVANT DOCUMENTS IN AI & ROBOTICS [Document 1]

Document found via (national associations or Google or another database)	Google
Title of the document	Transparência e Governança nos algoritmos: um estudo de caso sobre o setor de birôs de crédito (Transparency and Governance in Algorithms: A case study on the credit bureau sector)
Kind of document (PEC, NAEG, GDREC)	NAEG
Document developed by whom (organisation, profession)?	ITS Rio – Institute for Technology and Society of Rio de Janeiro
Year of publication (between 2005-2018)	2017
Document saved in folder as	SIENNA X.3 BRAZIL - Table 3 - ITSRIO 2017 - Case Study Credit Bureaus.pdf
Who is the stated audience	Policy makers
What definition of AI&R is used in the document?	The document provides the following definition of algorithms, which may be used here as a rough substitute for AI: "Algorithms are basically a set of steps or activities required to accomplish a task - be it a ballistic calculation, an e-commerce platform and even tasks like voice recognition. Algorithms, as they also become automated and executed by computers, have greatly increased their capacity and consequently their field of application." p. 32. The document does not address Robotics.
What forms of AI&R are described/covered in the document?	The use of AI for credit scoring and associated social discrimination.
Which ethical issues are addressed in the document?	Discrimination and social justice
How are the ethical issues addressed? Are solutions offered? If so, which ones?	It suggest there should be more transparency in these cases.

Format of the document (checklist, continuous text, other)?	Continuous text
How is the document structured?	It has the form of a long essay.
Why is the document important/useful for your country?	It addresses a question that has not been address in-depth by policy makers thus far.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes. It is a in-depth analysis of the danger of social discrimination through AI systems in Brazil.

TABLE 7: MOST RELEVANT DOCUMENTS IN AI & ROBOTICS [Document 2]

We will use the table below to review 4 documents simultaneously as they have been issued by the same institution, cover the same area (telemedicine), and complement each other.

Document found via (national associations or Google or another database)	Google
Title of the document	(Resolution CFM nº 2.178/2017) (CFM-commissioned report. CFM nº 31/2017 – Opinion CFM nº 41/2017) (Resolution CFM nº 2.107/2014) (Resolution CFM nº 1.643/2002)
Kind of document (PEC, NAEG, GDREC)	NAEG
Document developed by whom (organisation, profession)?	CFM – Conselho Federal de Medicina (Brazilian Federal Council of Medicine)
Year of publication (between 2005-2018)	2017; 2017; 2014; 2002
Document saved in folder as	SIENNA X.3 BRAZIL - Table 3 - CFM 2017 - Ethical Guidelines for Mobile Phone Apps.pdf SIENNA X.3 BRAZIL - Table 3 - CFM 2017 - Report Ethics Robot da Vinci Surgical System.pdf SIENNA X.3 BRAZIL - Table 3 - CFM 2014 – Telerradiography.pdf SIENNA X.3 BRAZIL - Table 3 - CFM 2002 - Telemedicine Services.pdf
Who is the stated audience	App developers; physicians; telemedicine professionals

What definition of AI&R is used in the document?	There is not a general, unified regulation for the use of AI&R technologies in Brazil. The current use of AI&R technologies for the purpose of medical procedures and medical research falls within the broad category of "telemedicine", which is ruled by Resolution CFM nº 1.643/2002. It defines "telemedicine" as the practice of "medicine through interactive methodologies of communication mediated by audio-visual data". This 2002 document is still valid, but it had to be supplemented by new resolutions by CFM on a number of occasions so as to rule the use of new techniques and procedures, which cannot be clearly ruled by the 2002 document alone.
What forms of AI&R are described/covered in the document?	Robotic surgery; mobile phones app for the purpose of telemedicine
Which ethical issues are addressed in the document?	Privacy and legal liability.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	Telemedicine, including diagnoses, may be issued and delivered by means of information technology, but a professional physician is ultimately responsible for examining images of patients (radiology images for instance) and issuing diagnoses.
Format of the document (checklist, continuous text, other)?	Continuous text
How is the document structured?	Sequence of numbered paragraphs and articles
Why is the document important/useful for your country?	These documents rule a growing range of medical activities, including robotic surgery and the use of AI for the purpose of telediagnosis. At least one company in Brazil claims to use AI for this purpose. See for instance: Portal Telemedicina: http://portaltelemedicina.com.br/inteligencia-artificial-na-medicina-tensorflow/ Portal Telemedicina: http://portaltelemedicina.com.br/telemedicina-no-brasil/
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes. Countries like Brazil seem to lag behind in their capacity to produce new, ground-breaking technologies, at least when compared to countries such as, for instance, the USA and the UK. But sooner or later new technologies in the domain of AI & Robotics are often acquired and deployed both in the public and in the private sector in Brazil. SIENNA might be interested comparing regulation both from the perspective of countries that produce new technologies and from the perspective of countries that consume new technologies. Does regulation differ substantially in these cases? The CFM report on the ethics of using robot Da Vinci Surgical System (built and sold by Intuitive Surgical) for thyroidectomy is a case in point here (see document CFM-commissioned report. CFM nº 31/2017 – Opinion CFM nº 41/2017). This particular document suggests that it is unethical to employ a procedure in one country (Brazil) if the same procedure has not been approved in its country of origin (USA). Should this principle be systematically applied in all similar cases? This is a question that might possibly be examined within the SIENNA.

5.2 China

TABLE 1: INDIVIDUAL AND COUNTRY INFORMATION

Names and emails of persons who did the work (if different from above)	ZHANG Yuanyuan
Your organisation	Dalian University of Technology
Your country (again)	China
Search conducted in which language	Chinese and English
Acknowledgements (any researcher who helped you to complete this task)	WANG Qian

TABLE 2: LIST OF ALL RELEVANT PROFESSIONAL ETHICS CODES

SIENNA area	Title of document (original + English translation)	URL	Year	Author/organisation	Stated audience	Comments
AI&R	《中国计算机学会学术道德规范》(China Computer FederationAcademic Normsof Ethics)	http://www.ccf.org.cn/c/2017-03-09/584443.shtml	2006	中国计算机学会 (China Computer Federation, CCF)	Computer professionals	This norm makes no specific reference to AI or robotics. But it lists some academic norms and principles for relevant professionals.
AI&R	《互联网终端软件服务行业自律公约》(Self-Regulatory Convention for Internet Terminal Software Service Industry)	http://www.isc.org.cn/hyzl/hyzl/listinfo-15616.html	2011	中国互联网协会 (Internet Society of China)	Internet professionals	This self-regulatory convention makes no specific reference to AI or robotics. But it regulates conducts of relevant professionals in aspects of the terminal software intellectual property and information security.

AI&R	《中国智能机器人白皮书》(White Paper onIntelligent Robots in China)	http://www.caai.cn/index.php?s=/Home/Article/detail/id/52.html	2015	中国人工智能学会 (Chinese Association for Artificial Intelligence)	Policy-makers and the general public	It makes reference to effects of robots for human society and effects of philosophy for robotics, and provides some general principles and suggestions for the development of AI&R.
AI&R	《新一代人工智能发展白皮书》（2017年）(White Paper on the Development of New Generation of Artificial Intelligence (2017))	https://mp.weixin.qq.com/s/rY4gUU7s3L24k15V-KRgkw	2017	中国电子学会 (Chinese Institute of Electronics)	Policy-makers and the general public	It makes reference to some requirements for artificial intelligence developers to protect personal privacy and to consider the interests of disadvantaged groups.
AI&R	GB/T 35273:2017《信息安全技术 个人信息安全规范》(Information security technology-Personal information security specification)	http://www.iso27001rz.com/UpFiles/20181/2018012937433985.pdf	2017	中华人民共和国国家质量监督检验检疫总局，中国国家标准化管理委员会 (General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China,Standardization Administration of the People's Republic of China)	Information professionals	It makes no specific reference to AI or robotics. But it lists some principles and safety requirements to regulate conducts of personal information processing, including collection, saving, usage, share, transfer and public disclosure.
AI&R	《移动智能终端应用软件分发服务自律公约》(Self-	http://www.miit.gov.cn/n1146290/n1146402/n1146455/c5899472/content.html	2017	中国互联网协会 (Internet Society of China)	Internet professionals	It makes no specific reference to AI or robotics. But it lists some general principles and regulations to protect users' personal information in software

	RegulatoryConvention on Software Distribution Services for Mobile Intelligent Terminals)					distribution services for mobile intelligent terminals.
AI&R	《人工智能辅助诊断技术管理规范》（2017版）；《人工智能辅助治疗技术管理规范》（2017版）(Management Specification of Artificial Intelligence Aided Diagnosis Technology(2017), Management Specification of Artificial Intelligence Aided Treatment Technology(2017))	http://www.nhfpc.gov.cn/yzygj/s3585/201702/e1b8e0c9b7c841d49c1895ecd475d957.shtml	2017	中国国家卫生计生委办公厅(General Office of National Health and Family Planning Commission of the People's Republic of China)	Medical institutions and medical personnel	It puts forward the minimum requirements for medical institutions and medical personnel to use artificial intelligence aided diagnosis technology and artificial intelligence aided treatment technology.

TABLE 3: LIST OF ALL RELEVANT DOCUMENTS FROM NATIONAL ADVISORY/ETHICS GROUPS

SIENNA area	Title of document (original + English translation)	URL	Year	Author/organization	Stated audience	Comments
AI&R	《新一代人工智能发展规划》(Development Plan for New Generation of Artificial Intelligence)	http://www.gov.cn/zhengce/content/2017-	2017	中国国务院(The State Council of the	Policy-makers and the general public	It makes a specific time plan for the formulation of laws,

		07/20/content_5211996.htm		People's Republic of China)		regulations and ethical norms to promote the development of artificial intelligence.
AI&R	《"互联网+"人工智能三年行动实施方案》(Internet + Artificial Intelligence Three-Year Action Implementation Plan)	http://www.gov.cn/xinwen/2016-05/23/content_5075944.htm	2016	中国国家发展改革委、科技部、工业和信息化部、中央网信办(National Development and Reform Commission, Ministry of Science and Technology of the People's Republic of China, Ministry of Industry and Information Technology of the People's Republic of China, Cyberspace Administration of China)	Policy-makers and the general public	It involves contents on standardsystem and intellectual property. It puts forward the establishment and improvement of such technical standards as network security and privacy protection standards, and the evaluation of AI system's intelligence level.
AI&R	《网络安全等级保护条例（征求意见稿）》(Cybersecurity Classification Protection Regulations (Draft for Comments))	http://www.mps.gov.cn/n2254536/n4904355/c6159136/content.html	2018	中国公安部(The Ministry of Public Security of the People's Republic of China)	Policy-makers and the general public	The regulation calls for measures to control security risks brought about by new technologies such as artificial intelligence, and to protect cybersecurity.

AI&R	《中华人民共和国网络安全法》(Cybersecurity Law of the People's Republic of China)	http://www.miit.gov.cn/n1146295/n1146557/n1146614/c5345009/content.html	2016	中国全国人民代表大会常务委员会(The StandingCommittee of the NationalPeople's Congressof the People's Republic of China)	Policy-makers and the general public	It makes no specific reference to AI or robotics. But it involves an overall framework to supervise cybersecurity, to protect personal privacy and sensitive information, and to safeguard the national cyberspace's sovereignty and security.
AI&R	《深圳市关于规范智能驾驶车辆道路测试有关工作的指导意见（征求意见稿）》(Guidance on Regulating Road Testing of Intelligent Driving Vehicles in Shenzhen (Draft for Comments))	http://www.sztb.gov.cn/zwgk/ztzl/wgk/jcgk/jcygk/zyggfa/201803/t20180316_11346991.htm	2018	深圳市交通运输委员会(ShenzhenTransportationCommittee)	Policy-makers and the general public	It regulates the related work of road testing of intelligent driving vehicles.
AI&R	《智能网联汽车道路测试管理规范（试行）》(Road Test Management Specifications for Intelligent Network Vehicles (Trial))	http://www.miit.gov.cn/n1146295/n1652858/n1652930/n3757018/c6128243/content.html	2018	中国工业和信息化部,，公安部，交通运输部(Ministry of Industry and Information Technology of the People's Republic of China, The Ministry of Public Security of the People's Republic of China, Ministry of Transport	Policy-makers and the general public	It definestest subjects, test drivers and test vehicles, and regulates the related work of intelligent network vehicles' road test.

				of the People's Republic of China)		
AI&R	《民用无人驾驶航空器系统驾驶员管理暂行规定》(Interim Provisions on the Administration of Pilots in Civil Unmanned Aircraft Systems)	http://www.caac.gov.cn/XXGK/XXGK/GFXWJ/201511/t20151102_8242.html	2013	中国民用航空局飞行标准司 (Department of Flight Standards in Civil Aviation Administration of China)	Policy-makers and the general public	It puts forward provisions for the present unmanned aircraft and its systems' pilots, and lists some requirements for these pilots.
AI&R	《民用无人驾驶航空器实名制登记管理规定》(Provisions on the Administration of Real-Name Registration of Civil Unmanned Aircraft)	http://www.caac.gov.cn/XWZX/MHYW/201705/t20170517_44079.html	2017	中国民用航空局航空器适航审定司 (Department of Aircraft Airworthiness in CertificationCivil Aviation Administration of China)	Policy-makers and the general public	It focuses on requirements of real-name registration for civil unmanned aircraft manufacturers and civil unmanned aircraft owners.
AI&R	《国务院关于印发促进大数据发展行动纲要的通知》(Notice of the State Council on Issuing the Action Plan for Promoting the Development of Big Data)	http://www.gov.cn/zhengce/content/2015-09/05/content_10137.htm	2015	中国国务院(The State Council of the People's Republic of China)	Policy-makers and the general public	It puts forward requirements for improving laws, regulations and standards systems, making scientific and standard use of big data, and ensuring data security.

AI&R	《国务院办公厅关于促进和规范健康医疗大数据应用发展的指导意见》(Guidance ofthe General Office of the State Councilon Promoting and Regulating the Application and Development of Big Data in Health and Medical Care)	http://www.gov.cn/zhengce/content/2016-06/24/content_5085091.htm	2016	中国国务院办公厅 (General Office of the State Council of the People's Republic of China)	Policy-makers and the general public	It provides some guiding principles, and puts forward some comments on regulating and promoting the integration and sharing of big data in health care.
AI&R	《大数据安全白皮书》（2018年）(White Paper on Big Data Security (2018))	http://www.caict.ac.cn/kxyj/qwfb/bps/201807/P020180712523226672500.pdf	2018	中国信息通信研究院(the China Academy of Information and Communications Technology)	Policy-makers and the general public	It puts forward some suggestions on big data security and privacy protection, based on the development of big data security technology.
AI&R	《中华人民共和国个人信息保护法（草案）》2017版(Personal Information Protection Law of the People's Republic of China (Draft) 2017)	https://www.sohu.com/a/203902011_500652	2017	中国全国人民代表大会 (The NationalPeople's Congressof the People's Republic of China)	Policy-makers and the general public	It makes no specific reference to AI or robotics. But it emphasizes the basic principles of personal information protection, and clarifies the basic norms for collecting, processing and utilizing personal information by state and non-state organs, as well as the main legal responsibilities for personal information protection.

AI&R	《人工智能创新发展道德伦理宣言》(Declaration on Morality andEthics ofArtificial Intelligence Innovation and Development)	https://mp.weixin.qq.com/s/_GCQeHxNGr6gdgLpl82ruA	2018	中国电子信息产业发展研究院，人工智能产业创新联盟 (CCID, AI Industry Innovation Alliance)	Policy-makers and the general public	It defines such contents as the relationship between AI (system) and human beings, the moral and ethical requirements for thespecific AI contact personnel, AI applications, AI's current development direction. Besides, it puts forward some requirements for AI innovation.
AI&R	《人工智能（AI）发展六大原则》(Six Principles for the Development of Artificial Intelligence (AI))	http://www.sohu.com/a/133562158_455313	2017	腾讯研究院 (Tencent Research Institut)	Policy-makers and the general public	It puts forward six principles which the development of AI should follow, principles of liability, justice, well-being, ethics, security and responsibility.

TABLE 4: LIST OF ALL RELEVANT GUIDANCE DOCUMENTS ON HOW TO WRITE RESEARCH ETHICS PROTOCOLS

Name of national REC	Title of document (original + English translation)	Ethical issues addressed in which SIENNA area (HG, HE, AI&R)?	URL	Stated audience	Comments

中国电子技术标准化研究院 (China Electronics Standardization Institute)	《人工智能标准化白皮书》（2018 版）(White Paper on Artificial Intelligence Standardization (2018))	AI&R	http://www.cesi.cn/201801/3545.html	Policy-makers and the general public	It focuses on policy and legal issues on security, ethics and privacy related to AI, takes security/ethics standards into the framework of AI standard system, and proposes to improve the legal policies related to security, ethics and privacy.

TABLE 7: MOST RELEVANT DOCUMENTS IN AI&R

Document 1 – White Paper on Artificial Intelligence Standardization (2018)

Document found via (national associations or Google or another database)	National research organization (China Electronics Standardization Institute's website)
Title of the document	《人工智能标准化白皮书》（2018 版） (White Paper on Artificial Intelligence Standardization (2018))
Kind of document (PEC, NAEG, GDREC)	GDREC (guidance documents on how to complete an ethics application for a research ethics committee) document
Document developed by whom (organisation, profession)?	中国电子技术标准化研究院 (China Electronics Standardization Institute)
Year of publication (between 2005-2018)	2018
Document saved in folder as	人工智能标准化白皮书（2018版）.pdf
Who is the stated audience	Policy-makers and the general public
What definition of AI&R is used in the document?	In this white paper, AI is a theory, method, technology and application system that utilizes digital computers or machines controlled by digital computers to simulate, extend and expand human intelligence, to perceive the environment, to acquire knowledge and to use knowledge for achieving the best result.
What forms forms of AI&R are described/covered in the document?	intelligent manufacturing, smart homes, intelligent finance, intelligent education, intelligent transportation, intelligent security, intelligent healthcare, intelligent logistics, etc.
Which ethical issues are addressed in the document?	ethical issues relating to safety, privacy, equality and responsibility

How are the ethical issues addressed? Are solutions offered? If so, which ones?	Some policy recommendations are made: it takes security/ethics standards into the framework of AI standard system, and proposes to improve the legal policies related to security, ethics and privacy. It puts forward ethical requirements for AI technology, which should rely on the deep thinking and broad consensus of the society and the public on the ethics of AI, and should follow some common principles, such as the principle of human interests and responsibility. Research on AI security/ethics standards, on the one hand, need strengthen the research on AI basic standards, to focus on the standard research on AI security's reference structures, security risks, ethics design, security evaluation and other standards, and put forward the security requirements and evaluation methods of AI algorithm, products and systems. On the other hand, it need continue to deepen the standardization in the application field, Improving the intelligent security requirements according to the existing standards, and continuing to carry out the standard researches in the fields of AI application security in cybersecurity, intelligent robot security, automatic drive security, intelligent security, intelligent transportation security, intelligent logistics security, smart city security, and so on.
Format of the document (checklist, continuous text, other)?	continuous text
How is the document structured?	Chapters and sections
Why is the document important/useful for your country?	It is important because the standardization of AI in China is conducive to accelerating AI technology innovation and achievements transformation, conducive to improving the quality of AI products and services, ensuring users' safety and creating a fair and open AI industrial ecology.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	It is useful in that China, as an important member of the international community, bears important responsibilities to ensure the application of AI technology on the right road and the healthy development for right reasons.

Document 2 – Development Plan for New Generation of Artificial Intelligence

Document found via (national associations or Google or another database)	National government (The State Council the People's Republic of China's website)
Title of the document	《新一代人工智能发展规划》 (Development Plan for New Generation of Artificial Intelligence)
Kind of document (PEC, NAEG, GDREC)	NAEG(national advisory/ethics groups) document
Document developed by whom (organisation, profession)?	中国国务院 (The State Council of the People's Republic of China)

Year of publication (between 2005-2018)	2017
Document saved in folder as	新一代人工智能发展规划.docx
Who is the stated audience	Policy-makers and the general public
What definition of AI&R is used in the document?	No specific definitions of AI&R. But a new generation of AI is explained. It is mainly AI based on big data, and presents new features of deep learning, border-crossing integration, man-machine coordination, group intelligence openness and autonomous intelligence. AI is shifted from a anthropomorphic robot to a broader intelligent autonomous system. Not only a robot, but also a smart factor and an unmanned aircraft system can be called AI.
What forms forms of AI&R are described/covered in the document?	such intelligent products as intelligent network vehicles, intelligent service robots, intelligent unmanned aircraft systems, medical imaging aided diagnosis systems, video image identification systems, intelligent voice interaction system, intelligent translation systems, and smart home products, also intelligent sensor, neural network chip, open-source platforms, etc.
Which ethical issues are addressed in the document?	ethical issues relating to privacy, responsibility, property right, information security, and robot alienation
How are the ethical issues addressed? Are solutions offered? If so, which ones?	It puts forward the formulation of laws, regulations and ethical norms to promote the development of artificial intelligence. Enhance the research on relevant laws, ethical norms and social problems of artificial intelligence, and set up the laws, regulations and ethical framework for ensuring the healthy development of artificial intelligence. Deploy the research on law issues on civil and criminal liability confirmation, privacy and property rights protection and information security utilization, which are related to artificial intelligence, set up the tracking and accountability system, and clarify the legal subject and its rights, obligations and liabilities in artificial intelligence. Accelerate the research and preparation of relevant safety management laws surrounding the subdivided fields with good foundation, such as the automatic drive and service robots, in order to lay the law foundation to the rapid application of new technology. Deploy the research on scientific and ethical issues, set up the ethics framework of multi-level judgment structure and human-machine collaboration. Develop ethic norms and action rules for research and development personnel and design personnel of artificial intelligence product, enhance the evaluation on the potential hazard and benefits of artificial intelligence, and develop solutions for complex scenes of artificial intelligence. Actively participate in the global governance of artificial intelligence, enhancing the research on major international common issues of artificial intelligence such as the robot alienation and security supervision, deepening the international cooperation of artificial intelligence in laws, regulations and international rules, and jointly facing the global challenges.
Format of the document (checklist, continuous text, other)?	continuous text

How is the document structured?	Chapters and sections
Why is the document important/useful for your country?	It is important because it is the first national systematic development plan for AI development. It focuses on deploying AI development from perspectives of strategic position, overall requirements, resource allocation, legislation, organization, etc., with speeding up the deep integration of AI and economic society as the main line, technology leading, systematic deployment, market leading, open-source and opening as basic principles.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	It is useful in that it puts forward the formulation of laws, regulations, ethical norms and political system of AI to form AI safety evaluation and control capacity. And in the aspect of ethics, traditional Chinese culture may be more conducive to the development of Chinese intelligent manufacturing with science, technology and humanity.

Document 3 – White Paper onIntelligent Robots in China

Document found via (national associations or Google or another database)	National advisory organization (Chinese Association for Artificial Intelligence's website)
Title of the document	《中国智能机器人白皮书》 (White Paper on Intelligent Robots in China)
Kind of document (PEC, NAEG, GDREC)	PEC (professional ethics codes) document
Document developed by whom (organisation, profession)?	中国人工智能学会 (Chinese Association for Artificial Intelligence)
Year of publication (between 2005-2018)	2015
Document saved in folder as	中国智能机器人白皮书.doc
Who is the stated audience	Policy-makers and the general public
What definition of AI&R is used in the document?	Various definitions of robots in the history and the classification of robotics are offered.
What forms forms of AI&R are described/covered in the document?	Robots, from the perspective of use, includes industrial robots and service robots, such as assembly robots, agricultural robots and family service robots, etc.
Which ethical issues are addressed in the document?	In the future, robots will have profound impacts on the productivity, social relations, ethical thoughts, life style and other aspects of human society, and will increase the instability of society and family. For example, labor employment (replacing human work), social structure (threatening human survival), social relations

	(issues on who should bear the burden brought about by robots' behavioral effects, and issues on human rights), ethical thoughts (opinions on robots' feeling, will, and social status), human security (opinions on robots' surpassing and conquering power over human),etc.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	Ten puzzles about the development of robots and ten impacts of robots on human society are summarized. To solve these problems, on the one hand, new industries (such as the service sector) and service projects should be expanded the breadth and depth of production and services. On the other hand, Continuing profession education and training for workers and technicians should be strengthened, so that they can adapt to the new social structure and continue to make contributions to the society in a new industry. To build a harmonious human-machine coexistence society, robots' intelligent technology needs more philosophical thinking, consistent with the development of the ecological civilization. Further, scientists need improve their moral quality and sense of responsibility, and need control the correct direction of AI development. In addition, in legal dimension, the human-oriented principle need be adhered to, and robots' rights and responsibilities need be specified.
Format of the document (checklist, continuous text, other)?	continuous text
How is the document structured?	Chapters and sections
Why is the document important/useful for your country?	It is important because it answers robots' development puzzles about robots' emotion, ethics, technology, etc. It outlines technologies in related industries and shows a way for Chinese industry.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	It is useful in that it makes reference to effects of robots for human society and effects of philosophy for robotics, and provides some general principles and suggestions for the development of AI&R.

Document 4 – White Paper on the Development of New Generation of Artificial Intelligence (2017)

Document found via (national associations or Google or another database)	National advisory organization(Chinese Institute of Electronics' official WeChat platform)
Title of the document	《新一代人工智能发展白皮书》（2017年） (White Paper on the Development of New Generation of Artificial Intelligence (2017))
Kind of document (PEC, NAEG, GDREC)	PEC(professional ethics codes) document
Document developed by whom (organisation, profession)?	中国电子学会 (Chinese Institute of Electronics)

Year of publication (between 2005-2018)	2017
Document saved in folder as	新一代人工智能发展白皮书（2017）.pdf
Who is the stated audience	Policy-makers and the general public
What definition of AI&R is used in the document?	Concept of artificial intelligence industry is explained, but no specific definitions of AI&R.
What forms forms of AI&R are described/covered in the document?	Various forms of AI&R are mentioned here.
Which ethical issues are addressed in the document?	ethical issues relating to privacy and security
How are the ethical issues addressed? Are solutions offered? If so, which ones?	At present, in the booming development of AI industry, the formulation and implementation of future industry regulation measures must be carefully considered. In the process of collecting and using data, AI developers need take appropriate technical measures to protect personal privacy, preventing personal information from disclosure, tampering and damage. Extensive inclusiveness is required in the training and design process. The interests of disadvantaged groups need be fully considered and special judgment rules should be set for extreme cases of morality and law. During the research and development process of technologies or products, administrative permission and access restrictions must be set, in order to judge how to issue application licenses of AI products in various subdivisions. The supervision of AI industry is not a problem faced by any single group. With a wide range of sociality, systematicness and complexity, it requires the joint participation of third-party organizations such as enterprises, government departments, users, scientific and technological associations, so as to build an ecological environment of innovative applications for the good development of the AI industry.
Format of the document (checklist, continuous text, other)?	continuous text
How is the document structured?	Chapters and sections
Why is the document important/useful for your country?	It is important because it is conducive to further promoting the sustained, healthy and rapid development of frontier emerging industries related to AI in China, and strongly supporting the deep integration of informatization and industrialization towards a new level.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	It is useful in that it makes reference to some requirements for artificial intelligence developers to protect personal privacy and to consider the interests of disadvantaged groups.

Document 5 –White Paper on Big Data Security (2018)

Document found via (national associations or Google or another database)	**National research organization (the China Academy of Information and CommunicationsTechnology's website)**
Title of the document	《大数据安全白皮书》（2018年） (White Paper on Big Data Security (2018))
Kind of document (PEC, NAEG, GDREC)	NAEG(national advisory/ethics groups) document
Document developed by whom (organisation, profession)?	中国信息通信研究院 (the China Academy of Information and Communications Technology)
Year of publication (between 2005-2018)	2018
Document saved in folder as	大数据安全白皮书（2018年）.pdf
Who is the stated audience	Policy-makers and the general public
What definition of AI&R is used in the document?	No definitions of AI&R are offered.
What forms forms of AI&R are described/covered in the document?	AI system, big data
Which ethical issues are addressed in the document?	ethical issues relating to security and privacy
How are the ethical issues addressed? Are solutions offered? If so, which ones?	Big data is becoming a new driving force for economic and social development, and increasingly has an important impact on the economic operation mechanism, social lifestyle and national governance capacity. Big data security has risen to the height of national security. It is necessary to build a comprehensive defense system for big data security from the level of the overall security thoughts. The security protection of big data platform should be strengthened from the aspects of attack and defense. With key links and key technologies as breakthrough points, the system of data security technology need be improved. The industrialization input of the core technologies for privacy protection need be increased, taking into account the dual needs of data utilization and privacy protection. The research and development of big data security evaluation technology need be taken seriously, and a third-party security detection and evaluation system need be built.
Format of the document (checklist, continuous text, other)?	continuous text
How is the document structured?	Chapters and sections

Why is the document important/useful for your country?	It is important because, based on the development of big data security technology, it puts forward the direction and suggestions for its future development, which provides the basis and reference for the development of big data industry and security technology.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Some of the recommendations in the document may be useful in the development of the SIENNA codes and other ethical frameworks.

Document 6 –Declaration on Morality and Ethics of Artificial Intelligence Innovation and Development

Document found via (national associations or Google or another database)	National research organization (the ChinaAI Industry Innovation Alliance's official WeChat platform)
Title of the document	《人工智能创新发展道德伦理宣言》 (Declaration on Morality andEthics ofArtificial Intelligence Innovation and Development)
Kind of document (PEC, NAEG, GDREC)	NAEG(national advisory/ethics groups) document
Document developed by whom (organisation, profession)?	中国电子信息产业发展研究院，人工智能产业创新联盟 (CCID, AI Industry Innovation Alliance)
Year of publication (between 2005-2018)	2018
Document saved in folder as	人工智能创新发展道德伦理宣言最终版.doc
Who is the stated audience	Policy-makers and the general public
What definition of AI&R is used in the document?	No definitions of AI&R are offered.
What forms forms of AI&R are described/covered in the document?	AI systems
Which ethical issues are addressed in the document?	ethical issues relating to such principles as privacy, autonomy, equity and equality, human dignity, etc.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	The basic data of AI system should uphold fairness and objectivity and discard biased data and algorithms, in order to eliminate possible results with discrimination. The data collection and data use of AI systems should respect a series of personality rights, such as the right of privacy, in order to protect the personality interests that rights carry. AI systems should have a corresponding technical risks assessment mechanism to keep the ability to prospectively control the system's potential danger.

	The autonomy degree of AI systems should be evaluated jointly by the level of science and technology, and such humane values as moral, ethical and legal values.
Format of the document (checklist, continuous text, other)?	continuous text
How is the document structured?	Chapters and sections
Why is the document important/useful for your country?	It is important because it defines such contents as the relationship between AI (system) and human beings, the moral and ethical requirements for the specific AI contact personnel, AI applications, AI's current development direction. Besides, it puts forward some requirements for AI innovation.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Some of the recommendations in the document may be useful in the development of the SIENNA codes and other ethical frameworks.

Document 7 –Six Principles for the Development of Artificial Intelligence (AI)

Document found via (national associations or Google or another database)	Enterprise research organization (Tencent Research Institute's official sohu platform)
Title of the document	《人工智能（AI）发展六大原则》 (Six Principles for the Development of Artificial Intelligence (AI))
Kind of document (PEC, NAEG, GDREC)	NAEG(national advisory/ethics groups) document
Document developed by whom (organisation, profession)?	腾讯研究院 (Tencent Research Institute)
Year of publication (between 2005-2018)	2017
Document saved in folder as	人工智能（AI）发展六大原则.doc
Who is the stated audience	Policy-makers and the general public
What definition of AI&R is used in the document?	No definitions of AI&R are offered.
What forms forms of AI&R are described/covered in the document?	AI system
Which ethical issues are addressed in the document?	ethical issues relating to such principles as liability, justice, well-being, ethics, security and responsibility

How are the ethical issues addressed? Are solutions offered? If so, which ones?	The development of AI will profoundly change our economy, society, even modes of production and lifestyle, and will also bring a series of challenges. To make AI develop towards to a broadly shared and beneficial direction, it puts forward six principles which the development of AI should follow, principles of liability, justice, well-being, ethics, security and responsibility. AI's researches, developments and applications should accord with human dignity and guarantee human rights and freedom. The development of AI should strengthen privacy protection and the control over individualdata, and prevent data abuse. Ensure the transparency of algorithm decision making, and ensure the fair, reasonable algorithm setting without discrimination. The decision-making of AI may affect individual rights and interests, and should provide relief ways. Promote the equitable distribution of AI's benefits around the world, and narrow the digital divide.
Format of the document (checklist, continuous text, other)?	continuous text
How is the document structured?	Chapters and sections
Why is the document important/useful for your country?	It is important because it puts forward six principles which the development of AI should follow, principles of liability, justice, well-being, ethics, security and responsibility, and make AI develop towards to a broadly shared and beneficial direction.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Some of the recommendations in the document may be useful in the development of the SIENNA codes and other ethical frameworks.

5.3 France

TABLE 1: INDIVIDUAL AND COUNTRY INFORMATION

Names and emails of persons who did the work (if different from above)	Anaïs Rességuier anais.resseguier@sciencespo.fr
Your organisation	Sciences Po Paris
Your country (again)	France
Search conducted in which language	French
Acknowledgements (any researcher who helped you to complete this task)	Robert Gianni and Bernard Reber

TABLE 3: LIST OF ALL RELEVANT DOCUMENTS FROM NATIONAL ADVISORY/ETHICS GROUPS

SIENNA area	Title of document (original + English translation)	URL	Year	Author/organization	Stated audience	comments
Research in general	"Pratiquer une recherche intègre et responsable. Un guide" "Conducting honest and responsible research. A guide"	http://www.cnrs.fr/comets/IMG/pdf/pratiquer_une_recherche_integre_et_responsable_un_guide_05.12.2016.pdf	2016	National Centre for Scientific Research (CNRS) and the Conference of University Presidents (CPU)	Researchers in general	
Research in general	"Promouvoir une recherche intègre et responsable. Un guide" "Promoting honest and responsible research. A guide"	http://www.cnrs.fr/comets/IMG/pdf/guide_promouvoir_une_recherche_inte_gre_et_responsable_8septembre2014.pdf	2014	COMETS: Ethics Committee of the National Centre for Scientific Research (CNRS)	Researchers in general	
AI&R	"Intelligence artificielle et robotique. Confluences de l'Homme et des STIC" "Artificial intelligence and robotics. Confluences of Humanity and the STIC"	http://www.agence-nationale-recherche.fr/informations/actualites/detail/intelligence-artificielle-et-robotique-confluences-de-l-homme-et-	2014	ANR: National Research Agency	Researchers and general public	

		des-stic-cahier-anr-n4-mars-2012/				
AI&R and HG	"Biométrie, données identifiantes et droits de l'homme" “Biometry, identifying data and human rights”	http://www.ccne-ethique.fr/fr/publications/biometrie-donnees-identifiantes-et-droits-de-lhomme	2007	National Ethics Consultative Committee for Life Sciences and Health (CCNE)	General public	
AI&R and HE	“Ethique de la recherche en robotique” “Ethics of research in robotics”	http://cerna-ethics-allistene.org/Publications+CERNA/	2014	CERNA: Research Ethics Board of Allistene, the Digital Sciences and Technologies Alliance	Researchers in AI & R and the general public	
AI&R	“Proposition de formation doctorale. Initiation à l’éthique de la recherche scientifique” “Proposition for a doctoral programme. Introductory to the ethics of scientific research”	http://cerna-ethics-allistene.org/Publications+CERNA/	2016	CERNA: Research Ethics Board of Allistene, the Digital Sciences and Technologies Alliance	Researchers in AI & R, prospective PhD candidates in AI&R ethics and professors on AI&R and AI&R ethics	
AI&R	“Ethique de la recherche en apprentissage machine “Research Ethics in Machine Learning”	http://cerna-ethics-allistene.org/Publications+CERNA/	2017	CERNA: Research Ethics Board of Allistene, the Digital Sciences and Technologies Alliance	Researchers in AI & R and General public	
AI&R	“La souverainené à l’heure du numérique. Rester maîtres de nos choix et de nos valeurs”	http://cerna-ethics-allistene.org/Publications+CERNA/	2018	CERNA: Research Ethics Board of Allistene, the Digital	Researchers in AI & R and General public	

	"Sovereignty in the digital era. Remaining in control over our choices and values""			Sciences and Technologies Alliance		
AI&R	Modalités de régulation des algorithmes de traitement des contenus "Modalities for the regulation of content processing algorithms"	https://www.economie.gouv.fr/cge/modalites-regulation-des-algorithmes-traitement-des-contenus	2016	Ilarion PAVEL Jacques SERRIS For the Ministry of Economy, Industry and the Digital	Ministry of Economy, Industry and the Digital	
AI&R	"Comment permettre à l'homme de garder la main ? Les enjeux éthiques des algorithmes et de l'intelligence artificielle" "How to make sure humanity remains in control? Ethics issues of algorithms and artificial intelligence"	https://www.cnil.fr/fr/comment-permettre-lhomme-de-garder-la-main-rapport-sur-les-enjeux-ethiques-des-algorithmes-et-de	2017	CNIL: National Commission Information Technologies and Liberties	General public, policy makers, jurists and engineers	
AI&R	"Anticiper les impacts économiques et sociaux de l'intelligence artificielle" "Anticipating economical and social impacts of artificial intelligence"	http://www.strategie.gouv.fr/sites/strategie.gouv.fr/files/atoms/files/report-intelligence-artificielle-en.pdf	2017	Digital National Council (CNN) and France Stratégie	General public, policy makers and engineers	
AI&R	"Pour une éthique de la recherche en Sciences et Technologies de l'Information et de la Communication (STIC)" "For an ethics of research in Sciences and Technologies of Information and Communication (STIC)"	http://www.cnrs.fr/comets/IMG/pdf/08-rapportcomets091112-2.pdf	2009	COMETS: Ethics committee of the National Centre for Scientific Research	General public, policy makers and engineers	

AI&R	"Véhicules autonomes et connectés. Les défis actuels et les voies de recherche" "Autonomous and connected vehicles. Current challenges and research paths"	https://www.inria.fr/institut/strategie/vehicules-autonomes-et-connectes	Not mentioned	INRIA: National Research Institute in Digital Sciences	General public, policy makers and engineers	
AI&R	"Intelligence Artificielle. Les défis actuels et l'action d'Inria" "Artificial intelligence. Current challenges and INRIA's work"	https://www.inria.fr/actualite/actualites-inria/intelligence-artificielle-les-defis-actuels-et-l-action-d-inria	Not mentioned	INRIA: National Research Institute in Digital Sciences	General public, policy makers and engineers	
AI&R	"Donner un sens à l'intelligence artificielle. Pour une stratégie nationale et européenne" "Making sense of artificial intelligence. For a national and European strategy"	http://m.enseignementsup-recherche.gouv.fr/cid128577/rapport-de-cedric-villani-donner-un-sens-a-l-intelligence-artificielle-ia.html	2018	Parliamentary mission	The Government and the general public	
AI&R and HE	"Pour une intelligence artificielle maîtrisée, utile et démystifiée" "Toward a Controlled, Useful and Demystified Artificial Intelligence"	http://www.senat.fr/rap/r16-464-1/r16-464-11.pdf	2017	OPECST: Parliamentary Office for the evaluation of scientific and technological choices	General public, policy makers, jurists, engineers and researchers	There is synthesis document in English of this report. I have also saved it in the folder.
AI&R	"La santé à l'heure de l'intelligence artificielle" "Health in the era of artificial intelligence"	http://tnova.fr/notes/la-sante-a-l-heure-de-l-intelligence-artificielle	2017	Terra Nova	General public, policy makers, engineers and health professionals	

AI&R	"Intelligences Artificielles. Quelles promesses? Quels défis?"	https://www.fondation-mines-telecom.org/wp-content/uploads/2016/01/CahierDeVeille-IntelligenceArtificielle-FondationTelecom-2016-VF.pdf	2016	Institut Mines-Telecom and Fondation Telecom	General public, policy makers, researchers and engineers	
AI&R	"Etude annuelle 2014 – Le numérique et les droits fondamentaux" "Annual study 2014 – The digital and fundamental rights"	http://www.conseil-etat.fr/Decisions-Avis-Publications/Etudes-Publications/Rapports-Etudes/Etude-annuelle-2014-Le-numerique-et-les-droits-fondamentaux	2014	Council of State	General public, policy makers, jurists, researchers and engineers.	There is an document in English introducing this study. I have saved it in the folder as well.
AI&R and HE	"Le corps, nouvel objet connecté. Du quantified self à la M-santé: les nouveaux territoires de la mise en données du monde" "The body, new connected object. From the quantified self to mobile health: the new territories of the datafication of the world"	https://www.cnil.fr/sites/default/files/typo/document/CNIL_CAHIERS_IP2_WEB.pdf	2014	CNIL: National Commission Information Technologies and Liberties	Researchers, funding bodies, policy makers and the general public.	
HG, HE and AI&R	"Rapport de synthèse du comité consultatif national d'éthique" "Synthesis report from the national consultative committee for life science and health"	https://etatsgenerauxdelabioethique.fr/blog/le-rapport-des-etats-generaux-de-la-bioethique-2018-est-en-ligne	2018	CCNE: National Ethics Consultative Committee for Life Sciences and Health	General public, policy makers, health professionals, researchers and lawyers	
HG and AI&R	"Données de santé" "Health data"	https://etatsgenerauxdelabioethique.fr/pages/donnees-de-sante	2018	National Ethics Consultative Committee for Life	Researchers in life sciences and health, policy	

				Sciences and Health (CCNE)	makers, and the general public.	
HG, HE and AI&R	“Intelligence artificielle et robotique” “Artificial intelligence and robotique”	https://etatsgenerauxdelabioethique.fr/pages/intelligence-artificielle-et-robotisation	2018	National Ethics Consultative Committee for Life Sciences and Health (CCNE)	General public	

TABLE 4: LIST OF ALL RELEVANT GUIDANCE DOCUMENTS ON HOW TO WRITE RESEARCH ETHICS PROTOCOLS					
Name of national REC	Title of document (original + English translation)	Ethical issues addressed in which SIENNA area (HG, HE, AI&R)?	URL	Stated audience	comments
ANSM	"Courrier de demande d'autorisation d'une recherche impliquant la personne humaine mentionnée au 1° de l'article L. 1121-1 du code de la santé publique portant sur le médicament" "Request for authorising research involving the human person as mentionned in 1° of article L. 1121-1 of the public health code relating to drugs"	Concerns medical research in general	https://ansm.sante.fr/Mediatheque/Publications/FormulAI&Res-et-demarches-Essais-cliniques	Researchers	
N/A	Rédaction d'un protocole médicamentaux Template for writing a medicinal research protocol	Concerns research on drugs	http://urcest.com/essais-cliniques/documents-essaiscliniques	Researchers in health research	
N/A	Rédaction d'un protocole pour un dispositif médicamenteux Template for writing a research protocol for a medicinal dispositive	Concerns research on drugs	http://urcest.com/essais-cliniques/documents-essaiscliniques	Researchers in health research	
INSERM	Instruction de remplissage du format du protocole Guide to complete the protocol template	Concerns medical research involving the human person	https://www.inserm.fr/professionnels-recherche/recherche-sur-personnes/soumission-projets-impliquant-personne-humaine	Researchers in health research	

CNIL: National Commission Information Technologies and Liberties	MR-001 “Recherches dans le domaine de la santé avec recueil du consentement” “Research in the health area with consent”	Concerns medical research	https://www.cnil.fr/sites/default/files/atoms/files/mr-001.pdf	Researchers in health research	Concerns research that involve collection and management of private data as part of the research.
CNIL: National Commission Information Technologies and Liberties	“Demande d’autorisation d’un traitement de recherche dans le monde de la santé” “Request for authorising a research treatment in the health sector”	Concerns medical research	https://www.formulAI&Res.modernisation.gouv.fr/gf/cerfa_10769.do	Researchers in health research	Concerns research that involve collection and management of private data as part of the research.
CERNI (Ethics Commitees for noninvasive research) at the University of Paris-Saclay	“FormulAI&Re de soumission au CERNI”	Concerns medical research		Researchers in non invasive research at the University of Paris-Saclay	
CERNI (Ethics Commitees for noninvasive research) Grenoble Alpes	“Guide de soumission” “Submission guide”	Concerns medical research	http://www.grenoblecognition.fr/index.php/ethique/ethique-soumettre-un-dossier	Researchers in Grenoble area	Guide to proceed to the evaluation of research protocols in particular in relation to ethical aspects.
CERNI (Ethics Commitees for noninvasive research) of the Federal University of Toulouse	“FormulAI&Re de soumission au CERNI” “CERNI application form”	Concerns medical research	http://www.univ-toulouse.fr/actualites/comite-d-ethique-de-recherche-cer EN version also available.	Researchers in non invasive research at the Federal University of Toulouse.	Guide to proceed to the evaluation of research protocols in particular in relation to ethical aspects.

TABLE 7: MOST RELEVANT DOCUMENTS IN AI & Robotics

Document found via (national associations or Google or another database)	National associations
Title of the document	"Ethique de la recherche en robotique" "Ethics of research in robotics"
Kind of document (PEC, NAEG, GDREC)	NAEG
Document developed by whom (organisation, profession)?	CERNA: Research Ethics Board of Allistene, the Digital Sciences and Technologies Alliance
Year of publication (between 2005-2018)	2014
Document saved in folder as	AI&R_CERNA_2014_Ethique de la recherche en robotique
Who is the stated audience	Not stated but most likely for researchers in AI & R and the general public
What definition of AI&R is used in the document?	This document only concerns robotics. It provides a 2-page definition of what a robot is (pp. 12-13).
What forms of AI&R are described/covered in the document?	It touches on a wide range of forms of robots but particularly explores three cases robots providing assistance to individuals or groups robots in the medical context robots in defence and security
Which ethical issues are addressed in the document?	This document seeks to cover all ethical issues that robotics imply. It introduces them by presenting the context through a focus on "robots in the society" (Ch 3) and the three cases presented above.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	CERNA's recommendations fall into four categories: a general one (9 recommendations) autonomy and decisional capacities (7 recommendations) imitation of life and affective and social interaction with human beings (6 recommendations) reparation and augmentation of the human by the machine (4 recommendations)
Format of the document (checklist, continuous text, other)?	Continuous text over 60 pages.
How is the document structured?	The document:

	presents what is a robot, the robotics market, and the use of robots in the society (ch 1, 2 and 3) presents 3 cases of use of robots (as presented above) (ch 4) presents the CERNA's recommendations (as presented above) (ch 5 and 6) The document also has a rich series of annexes including: on robotics terminology the CERNA
Why is the document important/useful for your country?	It is an important document for France as it is developed by an important group bringing together a number of French research institution. It is one of the rare document engaging with such precision with robotics ethics.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	It will certainly be useful for the development of SIENNA codes and framework in relation to robotics as it proposes very precise and thoughtful ethical recommendations on this technology.

Document found via (national associations or Google or another database)	National associations
Title of the document	"Research Ethics in Machine Learning"
Kind of document (PEC, NAEG, GDREC)	NAEG
Document developed by whom (organisation, profession)?	CERNA: Research Ethics Board of Allistene, the Digital Sciences and Technologies Alliance
Year of publication (between 2005-2018)	2017
Document saved in folder as	AI&R_CERNA_2017_machine_learning
Who is the stated audience	Researchers in AI & R and General public
What definition of AI&R is used in the document?	This document focuses specifically on machine learning. The first section of the document is dedicated to defining machine learning (pp. 9-15). As part of this definition it introduces the different types of machine learning algorithms and the case of multi-layer neural networks.
What forms of AI&R are described/covered in the document?	The use of machine learning in: personalized recommendations chatbots autonomous vehicles robots that interact with people and groups

Which ethical issues are addressed in the document?	Ethical issues are introduced in two categories: general properties of digital systems trustworthiness and fairness transparency, traceability, and explain ability responsibility compliance particular features of machine learning systems specification problem training agent learning without understanding dynamically involved models learning instability assessment and control
How are the ethical issues addressed? Are solutions offered? If so, which ones?	They are introduced as detailed in the box below and a series of recommendations in proposed. These recommendations are proposed in 6 different themes: learning system data (4 recommendations) autonomy of machine learning systems (2 recommendations) explain ability of learning methods and their assessment (3 recommendations) decision-making by machine learning-system (2 recommendations) consent to machine learning (3 recommendations) responsibility in human-machine learning system interaction (2 recommendations)
Format of the document (checklist, continuous text, other)?	Continuous text with some lists over 50 pages.
How is the document structured?	Defines machine learning and gives examples of applications (section 1 and 2) Presents ethical issues (section 3) Provides ethical recommendation (section 4) – 6 different categories are covered Presents the French and international contexts (section 5) Conclusion, synthesis of recommendations and appendices (section 6, 7, and appendices).
Why is the document important/useful for your country?	It is an important document for France as it is developed by an important group bringing together a number of French research institution. It engages with great precision in ethical issues related to machine learning and provides detailed and informed recommendations.

Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	It will certainly be useful for the development of SIENNA codes and framework in relation to artificial intelligence as it proposes very precise and thoughtful ethical recommendations on this technology.

Document found via (national associations or Google or another database)	Google
Title of the document	"Comment permettre à l'homme de garder la main ? Les enjeux éthiques des algorithmes et de l'intelligence artificielle" "How to make sure humanity remains in control? Ethics issues of algorithms and artificial intelligence"
Kind of document (PEC, NAEG, GDREC)	NAEG
Document developed by whom (organisation, profession)?	CNIL: National Commission Information Technologies and Liberties
Year of publication (between 2005-2018)	2017
Document saved in folder as	AI&R_CNIL_2017_enjeux éthiques des algorithmes et de l'intelligence artificielle
Who is the stated audience	It is not stated, but most likely: General public, policy makers, jurists and engineers
What definition of AI&R is used in the document?	It works on the basis of what it perceives to be the understanding of this technology in the current public debate as a "new class of algorithm set up on the basis of learning techniques" (p. 5). It proposes a more precise definition pp. 14-15.
What forms of AI&R are described/covered in the document?	This document seeks to be all-encompassing and hence to cover all forms of AI. It presents the various fields this technology covers p. 22 and in the annex pp. 62-70.
Which ethical issues are addressed in the document?	The report goes over "ethical stakes" on pp. 23-42. It covers: human autonomy in relation the machine autonomy Bias, discrimination, and exclusion Algorithmic fragmentation (i.e., impact on the collective)

	The balance between the development of megafiles and the development of IA (i.e. protection of data versus development of technology) Questions related to the quality, quantity and relevance of data. Questions related to the human identity (including the possibility to build "ethical" machines and the interface human-machine)
How are the ethical issues addressed? Are solutions offered? If so, which ones?	The ethical challenges presented above are responded to (from pp. 43 to 60) by introducing: currently existing legal regulations the question as to whether IA should simply be forbidden in particular sectors fundamental principles: loyalty vigilance intelligibility, transparency, and responsibility a series of recommendations (6)
Format of the document (checklist, continuous text, other)?	Continuous text with some boxes focusing on specific aspects.
How is the document structured?	Definitions and context (chp 1 et 2) Ethical stakes (Chp 3) Responses to the risks posed by IA (Chp 4)
Why is the document important/useful for your country?	It is an important document for France as it is prepared by a major organisation dedicated to the protection of personal data in France.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	It will certainly be useful for the development of SIENNA codes and framework in relation to artificial intelligence as it presents insightfully what is ethically concerning with IA and proposed thoughtful recommendations regarding this technology.

Document found via (national associations or Google or another database)	Document found by reading other documents on this technology
Title of the document	"Pour une intelligence artificielle maîtrisée, utile et démystifiée" "Toward a Controlled, Useful and Demystified Artificial Intelligence"
Kind of document (PEC, NAEG, GDREC)	This report has been prepared by the Parliamentary Office for the Evaluation of Scientific, and Technological Choices, and led by a deputy and a senator. Though it has not be prepared by a NAEG, I have included it as it engages a lot with the ethics of IA and intents to set the direction for IA in France.

Document developed by whom (organisation, profession)?	See above.
Year of publication (between 2005-2018)	2017
Document saved in folder as	AI&R_OPECST_2017_Pour une intelligence artificielle maîtrisée, utile et démystifiée And English synthesis report: AI&R_OPECST_2017_Artificial intelligence report (EN synthesis)
Who is the stated audience	General public, policy makers, jurists, engineers and researchers
What definition of AI&R is used in the document?	The document traces the history of artificial intelligence and notes that an AI technology deals with problem that has not found a solution; as soon as a solution is found, it no longer falls in the category of AI (p. 37). Hence, what was recognised as AI yesterday no longer is today. As a result, this report recognises that IA comprises a large variety of technologies.
What forms of AI&R are described/covered in the document?	The document covers a wide range of forms of AI&R.
Which ethical issues are addressed in the document?	The document includes a whole section on ethical and legal aspects of IA (Section 2 of Part 2) (pp. 128-190). It covers a wide range of ethical issues. These are drawn by analysing key documents and reports produced nationally and internationally on IA.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	Ethical issues are addressed by introducing relevant legal regulations and by making recommendations. The main recommendations are summarised in the synthesis document. These include: Controlled artificial intelligence (5 propositions) Useful AI at the service of humans and humanist values (6 propositions) Demystify AI (4 propositions)
Format of the document (checklist, continuous text, other)?	Continuous text, 273 pages long.
How is the document structured?	1st part: context (context of the report, IA history, IA research) 2nd part: IA's stakes: socio-economical stakes ethico-juridical stakes technologico-scientific questions 3rd part: propositions: a controlled IA a useful and human IA

	a demystified IA
Why is the document important/useful for your country?	It is an important document because it has been published by the parliamentary office in charge of scientific and technological choices. It explores IA in depth and covers a wide ranger of issues.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	It should be useful in particular for the propositions it makes at the end of the 3rd part of the report.

Document found via (national associations or Google or another database)	Google
Title of the document	"Donner un sens à l'intelligence artificielle. Pour une stratégie nationale et européenne" "Making sense of artificial intelligence. For a national and European strategy"
Kind of document (PEC, NAEG, GDREC)	This report has been commissioned by the French Prime Minister and prepared by a team led by the deputy Cédric Villani. Though it has not be prepared by a NAEG, I have included it as it engages a lot with the ethics of IA and intents to set the direction for IA in France.
Document developed by whom (organisation, profession)?	See above.
Year of publication (between 2005-2018)	2018
Document saved in folder as	AI&R_Rapport_Villani_2018
Who is the stated audience	The Government and the general public
What definition of AI&R is used in the document?	The document defines AI as a frontier that is constantly being pushed through new scientific and technological developments. It recognises it as being a program oriented toward the ambition of understanding human cognition and reproducing cognitive processes close to those of humans (p. 9).
What forms of AI&R are described/covered in the document?	It covers a wide range of forms of AI&R.
Which ethical issues are addressed in the document?	It also covers a wide ranger of issues related to IA, including those of bias and discrimination, predictive policing, autonomous weapons, etc.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	It focuses on the following aspects for an ethical framework for IA: increasing transparency and accountability of autonomous systems adapting protection of rights and liberties to potential risks linked to the use of learning machines ensuring that organisations that develop and use these technologies remain responsible in front of the law for damages they may cause ensuring that those who develop these technologies act responsibly

	Furthermore, it proposes the establishment of a National Ethics Consultative Committee dedicated to digital technologies and IA, in the same format as the one that exists for health and life sciences (CCNE)
Format of the document (checklist, continuous text, other)?	Continuous text, 235 pages long.
How is the document structured?	The report is broken down in 6 parts: focus on the fundamental role of data research impacts on work and employment for a more ecological economy ethics of IA Inclusiveness and diversity Furthermore, it develops a particular focus on 5 sectors: education health augmented agriculture transportation defence and security
Why is the document important/useful for your country?	This is major recent document on IA in France and intents to set the direction for this technology in France.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	The significant section on ethics of this report might be useful to Sienna as it makes recommendations to ensure an ethical design and use of IA.

5.4 Germany

TABLE 1: INDIVIDUAL AND COUNTRY INFORMATION

Names and emails of persons who did the work (if different from above)	Lisa Tambornino, tambornino@eurecnet.eu Dirk Lanzerath, mailto:lanzerath@eurecnet.org
Your organisation	EUREC
Your country (again)	Germany
Search conducted in which language	German
Acknowledgements (any researcher who helped you to complete this task)	

TABLE 2: LIST OF ALL RELEVANT PROFESSIONAL ETHICS CODES

SIENNA area	Title of document (original + English translation)	URL	Year	organisation	stated audience	comments
AI&R	Automatisiertes und vernetztes Fahren Ethics code for the use and development of self-driving computers	German: https://www.bmvi.de/SharedDocs/DE/Publikationen/DG/bericht-der-ethik-kommission.pdf?__blob=publicationFile English: https://www.bmvi.de/SharedDocs/EN/publications/report-ethics-commission.pdf?__blob=publicationFile	2017	Federal Ministry of Transport and digital infrastructure	Policy makers, law makers, researchers	First guidelines in the world for self-driving computers

AI&R	ZVEI-Code of Conduct zur gesellschaftlichen Verantwortung ZVEI's Code of Conduct for Corporate Social Responsibility	German: https://www.zvei.org/fileadmin/user_upload/Themen/Gesellschaft_Umwelt/ZVEI_Code_of_Conduct/pdf/ZVEI-Code-of-Conduct-Conduct-Deutsch-2014.pdf English: https://www.zvei.org/fileadmin/user_upload/Themen/Gesellschaft_Umwelt/ZVEI_Code_of_Conduct/pdf/ZVEI-Code-of-Conduct-Englisch-2014.pdf	2008	ZVEI. Die Elektroindustrie The German Electrical and Electronic Manufacturers' Association	professionals	Very broad "intended as a model for enterprises' own declarations to their customers, or for requests to suppliers for equivalent declarations"
HG, HE, AI&R	Research Code of Conduct	https://verwaltung.uni-koeln.de/forschungsmanagement/content/e12474/e160886/018_Research_Code_of_Conduct_neu_D_ger.pdf		University of Cologne	researchers	Very broad. value based approach
HG, HE	Berufsordnung für Ärztinnen und Ärzte	https://www.bundesaerztekammer.de/fileadmin/user_uplo	Version	Bundesärztekammer	physicians	Very broad

	professional code for physicians	ad/downloads/pdf-Ordner/MBO/MBO-AE.pdf (only German)	from 2018	German Medical Association		

TABLE 3: LIST OF ALL RELEVANT DOCUMENTS FROM NATIONAL ADVISORY/ETHICS GROUPS AND PROFESSIONAL GROUPS

SIENNA area	Title of document (original + English translation)	URL	Year	organization	Stated audience	comments
AI&R	REALIZING OUR DIGITAL FUTURE AND SHAPING ITS IMPACT ON KNOWLEDGE, INDUSTRY, AND THE WORKFORCE	https://www.leopoldina.org/uploads/tx_leopublication/2018_G7_Digital_EN.pdf	2018	Leopoldina and G7 sciences academies	Society, olicy makers, researchers, industry	
HG, HE, AI&R	Wissenschaftsfreiheit und Wissenschaftsverantwortung Empfehlungen zum Umgang mit sicherheitsrelevanter Forschung Scientific Freedom and Scientific Responsibility Recommendations for Handling Security-Relevant Research	http://www.dfg.de/download/pdf/dfg_im_profil/reden_stellungnahmen/2014/dfg-leopoldina_forschungsrisiken_de_en.pdf	2014	DFG German Research Foundation + Leopoldina	Professional organizations and universities, policy makers, researchers, public	Very broad "The recommendations offer assistance in answering ethical questions, thus contributing to defining standards and codes of conduct beyond statutory norms for scientists dealing with security-relevant research. "
AI&R	Big Data und Gesundheit – Datensouveränität als informationelle Freiheitsgestaltung	https://www.ethikrat.org/fileadmin/Publikationen/Stellungnahmen/deu	2017	Deutscher Ethikrat		

	Big Data and Health – Data Sovereignty as the Shaping of Informational Freedom	tsch/stellungnahme-big-data-und-gesundheit.pdf English version: https://www.ethikrat.org/fileadmin/Publikationen/Stellungnahmen/englisch/opinion-big-data-and-health-summary.pdf		German Ethics Council		
AI&R	VDMA-Positionspapier „Sicherheit bei der Mensch-Roboter-Kollaboration“ VDMA position paper „Security in human-robot-collaboration“	https://robotik.vdma.org/documents/105999/16922915/1493970055661_VDMA_Positionspapier_MRK-Sicherheit_DE.pdf/2b4f537a-0ba9-4e80-8840-793a83988861	2016	Verband Deutscher Maschinen- und Anlagenbau German Association of mechanical engineering		
AI&R	Robotik – ein GameChanger für Militär und Sicherheitspolitik?	https://www.swp-berlin.org/fileadmin/contents/products/studien/2015_S14_dkw.pdf	2015	Stiftung Wissenschaft und Politik Deutsches		

	Robotics - a game changer for military and Security policy?			Institut für Internationale Politik und Sicherheit German Institute for International and Security Affairs		
AI&R	Automation 2020 Bedeutung und Entwicklung der Automation bis zum Jahr 2020 Automation 2020 Importance and development of automation by the year 2020	https://www.vdi.de/fileadmin/vdi_de/redakteur_dateien/gma_dateien/AT_2020_INTERNET.pdf	2009	Verein Deutscher Ingenieure (VDI) The Association of German Engineers	Industry	
AI&R	Empfehlungen der Grünen zu Robotik und künstlicher Intelligenz Recommendations on robotocs and AI by the german party “Die Grünen”	https://www.janalbrecht.eu/2017/02/2017-02-01-empfehlungen-der-gruenen-zu-robotik-und-kuenstlicher-intelligenz/	2017	Die Grünen Party in the German Bundestag	Society, industry, reseachers, policy makers	

AI&R	Entscheidungsunterstützung mit Künstlicher Intelligenz Wirtschaftliche Bedeutung, gesellschaftliche Herausforderungen, menschliche Verantwortung Artificial Intelligence. Economic significance, societal challenges, human responsibility	https://www.bitkom.org/noindex/Publikationen/2017/Positionspapiere/FirstSpirit-1496912702488Bitkom-DFKI-Positionspapier-Digital-Gipfel-AI-und-Entscheidungen-13062017-2.pdf	2017	Bitkom e.V. Bundesverband and Information swirtschaft, Telekommunikation und neue Medien e.V. Bitkom, the German Association for IT, Telecommunications and New Media		
AI&R	Antworten auf den Fragenkatalog für das Fachgespräch zum Thema „Künstliche Intelligenz“ des Ausschusses Digitale Agenda am 22. März 2017	https://www.bundestag.de/blob/499636/cb565fea7b5969a0a4027262fe222c45/a-drs-18-24-133-data.pdf	2017	German Bundestag, committee for digital issues		

TABLE 4: LIST OF ALL RELEVANT GUIDANCE DOCUMENTS ON HOW TO WRITE RESEARCH ETHICS PROTOCOLS

Name of national REC	Title of document (original + English translation)	SIENNA area	URL	stated audience	comments
Ethics committee of the German Society for Nursing Science	Fragen zur ethischen Reflexion Guidance for ethical reflexion	all	https://dg-pflegewissenschaft.de/wp-content/uploads/2017/05/FragenEthReflexion.pdf	researchers	Very broad
Arbeitskreis Medizinischer Ethikkommissionen in der Bundesrepublik Deutschland e.V. (AMEK) **Working group of medical ethics committees in Germany**	Checkliste für die Probandeninformation zur Erlangung der Einwilligung in die wissenschaftliche Verwendung von Blut- bzw. Gewebeproben Checklist for getting informed consent for studys with blood or tissue samples	HG	https://www.uni-due.de/imperia/md/content/ethikkomission/berufsrecht_checkliste_probandeninformation.pdf	researchers	
	Checkliste: Erforderliche Antragsunterlagen für Studien nach AMG Checklist: Required application documents for studies according to AMG	HE, HG	https://www.uniklinik-freiburg.de/fileadmin/mediapool/10_andere/ethikkommission/sonstiges/checklisteamg.doc	researchers	
	Mustertext zur Information und Einwilligung in die	HG	https://www.ak-med-ethik-komm.de/docs/MustertextBiobanken.docx	researchers	

	Verwendung von Biomaterialien und zugehöriger Daten in Biobanken Template For informed consent concerning the donation, storage, and utilization of biological materials as well as collecting, processing, and usage of (related) data in biobanks		https://www.ak-med-ethik-komm.de/docs/Template-for-informed-consent.docx		
	Mustertext zur Information und Einwilligung bei einer optionalen zusätzlichen Sammlung von Biomaterialien anlässlich einer klinischen Arzneimittelprüfung zur Nutzung außerhalb des Prüfplans Template for information and consent to an optional additional collection of biomaterials for a clinical proving out of schedule	HG	https://www.ak-med-ethik-komm.de/docs/PharmakogenetikalsZusatzzuAMG.docx		

	Recommendation For the Assessment of Research-related Human Biobanks by Ethics Committees	HG	https://www.ak-med-ethik-komm.de/docs/Recommendations2016_draft2016_09_07.pdf	For Ethics Committee members !!!!	

TABLE 7: MOST RELEVANT DOCUMENTS IN AI & Robotics

Document found via (national associations or Google or another database)	Google
Title of the document	Automatisiertes und vernetztes Fahren self-driving computers
Kind of document (PEC, NAEG, GDREC)	PEC
Document developed by whom (organisation, profession)?	Federal Ministry of Transport and Digital Infrastructure. Ethics Commission on Automated Driving
Year of publication (between 2005-2018)	2017
Document saved in folder as	
Who is the stated audience	Policy makers, law makers, researchers
What definition of AI&R is used in the document?	
What forms forms of AI&R are described/covered in the document?	Self driving vehicles
Which ethical issues are addressed in the document?	
How are the ethical issues addressed? Are solutions offered? If so, which ones?	
Format of the document (checklist, continuous text, other)?	Continuous text + 20 propositions
How is the document structured?	The Ethics Commission's report comprises 20 propositions. The key elements are: Automated and connected driving is an ethical imperative if the systems cause fewer accidents than human drivers (positive balance of risk).

	Damage to property must take precedence over personal injury. In hazardous situations, the protection of human life must always have top priority. In the event of unavoidable accident situations, any distinction between individuals based on personal features (age, gender, physical or mental constitution) is impermissible. In every driving situation, it must be clearly regulated and apparent who is responsible for the driving task: the human or the computer. It must be documented and stored who is driving (to resolve possible issues of liability, among other things). Drivers must always be able to decide themselves whether their vehicle data are to be forwarded and used (data sovereignty).
Why is the document important/useful for your country?	The Federal Ministry of Transport and Digital Infrastructure's Ethics Commission comprises 14 academics and experts from the disciplines of ethics, law and technology. Among these are transport experts, legal experts, information scientists, engineers, philosophers, theologians, consumer protection representatives as well as representatives of associations and companies. The Ethics Commission on Automated and Connected Driving has developed initial guidelines for policymakers and lawmakers that will make it possible to approve automated driving systems but that set out special requirements in terms of safety, human dignity, personal freedom of choice and data autonomy.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	First guidelines in the world for self-driving computer

5.5 Greece

TABLE 1: INDIVIDUAL AND COUNTRY INFORMATION

Names and emails of persons who did the work	Maria Bottis
Your organisation	Ionian University
Your country	Greece
Search conducted in which language	Greek and English
Acknowledgements	Fereniki Panagopoulou

TABLE 2: LIST OF ALL RELEVANT PROFESSIONAL ETHICS CODES and OF ALL RELEVANT DOCUMENTS FROM NATIONAL ADVISORY/ETHICS GROUPS

Note: Only the first three documents are PECs.

SIENNA area	Title of document	URL	Year	Author/ Organisation	Stated audience	Comments
AI and R	Code of Ethics of Computer Scientists	https://www.epe.org.gr/uploads/media/%CE%95%CE%A0%CE%95-%CE%9A%CF%8E%CE%B4%CE%B9%CE%BA%CE%B1%CF%82-%CE%94%CE%B5%CE%BF%CE%BD%CF%84%CE%BF%CE%BB%CE%BF%CE%B3%CE%AF%CE%B1%CF%82-%CE%A0%CE%BB%CE%B7%CF%81%CE%BF%CF%86%CE%BF%CF	2016	Association for Greek Computer Scientists Ένωση Πληροφορικών Ελλάδος	Computer scientists, general public	This is a code of ethics for computer scientists not referring specifically to AI or robotics, but more generally, on ethical issues in computer science.

		%81%CE%B9%CE%BA%CF%8E%CE%BD_v1-Jun2016-final.pdf				

TABLE 7: MOST RELEVANT DOCUMENTS IN AI&R

Document found via (national associations or Google or another database)	Google
Title of the document	Code of Ethics for Computer Scientists
Kind of document (PEC, NAEG, GDREC)	PEC
Document developed by whom (organisation, profession)?	National Association for Computer Scientists
Year of publication (between 2005-2018)	2016
Document saved in folder as	
Who is the stated audience	Members of the national association for computer scientists
What definition of AI&R is used in the document?	The document contains no definition of AI&R
What forms of AI&R are described/covered in the document?	The documents is of a general nature and does not deal directly with AI&R
Which ethical issues are addressed in the document?	Ethical responsibility of a computer scientist towards their colleagues, the general public, obligation to offer quality services, integrity, independence, work in the public interest
How are the ethical issues addressed? Are solutions offered? If so, which ones?	The Code lays down general ethical principles and does not offer any real practical solutions.
Format of the document (checklist, continuous text, other)?	Continuous text
How is the document structured?	Chapters and paragraphs.
Why is the document important/useful for your country?	The Code is the first professional code for computer scientists by a professional organization and therefore, is the main text of reference towards the solution of ethical conflicts in this case.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	The Code is useful as a general and only text referring to ethical responsibilities of computer scientists in Greece.

5.6 Japan

A national search for Japan was planned. Although the partner from Japan, who is no beneficiary partner in SIENNA, was not able to conduct the search.

5.7 Netherlands

TABLE 1: INDIVIDUAL AND COUNTRY INFORMATION

Names and emails of persons who did the work (if different from above)	Philip Jansen
Your organisation	University of Twente
Your country (again)	The Netherlands
Search conducted in which language	Dutch and English
Acknowledgements (any researcher who helped you to complete this task)	Philip Brey

TABLE 2: LIST OF ALL RELEVANT PROFESSIONAL ETHICS CODES

SIENNA area	Title of document (original + English translation)	URL	Year	Author/organisation	Stated audience	comments
AI&R	KIVI Ethische Code (KIVI Ethical Code)	https://www.kivi.nl/ethische-code	2018 (latest version)	Koninklijk Instituut Van Ingenieurs (KIVI) (Royal Netherlands Society of Engineers)	Engineering professionals	This code makes no specific reference to AI or robotics.
AI&R	Gedragscode (Code of Conduct)	http://www.vri.nl/wp-content/uploads/2016/03/gedragscode_RI_2015.pdf	2015 (latest version)	Vereniging Register voor Informatici (Association for Registered Information Professionals)	Information professionals	This code makes no specific reference to AI or robotics. Besides general principles of professional conduct, it makes reference to the potential effects of members' actions on the common good.

AI&R	Gedragscode van de NVBI (Code of Conduct of the NVBI)	https://www.nvbi.nl/nvbi/gedragscode	2004 (latest version)	Nederlandse Vereniging van Beëdigde Informaticadeskundigen NVBI (Netherlands Society of Chartered Information Science Experts)	Information professionals	This code makes no specific reference to AI or robotics. It lists only general principles of professional conduct.

TABLE 3: LIST OF ALL RELEVANT DOCUMENTS FROM NATIONAL ADVISORY/ETHICS GROUPS

SIENNA area	Title of document (original + English translation)	URL	Year	Author/ organization	Stated audience	comments
AI&R	Overal Robots: Automatisering van de Liefde tot de Dood (Robots Everywhere: Automation From Love Until Death)	https://www.rathenau.nl/nl/digitale-samenleving/overal-robots	2012	Rathenau Institute	General public and policy-makers	-
AI&R	Op Advies van de Auto: Persuasieve technologie en de toekomst van het verkeerssysteem (On the Car's advice: Persuasive Technology and the Future of Road Transportation)	https://www.rathenau.nl/nl/digitale-samenleving/op-advies-van-de-auto	2013	Rathenau Institute	General public and policy-makers	-
AI&R	Tem de Robotauto: De Zelfsturende Auto Voor Publieke Doelen (Converging Roads: Linking Self-Driving Cars to Public Goals [official translation of the report])	https://www.rathenau.nl/en/digital-society/converging-roads-0	2014/2015	Rathenau Institute	General public and policy-makers	-
AI&R	Mensenrechten in het robottijdperk: Uitdagingen door Het Gebruik van Robots, Kunstmatige Intelligentie, Virtual & Augmented Reality (Human Rights in the Robot Age: Challenges Arising From the Use of Robotics, Artificial Intelligence, and Virtual and Augmented Reality [official translation of the report])	https://www.rathenau.nl/en/digital-society/human-rights-robot-age	2017	Rathenau Institute	General public and policy-makers	-

AI&R	Opwaarderen: Borgen van publieke waarden in de digitale samenleving (Urgent Upgrade: Protect public values in our digitized society [official translation of the report])	https://www.rathenau.nl/en/digital-society/urgent-upgrade	2017	Rathenau Institute	General public and policy-makers	-
AI&R	Bijdrage Rathenau Instituut aan het Rondetafelgesprek Artificiële Intelligentie in het Recht (Contribution of the Rathenau Institute to the Roundtable Discussion on Artificial Intelligence in Law)	https://www.rathenau.nl/sites/default/files/inline-files/Bijdrage%20Rathenau%20Instituut%20rtg%20AI%20en%20Recht%20maart2018.pdf	2018	Rathenau Institute	General public and policy-makers	-
AI&R	Robotisering en Automatisering op de Werkvloer: Bedrijfskeuzes bij Technologische Innovaties (Robotisation and Automation in the Workplace: Company Management Choices in Technological Innovations)	https://www.rathenau.nl/nl/digitale-samenleving/robotisering-en-automatisering-op-de-werkvloer	2018	Rathenau Institute	General public and policy-makers	-
AI&R	De Robot de Baas: De Toekomst van Werk in het Tweede Machinetijdperk (Keeping the Robot in Check: The Future of Work in the Second Machine Age)	https://www.wrr.nl/binaries/wrr/documenten/verkenningen/2015/12/08/de-robot-de-baas/V031-Robot-baas.pdf	2015	Wetenschappelijke Raad voor het Regeringsbeleid (WRR) (The Netherlands Scientific Council for Government Policy)	Policy-makers and the general public	-
AI&R	Mens en Technologie: Samen aan het Werk (Man and Technology: Together at Work)	https://www.ser.nl/~/media/db_adviezen/2010_2019/2016/mens-technologie.ashx (version for policy-makers) https://www.ser.nl/~/media/db_deeladviezen/	2016	Sociaal-Economische Raad (SER) (Social and Economic Council of the Netherlands)	Policy-makers and the general public	-

		2010_2019/2016/mens-technologie/mens-technologie-publieksversie.ashx (version for the general public)				
AI&R	Opkomend Risico voor Arbeidsveiligheid door Inzet van Robots op de Werkvloer (Emergent Risks to Worker Safety from the Use of Robots in the Workplace)	http://publications.tno.nl/publication/34622296/gK9LWJ/steijn-2016-opkomend.pdf http://publications.tno.nl/publication/34622297/v83yVf/steijn-2016-robot.pdf	2016	Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek (Netherlands Organisation for Applied Scientific Research)	Policy-makers and the general public	-

TABLE 7: MOST RELEVANT DOCUMENTS IN AI & Robotics

Document 1 – Robots Everywhere: Automation from Love until Death

Document found via (national associations or Google or another database)	National advisory organisation (Rathenau Institute's website)
Title of the document	Overal Robots: Automatisering van de Liefde tot de Dood (Robots Everywhere: Automation from Love until Death)
Kind of document (PEC, NAEG, GDREC)	NAEG (national advisory/ethics groups) document
Document developed by whom (organisation, profession)?	Rathenau Institute (a Dutch technology assessment organisation)
Year of publication (between 2005-2018)	2012
Document saved in folder as	Rathenau_2012_Overal Robots.pdf
Who is the stated audience	Policy-makers and the general public
What definition of AI&R is used in the document?	No definitions are offered.

What forms of AI&R are described/covered in the document?	Mainly service robots in the home, automation in cars, law enforcement robots, autonomous weapons systems and healthcare robots.
Which ethical issues are addressed in the document?	Various ethical issues in relation to the above five categories of robots are discussed: de-socialization in humans resulting from the use of private entertainment robots, various issues with (child-)sex robots, issues with healthcare robots (e.g., loss of autonomy, loss of contact with others, loss of privacy, objectification, loss of human dignity, deception), issues with automation in automobiles (e.g., driver safety, privacy, responsibility and accountability), issues with law enforcement robots (e.g., surveillance society, privacy vs. security, skilling vs. deskilling, erosion of responsibility), and issues with autonomous military weapons systems (e.g., erosion of the proportionality principle, responsibility of the "cubicle warrior", insufficient ability of robots to discriminate, proliferation of autonomous weapons).
How are the ethical issues addressed? Are solutions offered? If so, which ones?	Some policy recommendations are made: policy should be made on which types of robots to allow and which to prohibit; development of autonomous, weaponised (esp. lethal) military robots should be prohibited (decisions on life and death should not be automated), policy should be made that makes certain driver assist features mandatory in cars, policy-makers should carefully consider which types of healthcare robots to allow and which to prohibit.
Format of the document (checklist, continuous text, other)?	Continuous text.
How is the document structured?	Chapters with subsections for each of the five robotics domains discussed.
Why is the document important/useful for your country?	It is important because the Rathenau Institute advises the Dutch government and other policy-makers on important issues in relation to emerging robotics technologies. The institute's advice carries significant weight in policy circles.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	It is useful in that it offers a set of clear policy recommendations based on the ethical consideration of the development and application of robotics technologies in a variety of domains.

Document 2 – On the Car's advice: Persuasive Technology and the Future of Road Transportation

Document found via (national associations or Google or another database)	National advisory organisation (Rathenau Institute's website)
Title of the document	Op Advies van de Auto: Persuasieve technologie en de toekomst van het verkeerssysteem (On the Car's advice: Persuasive Technology and the Future of Road Transportation)
Kind of document (PEC, NAEG, GDREC)	NAEG (national advisory/ethics groups) document

Document developed by whom (organisation, profession)?	Rathenau Institute (a Dutch technology assessment organisation)
Year of publication (between 2005-2018)	2013
Document saved in folder as	Rathenau_2013_Op Advies van de Auto
Who is the stated audience	Policy-makers and the general public
What definition of AI&R is used in the document?	Definition of persuasive technology is given, but no specific definitions of AI&R.
What forms of AI&R are described/covered in the document?	Persuasive technologies in automobiles (e.g., smart systems that aim to influence the driver's behaviour by providing them with evaluative feedback on fuel consumption, driving speed, etc.).
Which ethical issues are addressed in the document?	The document describes some ethical, legal and societal implications of persuasive technologies in automobiles in relation to their effectiveness, autonomy vs. safety, legal responsibility, and societal acceptance.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	No clear solutions or recommendations are provided. As a part of its conclusions the document suggests that persuasive technologies in cars can be a good alternative for systems that have the ability to take control away from the driver [even though such systems are not always seen by their users as too intrusive]. Persuasive and more dominant ("interfering") systems can also be used in combination (where persuasive systems are used as a first line of defence, before an "interfering" system will take more forceful measures). The document argues Dutch society should consider whether a moral obligation to make certain persuasive systems in cars mandatory given their supposed benefits for the safety of road users.
Format of the document (checklist, continuous text, other)?	Continuous text.
How is the document structured?	Chapters with subsections.
Why is the document important/useful for your country?	It is important because the Rathenau Institute advises the Dutch government and other policy-makers on important issues in relation to emerging robotics technologies. The institute's advice carries significant weight in policy circles.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Its analyses of the nature and effects of persuasive technologies in automobiles is somewhat useful for SIENNA.

Document 3 – Converging Roads: Linking Self-Driving Cars to Public Goals

Document found via (national associations or Google or another database)	National advisory organisation (Rathenau Institute's website)

Title of the document	Tem de Robotauto: De Zelfsturende Auto Voor Publieke Doelen (Converging Roads: Linking Self-Driving Cars to Public Goals [official translation of the report])
Kind of document (PEC, NAEG, GDREC)	NAEG (national advisory/ethics groups) document
Document developed by whom (organisation, profession)?	Rathenau Institute (a Dutch technology assessment organisation)
Year of publication (between 2005-2018)	2014/2015
Document saved in folder as	Rathenau_2014_Tem de Robotauto.pdf Rathenau_2015_Converging Roads.pdf (translated document)
Who is the stated audience	Policy-makers and the general public
What definition of AI&R is used in the document?	Definition of self-driving car is given, but no specific definitions of AI&R.
What forms forms of AI&R are described/covered in the document?	Self-driving cars, intelligent roads.
Which ethical issues are addressed in the document?	This document aims to clarify the different innovation approaches of the self-driving car. It shows that the two approaches – "cooperative systems" and "autonomous robot cars" - raise different governance issues and social questions. It argues the Dutch government should aim for convergence and integrate the robot car with the existing approach towards cooperative systems. The document argues that digitisation issues need to be addressed in such cooperative systems as a result of an explosion of available data and a rise in possible applications enabled by that data: "data-driven mobility and the socially responsible innovations that arise from it are only possible if answers are found to questions regarding privacy, data protection, re-use, ownership and management of data."
How are the ethical issues addressed? Are solutions offered? If so, which ones?	No solutions for the ethical issues are offered.
Format of the document (checklist, continuous text, other)?	Continuous text.
How is the document structured?	Chapters with subsections.
Why is the document important/useful for your country?	It is important because the Rathenau Institute advises the Dutch government and other policy-makers on important issues in relation to emerging robotics technologies. The institute's advice carries significant weight in policy circles.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	The document is of lesser importance to the development of the SIENNA codes and other ethical frameworks. It raises some potential future ethical issues with driverless cars, but mainly aims to clarify the different innovation approaches of the self-driving car, and provided some policy recommendations on how to properly integrate them.

Document 4 – Human Rights in the Robot Age: Challenges Arising from the Use of Robotics, Artificial Intelligence, and Virtual and Augmented Reality

Document found via (national associations or Google or another database)	National advisory organisation (Rathenau Institute's website)
Title of the document	Mensenrechten in het robottijdperk: Uitdagingen door het Gebruik van Robots, Kunstmatige Intelligentie, Virtual & Augmented Reality (Human Rights in the Robot Age: Challenges Arising from the Use of Robotics, Artificial Intelligence, and Virtual and Augmented Reality [official translation of the report])
Kind of document (PEC, NAEG, GDREC)	NAEG (national advisory/ethics groups) document
Document developed by whom (organisation, profession)?	Rathenau Institute (a Dutch technology assessment organisation)
Year of publication (between 2005-2018)	2017
Document saved in folder as	Rathenau_2017_Human Rights in the Robot Age.pdf
Who is the stated audience	Policy-makers and the general public
What definition of AI&R is used in the document?	AI&R are not explicitly defined in the document.
What forms forms of AI&R are described/covered in the document?	The report considers a number of AI&R technologies, from smart surveillance systems to care robots.
Which ethical issues are addressed in the document?	The report outlines ethical issues caused by novel AI&R technologies in relation to various human rights and ethical principles, such as: the right to the protection of personal data, the right to respect for private life, the right to respect for family life, human dignity, the right to the peaceful enjoyment of possessions, safety, responsibility and liability, the right to freedom of expression, the prohibition of discrimination, access to justice and the right to a fair trial, the right to not be measured, analysed or coached, and the right to meaningful human contact. Furthermore, it argues in favour of two novel human rights: the right to not be measured, analysed or coached, and the right to meaningful human contact.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	The document offers a number of recommendations in terms of policy steps for the ethical issues related to these rights (too many to list here).
Format of the document (checklist, continuous text, other)?	Continuous text.
How is the document structured?	Chapters for different human rights with descriptions of how a particular right may be impacted by new AI&R technologies.

Why is the document important/useful for your country?	The Rathenau Institute conducted the study for the Council of Europe and performed an ethical analysis of various AI&R technologies from the perspective of basic human rights, so the study has no special importance to the Netherlands.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Its focus on the impact of various AI&R technologies on human rights and its argument for two novel human rights (the right to not be measured, analysed or coached, and the right to meaningful human contact) make this document very relevant for SIENNA.

Document 5 – Urgent Upgrade: Protect public values in our digitized society

Document found via (national associations or Google or another database)	National advisory organisation (Rathenau Institute's website)
Title of the document	Opwaarderen: Borgen van publieke waarden in de digitale samenleving (Urgent Upgrade: Protect public values in our digitized society [official translation of the report])
Kind of document (PEC, NAEG, GDREC)	NAEG (national advisory/ethics groups) document
Document developed by whom (organisation, profession)?	Rathenau Institute (a Dutch technology assessment organisation)
Year of publication (between 2005-2018)	2017
Document saved in folder as	Rathenau_2017_Opwaarderen.pdf Rathenau_2017_Urgent Upgrade.pdf
Who is the stated audience	Policy-makers and the general public
What definition of AI&R is used in the document?	The document focuses on the broad trend of "digitisation" of society (covering such fields as robotics, biometrics, persuasive technology, digital platforms, augmented reality, virtual reality and social media, artificial intelligence, algorithms and big data). It does not offer explicit definitions of robotics and AI.
What forms forms of AI&R are described/covered in the document?	Various types of robots (e.g., manufacturing robots, household robots, driverless cars)
Which ethical issues are addressed in the document?	The document discusses ethical and societal issues raised by digitization. It concludes that digitization challenges important public values and human rights such as privacy, equal treatment, autonomy and human dignity. For robotics and AI, it lists ethical issues relating to such principles as privacy, safety, autonomy, security, equity and equality, balance of power and human dignity.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	The document offers governance recommendations to address these ethical and societal issues. It states that "[a]t the moment, government, industry and society are not yet adequately equipped to deal with these challenges. Great efforts need to be made at all levels of government and society to steer digitization in the right direction. An urgent upgrade of the governance system is needed, in which ethical and social values are

	structurally secured. The Rathenau Instituut proposes a national action programme for a responsible digital society."
Format of the document (checklist, continuous text, other)?	Continuous text.
How is the document structured?	Chapters and subchapters. Identification of ethical and societal issues and then government recommendations.
Why is the document important/useful for your country?	It is important because the Rathenau Institute advises the Dutch government and other policy-makers on important issues in relation to emerging AI&R technologies. The institute's advice carries significant weight in policy circles.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	It is useful in that it contains lengthy discussions of a fair number of social and ethical issues of emerging AI&R technologies in a variety of domains.

Document 6 – Contribution of the Rathenau Institute to the Roundtable Discussion on Artificial Intelligence in Law

Document found via (national associations or Google or another database)	National advisory organisation (Rathenau Institute's website)
Title of the document	Bijdrage Rathenau Instituut aan het Rondetafelgesprek Artificiële Intelligentie in het Recht (Contribution of the Rathenau Institute to the Roundtable Discussion on Artificial Intelligence in Law)
Kind of document (PEC, NAEG, GDREC)	NAEG (national advisory/ethics groups) document
Document developed by whom (organisation, profession)?	Rathenau Institute (a Dutch technology assessment organisation)
Year of publication (between 2005-2018)	2018
Document saved in folder as	Rathenau_2018_Bijdrage Rathenau Instituut aan het Rondetafelgesprek Artificiële Intelligentie in het Recht.pdf
Who is the stated audience	Policy-makers and the general public
What definition of AI&R is used in the document?	No definition of AI is offered.
What forms forms of AI&R are described/covered in the document?	AI systems used by the government, dealing with citizen's information.
Which ethical issues are addressed in the document?	The document lists a number of ethical issues in relation to government use of AI technologies: privacy, safety, justice, human dignity, autonomy, and control over the technology.

How are the ethical issues addressed? Are solutions offered? If so, which ones?	In the document, it is argued that we need to realize control over the "data values chain" in AI systems, from the gathering to the analysis to the application of data. It is argued that the Dutch government should make the AI algorithms it uses transparent, explainable and accountable. It must be able to explain to citizens where the algorithms are being applied, how they function internally and how they influence their lives. The government needs to ensure there is "algorithmic accountability", which can be achieved by conducting an Algoritmische Impact Assessment (AIA). In addition to providing information, government needs create effective oversight by instituting expert commissions and watchdog organisations to ensure algorithms are socially responsible.
Format of the document (checklist, continuous text, other)?	Continuous text. Three-page position paper.
How is the document structured?	-
Why is the document important/useful for your country?	It offers general recommendations to the Dutch government and other parties on the government use of AI technologies.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Some of the above-mentioned recommendations in the document may be of use in the development of the SIENNA codes and other ethical frameworks.

Document 8 – Keeping the Robot in Check: The Future of Work in the Second Machine Age

Document found via (national associations or Google or another database)	Google search
Title of the document	De Robot de Baas: De Toekomst van Werk in het Tweede Machinetijdperk (Keeping the Robot in Check: The Future of Work in the Second Machine Age)
Kind of document (PEC, NAEG, GDREC)	NAEG (national advisory/ethics groups) document
Document developed by whom (organisation, profession)?	Wetenschappelijke Raad voor het Regeringsbeleid (WRR) (The Netherlands Scientific Council for Government Policy)
Year of publication (between 2005-2018)	2015
Document saved in folder as	WRR_2015_De robot de baas.pdf
Who is the stated audience	Policy-makers and the general public
What definition of AI&R is used in the document?	A robot is defined in chapter 4 as a "device with sensors to perceive (something in its) environment, computer algorithms to take decisions on the basis of sensor data, and actuators to set some mechanical parts in motion."

What forms forms of AI&R are described/covered in the document?	Industrial robots, service robots
Which ethical issues are addressed in the document?	Ethical issues relating to the loss of jobs and the changing nature of work as a result of the use of robots and automation.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	In the document, it is argued that in order to ensure robotisation benefits the economy and does not pose a significant threat to workers, we need a robot agenda. "Complentarity" is key: collaboration between robot and human rather than robots replacing humans. In addition, attention should be paid to education, the quality of work and new issues of redistribution.
Format of the document (checklist, continuous text, other)?	Continuous text.
How is the document structured?	The document contains a number chapters on different subtopics that are approached from different disciplinary perspectives by different authors.
Why is the document important/useful for your country?	
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Some of the above-mentioned recommendations may be of use in the development of the SIENNA codes and other ethical frameworks.

Document 9 – Man and Technology: Together at Work

Document found via (national associations or Google or another database)	Google search
Title of the document	Mens en Technologie: Samen aan het Werk (Man and Technology: Together at Work)
Kind of document (PEC, NAEG, GDREC)	NAEG (national advisory/ethics groups) document
Document developed by whom (organisation, profession)?	Sociaal-Economische Raad (SER) (Social and Economic Council of the Netherlands)
Year of publication (between 2005-2018)	2016
Document saved in folder as	Mens en technologie Samen aan het werk_SER_2016.pdf
Who is the stated audience	Policy-makers and the general public
What definition of AI&R is used in the document?	No definitions given.

What forms forms of AI&R are described/covered in the document?	Manly AI&R technologies that are used in economic production.
Which ethical issues are addressed in the document?	This document focuses on various impacts on the labour market, the organisation of work and labour relations, and associated societal issues, caused by the process of digitisation.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	Focus on policy recommendations.
Format of the document (checklist, continuous text, other)?	Continuous text.
How is the document structured?	Analysis of issues, and offering of policy recommendations.
Why is the document important/useful for your country?	
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	This document is of lesser relevance in the development of SIENNA's ethical codes, as it is lacking in terms of ethical analysis/guidelines (it is more of a technical analysis of the negative societal effects of digitisation plus detailed policy recommendations to mitigate these effects).

5.8 Poland

TABLE 1: INDIVIDUAL AND COUNTRY INFORMATION

Your organisation	Helsinki Foundation for Human Rights
Your country	Poland
Search conducted in which language	Polish

TABLE 2: LIST OF ALL RELEVANT PROFESSIONAL ETHICS CODES

SIENNA area	Title of document (original + English translation)	URL	Year	Author/organisation	Stated audience	comments
AI	Kodeks Zawodowy Informatyków Polskiego Towarzystwa Informatycznego (Professional Code of IT Professionals of the Polish Information Processing Society)	http://www.pti.org.pl/Dla-czlonkow/Kodeks-Zawodowy-Informatykow-PTI	2011	Polskie Towarzystwo Informatyczne (Polish Information Processing Society)	professionals	
Robotics (?)	Kodeks Etyki Protetyki Słuchu (Code of Ethics of Hearing Aid Technicians)	https://goo.gl/Wd2DCW	2015	Polskie Towarzystwo Protetyki Słuchu (Polish Society of Hearing Aid Technicians)	professionals	

TABLE 4: LIST OF ALL RELEVANT GUIDANCE DOCUMENTS ON HOW TO WRITE RESEARCH ETHICS PROTOCOLS

Please note: these are examples of recommendations published by some of the local RECs. Not all 54 RECs have been looked at. Because the documents are not technology specific, it was not possible to carry out analysis referred to in Step 3, p. 7 of the Work plan.

Name of national REC	Title of document (original + English translation)	Ethical issues addressed in which SIENNA area (HG, HE, AI&R)?	URL	Stated audience	comments
Bioethics Committee by the Warsaw Chamber of Physicians	Regulamin Komisji Bioetycznej Rules of proceeding of a the bioethics committee (REC) by the Warsaw Chamber of Physicians	n/a (non-specific)	https://izba-lekarska.pl/wp-content/uploads/2015/03/Regulamin-Komisji-Bioetycznej.pdf	Researchers submitting the application.	Rules of proceeding the REC contain a form that has to be filled by the applicant. However there is no guidance on how to write a research ethics protocol
Bioethics Committee by the Warsaw	(Information on required documents)	n/a (non-specific)	https://komisja-bioetyczna.wum.edu.pl/content/szczeg%C3%B3%C5%	Researchers submitting the application.	REC provides information on what information should be given to participants and an example of an informed consent form.

Medical University			82owe-informacje-oraz-wzory-dokument%C3%B3w		
Bioethics Committee by the Copernicus University in Toruń Uniwersytet Mikołaja Kopernika w Toruniu	(Bioethics Committee - Remarks on the most common formal mistakes made when filling in applications)	n/a	https://www.cm.umk.pl/aktualnosci-2/2-collegium-medicum/165-komisja-bioetyczna.html https://www.cm.umk.pl/aktualnosci-2/2-collegium-medicum/561-komisja-bioetyczna-uwagi-odnosnie-najczestszych-bledow-formalnych-popelnianych-przy-wypelnianiu-wnioskow.html		REC provides information on the „most common formal mistakes", and are related to e.g. recruitment of participants, the use of medical data in research or on biological material.

TABLE 7: MOST RELEVANT DOCUMENTS IN AI & Robotics

Document found via (national associations or Google or another database)	National association
Title of the document	Professional Code of IT Professionals of the Polish Information Processing Society
Kind of document (PEC, NAEG, GDREC)	PEC
Document developed by whom (organisation, profession)?	Professionals (organisation of professionals)
Year of publication (between 2005-2018)	2011
Document saved in folder as	IT specialists professional code + 2011
Who is the stated audience	IT professionals

What definition of AI&R is used in the document?	None
What forms forms of AI&R are described/covered in the document?	The use of algorithms is addressed. According to point 2 the use of algorithms is not a goal in itself, but a means to solve IT problems in line with the principles of logic, respect for human rights, the natural environment, ergonomics, economics, linguistic correctness, quality standards and the specificity of a given area.
Which ethical issues are addressed in the document?	The purpose of informatics – not a goal in itself, but should serve other disciplines.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	n/a
Format of the document (checklist, continuous text, other)?	Introduction and 12 points
How is the document structured?	Introduction and 12 points
Why is the document important/useful for your country?	This is the only national document addressing ethics in informatics.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Although the document is concise, general and it does not address ethical issues related to AI (or robotics) directly, the statement that the use of algorithms should be in line with human rights seems noteworthy.

5.9 South Africa

TABLE 1: INDIVIDUAL AND COUNTRY INFORMATION

Names and emails of persons who did the work (if different from above)	Jantina de Vries
Your organisation	University of Cape Town
Your country (again)	South Africa
Search conducted in which language	English (lingua franca of official communication in South Africa)
Acknowledgements (any researcher who helped you to complete this task)	Prof. Emma Ruttkamp-Bloem; Prof Tommy Meyer; Prof Deshen Moodley

TABLE 2: LIST OF ALL RELEVANT PROFESSIONAL ETHICS CODES

Ethical issues addressed in which SIENNA area (HG, HE, AI&R)?	Title of document (original + English translation)	URL	Year	Author/organisation	Stated audience	comments
AI & R	Code of Conduct of the Institute of Information Technology Professionals South Africa	https://www.iitpsa.org.za/codes-of-conduct/	Not given	Institute of Information Technology Professionals South Africa	All (corporate) members of the Institute	Code very generic and not specific to AI, but does include statements like 'members should combat ignorance about technology' and is heavily premised on acting with integrity

TABLE 7: MOST RELEVANT DOCUMENTS IN AI & Robotics

Document found via (national associations or Google or another database)	Colleague
Title of the document	Autonomous weapons in armed conflict and the right to a dignified life: an African perspective
Kind of document (PEC, NAEG, GDREC)	Scholarly article
Document developed by whom (organisation, profession)?	Christopher Heyns (Former Representative for the African Union at the UN)
Year of publication (between 2005-2018)	2017
Document saved in folder as	https://www.tandfonline.com/doi/full/10.1080/02587203.2017.1303903?scroll=top&needAccess=true
Who is the stated audience	Academic publication
What definition of AI&R is used in the document?	Autonomous weapon system
What forms forms of AI&R are described/covered in the document?	ibid
Which ethical issues are addressed in the document?	Authors explores whether completely autonomous weaponised systems should be allowed and under what conditions. Although mostly quite general, it does bring in the African Charter on Human and Peoples' Rights which incorporates the right to dignity (and outlaws undignifying punishments or treatments). Exploring the various ways in which 'human dignity' could be affected by killing conducted by fully autonomous systems, the author then argues for 'meaningful human control' over almost-autonomous systems. The analysis is not really typical to the African context though, but rather more generic.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	See above
Format of the document (checklist, continuous text, other)?	Academic journal article
How is the document structured?	
Why is the document important/useful for your country?	Somewhat
Is the document useful for the development of the SIENNA codes and	Not really, article doesn't go beyond generic issues and considerations that would be true across the world.

other ethical frameworks? If yes, please explain.	

Document found via (national associations or Google or another database)	Google
Title of the document	AI likely to hit South Africa harder than other countries: expert
Kind of document (PEC, NAEG, GDREC)	Newspaper article
Document developed by whom (organisation, profession)?	Staff writer at Business Tech
Year of publication (between 2005-2018)	2018
Document saved in folder as	https://businesstech.co.za/news/technology/217807/ai-likely-to-hit-south-africa-harder-than-other-countries-expert/
Who is the stated audience	Business leaders
What definition of AI&R is used in the document?	Not specified.
What forms forms of AI&R are described/covered in the document?	Not specified
Which ethical issues are addressed in the document?	Three ethical issues: That AI would increase unemployment; That AI would increase inequality in South African society by concentrating wealth in the hands of those who have (because they are more likely to make effective use of AI early on). Companies could use AI to try to control market segments. A compounded challenge is that governments in 'developing countries' may be ineffective and burdened with corruption and bureaucracy, and unable to effectively regulate the use of AI to promote the social good; AI will only affirm existing social divisions and discrimination, because AI algorithms are designed in line with existing biases or prejudice (including racial, gender).
How are the ethical issues addressed? Are solutions offered? If so, which ones?	No, they are just mapped out, not discussed

Format of the document (checklist, continuous text, other)?	Newspaper article
How is the document structured?	
Why is the document important/useful for your country?	Yes
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes, in outlining the ethical challenges around the rollout of AI for countries like SA.

Document found via (national associations or Google or another database)	Google
Title of the document	Developing countries need to wake up to the risks of new technologies
Kind of document (PEC, NAEG, GDREC)	Newspaper article
Document developed by whom (organisation, profession)?	Ralph Hamann at The Conversation
Year of publication (between 2005-2018)	2018
Document saved in folder as	https://theconversation.com/developing-countries-need-to-wake-up-to-the-risks-of-new-technologies-87213
Who is the stated audience	African professionals (academics, government, business)
What definition of AI&R is used in the document?	Not specified.
What forms forms of AI&R are described/covered in the document?	Not specified
Which ethical issues are addressed in the document?	Article is a bit more expansive than the one found in The Business (see above) but introduces the same ethical issues, namely that That AI would increase unemployment; That AI would increase inequality in South African society by concentrating wealth in the hands of those who have;

	AI will only affirm existing social divisions and discrimination, because AI algorithms are designed in line with existing biases or prejudice (including racial, gender).
How are the ethical issues addressed? Are solutions offered? If so, which ones?	No, they are just mapped out, not discussed
Format of the document (checklist, continuous text, other)?	Website article
How is the document structured?	
Why is the document important/useful for your country?	Yes
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes, in outlining the ethical challenges around the rollout of AI for countries like SA.
Document found via (national associations or Google or another database)	Google
Title of the document	The rise of artificial intelligence in Africa
Kind of document (PEC, NAEG, GDREC)	Website article
Document developed by whom (organisation, profession)?	How we made it in Africa; Africa business insight
Year of publication (between 2005-2018)	2017
Document saved in folder as	https://www.howwemadeitinafrica.com/rise-artificial-intelligence-africa/59770/
Who is the stated audience	Not specified (business community)
What definition of AI&R is used in the document?	Not specified
What forms forms of AI&R are described/covered in the document?	Not specified (but described as 'Fourth Industrial Revolution' and as constituting a blurring between physical, biological and digital worlds)
Which ethical issues are addressed in the document?	On the one hand, article expresses a concern that on the one hand "many African countries are still battling with issues related to the first, second and third industrial revolutions such as electricity, mechanisation of production and automation" and that the infrastructure and social structures do not situate it to benefit from the 4th industrial revolution.

	On the other, article lists several examples where African business has been amongst the early adopters of this new technology. Examples include AI used to trace coffee throughout the production chain in Ethiopia, and use of AI&R to optimise crop harvest by early detection of problematic areas in the crop. Other examples are the use of AI to predict patient genotypes (also used in SA); (the use of drones) for the distribution of urgent medical supplies to rural areas of Rwanda; and the use of AI in smartphones to help in the diagnosis of cervical cancer.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	Not addressed, issues just introduced
Format of the document (checklist, continuous text, other)?	Continuous text
How is the document structured?	
Why is the document important/useful for your country?	Yes, in introducing some concrete ways in which AI has already been used in the African context
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Somewhat

Document found via (national associations or Google or another database)	Google
Title of the document	Developing countries need to wake up to the risks of new technologies
Kind of document (PEC, NAEG, GDREC)	Newspaper article
Document developed by whom (organisation, profession)?	Ralph Hamann at The Conversation
Year of publication (between 2005-2018)	2018
Document saved in folder as	https://theconversation.com/developing-countries-need-to-wake-up-to-the-risks-of-new-technologies-87213
Who is the stated audience	African professionals (academics, government, business)
What definition of AI&R is used in the document?	Not specified.
What forms forms of AI&R are described/covered in the document?	Not specified
Which ethical issues are addressed in the document?	Article is a bit more expansive than the one found in The Business (see above) but introduces the same ethical issues, namely that That AI would increase unemployment; That AI would increase inequality in South African society by concentrating wealth in the hands of those who have; AI will only affirm existing social divisions and discrimination, because AI algorithms are designed in line with existing biases or prejudice (including racial, gender).
How are the ethical issues addressed? Are solutions offered? If so, which ones?	No, they are just mapped out, not discussed
Format of the document (checklist, continuous text, other)?	Website article
How is the document structured?	
Why is the document important/useful for your country?	Yes
Is the document useful for the development of the SIENNA codes and	Yes, in outlining the ethical challenges around the rollout of AI for countries like SA.

other ethical frameworks? If yes, please explain.	
Document found via (national associations or Google or another database)	Google
Title of the document	The rise of artificial intelligence in Africa
Kind of document (PEC, NAEG, GDREC)	Newspaper article
Document developed by whom (organisation, profession)?	Drones will soon decide who to kill
Year of publication (between 2005-2018)	2018
Document saved in folder as	https://www.timeslive.co.za/news/sci-tech/2018-04-23-drones-will-soon-decide-who-to-kill/
Who is the stated audience	Not specified (general audience)
What definition of AI&R is used in the document?	Not specified
What forms forms of AI&R are described/covered in the document?	Drones, and in particular autonomous weaponised drones.
Which ethical issues are addressed in the document?	Article introduces questions about whether it is appropriate that drones make decisions about who to kill, and also questions the involvement of humans in deciding when an AI system has learnt enough to be allowed to operate autonomously
How are the ethical issues addressed? Are solutions offered? If so, which ones?	Issues raised, not addressed
Format of the document (checklist, continuous text, other)?	Newspaper article
How is the document structured?	
Why is the document important/useful for your country?	Introduces some of these ethical issues to the general South African audience
Is the document useful for the development of the SIENNA codes and	Not particularly

other ethical frameworks? If yes, please explain.	

Document found via (national associations or Google or another database)	Google
Title of the document	Developing countries need to wake up to the risks of new technologies
Kind of document (PEC, NAEG, GDREC)	Newspaper article
Document developed by whom (organisation, profession)?	Ralph Hamann at The Conversation
Year of publication (between 2005-2018)	2018
Document saved in folder as	https://theconversation.com/developing-countries-need-to-wake-up-to-the-risks-of-new-technologies-87213
Who is the stated audience	African professionals (academics, government, business)
What definition of AI&R is used in the document?	Not specified.
What forms forms of AI&R are described/covered in the document?	Not specified
Which ethical issues are addressed in the document?	Article is a bit more expansive than the one found in The Business (see above) but introduces the same ethical issues, namely that That AI would increase unemployment; That AI would increase inequality in South African society by concentrating wealth in the hands of those who have; AI will only affirm existing social divisions and discrimination, because AI algorithms are designed in line with existing biases or prejudice (including racial, gender).
How are the ethical issues addressed? Are solutions offered? If so, which ones?	No, they are just mapped out, not discussed
Format of the document (checklist, continuous text, other)?	Website article
How is the document structured?	

Why is the document important/useful for your country?	Yes
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes, in outlining the ethical challenges around the rollout of AI for countries like SA.
Document found via (national associations or Google or another database)	Google
Title of the document	Artificial Intelligence Researchers Must Learn Ethics
Kind of document (PEC, NAEG, GDREC)	Website article
Document developed by whom (organisation, profession)?	Tech Financials
Year of publication (between 2005-2018)	2017
Document saved in folder as	https://techfinancials.co.za/2017/08/30/artificial-intelligence-researchers-must-learn-ethics/
Who is the stated audience	Not specified (business community)
What definition of AI&R is used in the document?	Not specified
What forms forms of AI&R are described/covered in the document?	Autonomous weapons, self-driving cars
Which ethical issues are addressed in the document?	Article calls for people involved in the development of AI to also be trained or empowered to engage in deep intellectual thinking about ethics and moral reasoning
How are the ethical issues addressed? Are solutions offered? If so, which ones?	Not addressed, issues just introduced
Format of the document (checklist, continuous text, other)?	Continuous text
How is the document structured?	
Why is the document important/useful for your country?	Yes, in introducing some concrete ways in which AI has already been used in the African context

Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Somewhat

5.10 Spain

TABLE 1: INDIVIDUAL AND COUNTRY INFORMATION

Names and emails of persons who did the work (if different from above)	JAVIER VALLS jvalls@ugr.es
Your organisation	University of Granada
Your country (again)	Spain
Search conducted in which language	Spanish
Acknowledgements (any researcher who helped you to complete this task)	

TABLE 2: LIST OF ALL RELEVANT PROFESSIONAL ETHICS CODES

SIENNA area	Title of document (original + English translation)	URL	Year	Author/organisation	Stated audience	comments
AI&R	Barcelona Declaration	https://www.bdebate.org/sites/.../barcelona-declaration_v7-1-eng....	2017	Obra Social la Caixa	AI practitioners	It is a draft at the moment

TABLE 7: MOST RELEVANT DOCUMENTS IN AI & Robotics

Document found via (national associations or Google or another database)	Google
Title of the document	Draft of a future ethical code
Kind of document (PEC, NAEG, GDREC)	PEC
Document developed by whom (organisation, profession)?	IBE-UPF CSIC
Year of publication (between 2005-2018)	2017
Document saved in folder as	Barcelona Declaration
Who is the stated audience	AI practitioners

What definition of AI&R is used in the document?	a collection of computational components to build systems that emulate functions carried out by the human brain
What forms forms of AI&R are described/covered in the document?	Knowledge bases and data driven AI
Which ethical issues are addressed in the document?	A limited use of the AI particularly based on prudence: try to avoid risk situation and not to force the use of AI outside the common sense. Test them before use it. This control system have been already use it in autonomous robot but not in data driven AI. Accountability: In automatic decision making that affect human should be an explanation of this decision. Responsibility: particular in the case of boots in social networks. One solution could be to make it obligatory clear whether an interaction originates from a human or from an AI system, and that, in the case of an artificial system, those responsible for it can be traced and identified. Constrain autonomy: AI decision making have to be ruled by clear rules in a way developers can embed them in their aplication. Human role: Human has to control the AI decision making having the last word.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	(above)
Format of the document (checklist, continuous text, other)?	Continuous text
How is the document structured?	An introduction of the important of AI in a new age for the society but also the risk that should be faced It focus in 6 point: Prudence; Reliability; Accountability; Responsibility; Constrained autonomy and Human role
Why is the document important/useful for your country?	The leader is seated in Barcelona and some other research groups in AI&R has join to the proposal
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	It is a base of the future develop of AI&R use and pretend to be a referent for European and International level.

5.11 Sweden

TABLE 1: INDIVIDUAL AND COUNTRY INFORMATION

Names and emails of persons who did the work (if different from above)	HC Howard, Emilia Niemiec, Caroline Gallant, and Cornelia Tandre Heidi.howard@crb.uu.se
Your organisation	Uppsala University
Your country (again)	SWEDEN
Search conducted in which language	Swedish and English
Acknowledgements (any researcher who helped you to complete this task)	NA

TABLE 2: LIST OF ALL RELEVANT PROFESSIONAL ETHICS CODES

SIENNA area	Title of document	URL	Year	Author/organisation	Stated audience	Comments
HE/AI/RO	Hederskodex (Honorary codex)	https://www.sverigesingenjorer.se/Om-forbundet/Sa-tycker-vi/hederskodex/		Sveriges ingenjörer	Ingenjörer	Meta level guidance for engineers
AI	Artificiell intelligens i svenskt näringsliv och samhälle (new!)	https://www.vinnova.se/contentassets/55b18cf1169a4a4f8340a5960b32fa82/vr_18_08.pdf	2018	Vinnova (funders for innovation)		It's informatic, political and economical but there is a part where they cite this international document with ethical recommendations for AI https://arxiv.org/pdf/1802.07228.pdf Very long report, mentione few ethical issues buried in the more "pro" innovation discourse

TABLE 3: LIST OF ALL RELEVANT DOCUMENTS FROM NATIONAL ADVISORY/ETHICS GROUPS

SIENNA area	Title of document	URL	Year	Author/organisation	Stated audience	Comments
Ai/R	Robots and surveillance in the care of older - ethical aspects (Robotar och övervakning i vården av äldre – etiska aspekter)	http://www.smer.se/wp-content/uploads/2015/02/Sammanfattning-robotar-engE-ändrad.pdf	2003	SMER	AI/R Stakeholders	The Swedish National Council on Medical Ethics has, on its own initiative, prepared this report on the ethical aspects of robots and monitoring in the care of elderly people. The aim of the report is to encourage public debate and provide support ahead of decisions on the use of robots and monitoring in health and medical care, and care provided by social services, to elderly people. The report is limited to only cover such robots as specified in Chapter 2 and monitoring using cameras and GPS transmitters. NO Ethical guidance per se

TABLE 4: LIST OF ALL RELEVANT GUIDANCE DOCUMENTS ON HOW TO WRITE RESEARCH ETHICS PROTOCOLS

SIENNA area	Title of document	URL	Name of national REC	Stated audience	Comments
HG + All types with humans	Vägledning till ansökan (Guidance for application)	https://www.epn.se/media/2469/vaegledning-till-ansokan.docx https://www.epn.se/start/	Etikprövningsnämnderna	Researchers	There is one part called “Redogör för om insamlat biologiskt material kommer att förvaras i en biobank” so it should apply to HG. For all research involving humans
All	Vägledning till forskningsplan/ forskningsproto	https://www.epn.se/media/1103/v_gledning_till_forskningsplan.pdf	Etikprövningsnämnderna	Researchers	could be relevant as a complement, but very brief and mostly about the research protocol application, not the ethics per se

	koll (program) (Guidance for research plan/research protocol (program))	https://www.epn.se/start/			
Potentially all	Vägledning till forskningspersonsinformation (Guidance for research person information)	https://www.epn.se/media/2573/vaegledning-till-forskningspersonsinformation gdpr-med-korrigeringar.pdf https://www.epn.se/start/	Etikprövningsnämnderna	Researchers	Guide to research professionals information. Useful for information needed to recruit human subjects u
HG/Biomed professions	Yrkesetiska koder	https://www.vardforbundet.se/rad-och-stod/regelverket-i-varden/etik/yrkesetiska-koder/	Vårdförbundet	See ->	Vårdförbundet is a union for nurses, midwives, biomedical scientists and radiology nurses. PECs for all the professions can be found at their websites.
ALL	Nationella etiknätverket (KI)	https://ki.se/lime/etik-i-praktiken		Researchers and other stakeholders in research	A They have some good links on their website,like the mapping of all regional ethics groups for example. They also make documents where they collect new articles, laws e.t.c. about ethics (e.g. https://ki.se/sites/default/files/2017/11/02/omvarldsbevakning_varen_2017.pdf) No ethical guidelines.

TABLE 7: MOST RELEVANT DOCUMENTS IN AI & Robotics[28]

Document found via (national associations or Google or another database)	Google
Title of the document	Hot och risker med framtida teknologier (Threats and risks of future technologies)
Kind of document (PEC, NAEG, GDREC)	NAEG
Document developed by whom (organisation, profession)?	The research on which the document is based on is done by FOI and KTH. MSB has financed the research and published the document.
Year of publication (between 2005-2018)	2011?
Document saved in folder as	
Who is the stated audience	Society*
What definition of AI&R is used in the document?	
What forms forms of AI&R are described/covered in the document?	
Which ethical issues are addressed in the document?	
How are the ethical issues addressed? Are solutions offered? If so, which ones?	
Format of the document (checklist, continuous text, other)?	
How is the document structured?	
Why is the document important/useful for your country?	
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	

[28] Please note that the quotes included in these tables are based on translations obtained using Google Translate software, which were then refined by the authors. Yet, they may not always precisely reflect the content of the documents; they are rather indicative of their content.

fahB Table 7.1

Document found via (national associations or Google or another database)	Google
Title of the document	Robots and surveillance in the care of older - ethical aspects (Robotar och övervakning i vården av äldre – etiska aspekter)
Kind of document (PEC, NAEG, GDREC)	NAEG
Document developed by whom (organisation, profession)?	SMER - the Swedish National Council on Medical Ethics (Statens medicinsk-etiska råd)
Year of publication (between 2005-2018)	2014
Document saved in folder as	Smer-2014_2_webb
Who is the stated audience	
What definition of AI&R is used in the document?	Robot “What a robot is can be described in many different ways. In this report, the term robot is used as follows. A robot is a technical device with specific properties that exist physically, reads its environment with sensors, analyzes the information and acts. That a robot physically exists differs from software that controls computers. That it analyzes data excludes machines that are completely controlled by remote controls, such as toys. The robot's analysis further means that it can process information that it accepts and that it makes decisions independently based on a predetermined programming.” (p.21)
What forms forms of AI&R are described/covered in the document?	From page 22 “feeding” robot/robot that helps with eating (Ätrobotar) communication robot (kommunikationsrobotar) – it can be a mobile phone which is controlled via a computer over the internet and which has a display like "face". One such may make it possible for healthcare professionals and others to communicate with the patient. robots arms and motion-assisting robots (Robotarmar och rörelseassisterande robotar) assisting and training robots (Assisterande robotar och träningsrobotar) There are assisting robots that can help in everyday life for example by picking up items, reminding things and help the user

	get up. One example is the robot "HERB" (Home Exploring Robot Butler) that can be found on its own and with the help of two robotic arms pick up and turn off things, give them to people etc. Companion and therapy robots This type of robot needs to have cognitive abilities such as perception, learning through observation, memory and ability to communicate and interact with people. They are for example designed for to interact with people, increasing zest for life, spreading joy and be a tool for therapy and education. Service Robots Service robots facilitate people by doing jobs which are dirty, heavy, weary, dangerous or repetitive and can also used in hospitals. An example is "RobCab" that helps for transport and already in use in Swedish healthcare. Transport robots Transport robots help persons with reduced mobility to move between different places and can range between wheelchairs and small cars. Human robots Human or humanoid robots have the most advanced technology and may in some cases copy complex human movements. Certain are designed to assist in everyday activities and houshold works.
Which ethical issues are addressed in the document?	Starts on page 53: • “When is it ethically justifiable to transfer care and care tasks to a robot? Among other things, questions about what good quality good care and quality care means, as well as human needs such as social incentive. • How can a fair distribution of resources be ensured takes place so that those in need of the new technology have access the? • How is the right to self-determination and to persons guaranteed? With reduced decision-making skills, the care they need and that their will be considered?

	• Is it possible to balance the intrusion of the individual? integrity and benefit with technology and if so how? • How to ensure that research and development of new technologies are evaluated from an ethical perspective as well as ethical assessments is being made for the introduction of robots in health care and social services Value conflicts When using health robots, value conflicts can be actualized and here are a number of interests exemplified by each other conflict with each other: - The interest in the individual to get good care. - The interest in the individual to have social incentives and their need for human presence catered for. - the interest for the individual to have access to a particular health robot as can improve his or her health and quality of life. - the care provider's interest in saving resources or streamlining operations. - caregiver's interest in attracting workers through new technology and create an attractive business for their employees. - healthcare professionals' interest in having a good working environment and avoiding for example heavy lifting." Then the arguments for and against are discussed p. 69: "The discussion concerns the ethical aspects of healthcare monitoring and care of elderly people. Ethical issues • When is it ethically justifiable to use camera and GPS in care of the elderly? Among other things, Updating questions about what good care and good quality care means human needs as well social incentive. • How is the right to self-determination and to persons guaranteed? With reduced decision-making skills, the care they need and that their will be considered? • Is it possible to balance the intrusion of the individual integrity and the benefit of the monitoring

	and, if so, how? Conflicts of values When using camera and GPS surveillance in the care of older values conflicts can be actualized and exemplified here The number of interests that may interfere with each other can be: - The interest in the individual to get good care - The interest in the individual to have social incentives and their need for human presence catered for - the interest of the individual and his relatives to get his personal integrity respected - the care provider's interest in saving resources or streamlining business - the healthcare staff's interest in not spending time between different healthcare providers (camera surveillance) - Relatives' interest in knowing where the elderly are (GPS monitoring) - society's interest in complying with current legislation, eg requirements consent to monitoring efforts." Then the arguments for and against are discussed and stakeholders discussed.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	p. 68 "A responsible authority should be instructed to implement such assessments and evaluations. In an assessment in the individual case of a health robot, used in particular should be ensured: • an individual assessment based on the individual's conditions and needs are made if the action is appropriate. Questions like The meaning is: what benefit does the robot have for the individual? Which risks are there? What is the individual's own attitude? It has to Guaranteed that the individual receives his / her need for social incentives

	and that the robot does not adversely affect it. • that the individual's consent to an effort is informed and voluntarily. • Complete information is provided in an appropriate manner and that the person understood the information. • that an equivalent option is offered to the person if this is thanks no to the effort. • testing is done according to the individual's needs and a trial period applied when the person is given the opportunity to test the health robot. • that follow-up and evaluation are done by staff with expertise for the assignment, checking that the individual gets his care and care needs. If this is not the case, The bet ends immediately. • Sensitive information about the individual registered by the health robot protected as well as retrieval and handling of information limited as far as possible. In the case of elderly people with reduced decision-making capacity, the Council wishes to emphasize that it is extra important for healthcare professionals to be careful about how information is provided that it is ensured that the individual understood the information, that additional responsiveness is shown and support is given to enable a position before a robot is introduced to healthcare. The there is another risk that the person's will is not respected and that person do not get the necessary care and care which is contrary to both ethical principles and legislation” p.78, on monitoring of elderly: “The Council considers that before surveillance measures are introduced in health care as well as social services, an assessment must be made of which Consequences Monitoring can get for ethical values. It is therefore decisive that careful assessments are made in each case so that the individual's right to self-determination, integrity and equal care on equal termsconditions are respected as well as requirements for good care and care of good quality is met. Such an

	assessment must be done before supervision starts to use. In the activities there should be one person who is responsible for this happening. With the supervision that can be carried out with the help of Only a camera is limited, the Council sees a risk of using it as compensation for personal visits if not supervised supplemented with other supervision or additional technical solutions. In an assessment in the individual case of monitoring, used in particular should be ensured: • an individual assessment based on the individual's conditions and needs are made if the action is appropriate. Questions like The meaning is: what benefit does the supervision have for the individual? What are the risks? What is the individual's own attitude? It has to Guaranteed that the individual receives his / her need for social incentives and that monitoring does not adversely affect same. • that the individual's consent to an effort is informed and voluntarily. • that full information is provided on how the monitoring is conducted, who which is authorized to access the information that is registered, when information is recorded, etc. and that information is provided in an effective manner. It must also be ensured that the person understood the information. • that an equivalent option is given to the person if this is not accepted insert. • testing is done according to the individual's needs and a trial period applied when the person is given the opportunity to test the bet. • that follow-up and evaluation are done by staff who have competence for the assignment, then it is checked that the individual will be able to meet his care and care needs. If this is not the case shall the monitoring be terminated immediately. • that sensitive information about the user being registered is protected and that the collection and management of information is limited as far as possible. In particular, the Council wishes to emphasize the importance of achieving a balance between the benefit of the monitoring and the violation of the integrity of the individual as surveillance

	means. Measures should therefore be taken to ensure that integrity intrusion becomes as limited as possible. In the case of elderly people with reduced decision-making capacity, the council wishes emphasize that it is extra important for healthcare professionals to be careful how information is provided to ensure that the individual understands information, additional responsiveness and support to enable a position to be taken before supervision is introduced in care. There is another risk that the person's will not be respected and that the person does not receive the necessary care and care which violates both ethical principles and legislation.”
Format of the document (checklist, continuous text, other)?	Continuous text, with some bullet points, like in the cell above for example.
How is the document structured?	Chapters: Introduction to robotics, various types of robots; analysis of ethical issues; recommendations
Why is the document important/useful for your country?	
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes, very in line and relevant with what we do in SIENNA

Table 7.2

Document found via (national associations or Google or another database)	
Title of the document	Hederskodex (Code of honor)
Kind of document (PEC, NAEG, GDREC)	looks like PEC
Document developed by whom (organisation, profession)?	Sveriges ingenjörer – Swedish engineers
Year of publication (between 2005-2018)	not stated
Document saved in folder as	Sverigesingenjorer
Who is the stated audience	Engineers

What definition of AI&R is used in the document?	no definition
What forms forms of AI&R are described/covered in the document?	not specified
Which ethical issues are addressed in the document?	responsibility: that the technology is used in a manner that benefits humanity, the environment and society. avoiding harmful effects of tech transparency of their knowledge 'Engineers ought not to work for or cooperate with companies and organizations of a questionable nature or with objectives that conflict with personal beliefs.' integrity? loyalty to colleagues and employers fairness: 'Engineers must not use inappropriate methods when competing for employment, assignments or orders, and nor should they attempt to damage the reputation of colleagues with unfounded allegations.' confidentiality when required about inventions etc. openness about conflicts of interest transparency and honesty in reporting on science responsibility to ensure others adhere to the principles
How are the ethical issues addressed? Are solutions offered? If so, which ones?	to adhere to the principles summarized above
Format of the document (checklist, continuous text, other)?	bullet points
How is the document structured?	one page, mainly bullet points
Why is the document important/useful for your country?	gives principles which should be uphold by engineers
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	potentially yes, the document is very clear on which principles should be followed

Table 7.3.

Document found via (national associations or Google or another database)	
Title of the document	Nationell inriktning för artificiell intelligens (National orientation for artificial intelligence)
Kind of document (PEC, NAEG, GDREC)	
Document developed by whom (organisation, profession)?	Näringsdepartementet (the Ministry of Enterprise, and Innovation)
Year of publication (between 2005-2018)	2018
Document saved in folder as	2018ai_webb.pdf
Who is the stated audience	
What definition of AI&R is used in the document?	"Artificial intelligence has no clear definition or generally accepted demarcation, but there are many definitions. In general, however, intelligence is meant by machines. Vinnova (2018) Artificial intelligence in Swedish business and society. Partial report 2018-02-12, dnr 2017-05616." (Artificiell intelligens har...)
What forms forms of AI&R are described/covered in the document?	Mentioned "At present, there are examples that AI can help to better identify diseases, reduce energy use, reduce traffic accidents, create new services, streamline industrial production, developing new drugs and shortening processing times."
Which ethical issues are addressed in the document?	Mentioned: "There may be unwanted or unforeseen consequences of using AI as a result of angled or manipulated data, lack of transparency, abuse or hostile use. This can lead to discrimination, reduced trust, economic harm and impact on democracy's functioning." (Swedish: Det kan finnas oönskade eller oförutsedda kon- sekvenser av att använda AI som följd av vinklade eller manipule- rade data, bristande transparens, missbruk eller fientlig använd- ning. Det kan leda till diskrimi- nering, minskad tillit, ekonomisk skada och påverkan på demokra- tins funktionssätt.) 'Not least, critical systems and systems affect the physical world, such as self-driving vehicles or AI applications in healthcare.'

	Please see more below
How are the ethical issues addressed? Are solutions offered? If so, which ones?	'Public actors should therefore actively support AI applications by taking into account relevant data and developing a national digital infrastructure, taking into account security and integrity. A comprehensive theme should be sustainable AI, meaning that AI applications should be ethical, safe, reliable and transparent. Not least, critical systems and systems affect the physical world, such as self-driving vehicles or AI applications in healthcare. Ethical and security considerations can not be a reflection in AI applications, but must be an integral part of the early design work.' "Sweden needs strong AI content in non-technical education with the aim of creating the prerequisites for broad and responsible application of the technology" (Sverige behöver ett starkt AI-innehåll i icke-tekniska utbildningar i syfte att skapa förutsättningar för en bred och ansvarsfull tillämpning av tekniken.) "Interdisciplinary knowledge is crucial to ensuring ethical, safe and sustainable use of AI. Relevant AI knowledge is needed not only at technical experts but also by leaders, managers and other professionals who meet the technology." (Det interdisciplinära kunnandet är av- görande för att kunna säkerställa etisk, säker och hållbar använd- ning av AI. Relevant AI-kunskap behövs inte bara hos tekniska ex- perter utan också bland ledare, chefer och andra yrkesgrupper som möter tekniken.) "At the same time, it is important that the AI system is carefully designed to prevent malicious behavior. It is therefore important that companies and public institutions cooperate with relevant academic environments, for example through joint projects or exchanges of staff. (Samtidigt är det viktigt att syste- men för AI...) "The government's assessment is that: • Sweden needs pilot projects, test beds and environments for the development of AI applications in the public and private sectors, with the potential to contribute to the safe and responsible development of the use of AI. • Sweden needs to continue developing its efforts to prevent and manage the risks of AI.

	• Sweden needs to develop partnerships and collaborations on the use of AI applications with other countries, especially within the EU. (Regeringens bedömning är att: • Sverige behöver pilotprojekt…) “AI also follows risks. It may involve new types of intellectual cyber attacks or manipulated data that can have serious consequences. AI may also lower the thresholds for attacks against demographic functions, such as disinformation. The risks associated with AI are not only technical but also ethical, not least in terms of public sector appeals. The use of AI algorithms must be transparent and understandable. The use of AI requires a position to take legal and legal issues and poses challenges regarding, for example, the rule of law and the automation of government decisions. A reputable ethical question is how an automated vehicle should resonate and act on it In an emergency, you have to choose between two outcomes, both of which mean that people may be injured. Sweden has the opportunity to take a le- darroll in ethical, safe and sustainable use of AI by actively working on the issue nationally and driving it internationally.” (Med AI följer också risker…) “Sweden needs to develop rules, standards, norms and ethical principles to guide ethical and sustainable AI and use of AI. • Sweden needs to work for Swedish and international standards and regulations that promote the use of AI and prevent risks.” The development and use of AI needs to be guided by norms and ethical principles aimed at benefiting from benefits and at the same time minimizing risks to society as well as to individuals. It is a question not only for researchers and engineers but for a wide range of professional categories. AI basic requirement for AI is access to data, which is an essential part of the infrastructure. As society is digitized, there is a growing amount of data available in digital form. It includes data created by human hand and auto-collected data, such as data from sensors. Often, extensive work requires data to be useful. Risks may occur in the form of incorrect or

	otherwise undesirable results if data is not high quality, eg. due to errors in registrations, systematic (conscious as well as unconscious) errors in the collection, selection of sources or labeling of data. Appropriate framework with principles, standards, standards and regulations is therefore an important prerequisite for Sweden to realize the benefits of AI in society. Such frameworks must balance the fundamental needs of integrity protection, ethics, trust and community protection with the necessary access to data to enable the potential of AI."
Format of the document (checklist, continuous text, other)?	Continuous text about possibilities AI opens and how its development should be facilitated including securing ethical aspects are addressed
How is the document structured?	
Why is the document important/useful for your country?	Yes, gives idea what Swedish government sees as important to pay attention to.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	

5.12 UK

Intro: This document presents the results of the UK country research for artificial intelligence (AI) and robotics professional ethics codes, guidance documents from national advisory/ethics groups. It has five tables: 1. Individual and country information, 2. List of relevant professional ethics codes (PECs), 3. List of all relevant documents from national advisory/ethics groups (NAEGs) 4. List of relevant guidance documents on how to write research ethics protocols (GDRECs) and 5. Most relevant documents in AI&R – analysis. A summary follows.

TABLE 1: INDIVIDUAL AND COUNTRY INFORMATION

Names and emails of persons who did the work (if different from above)	Rowena Rodrigues rowena.rodrigues@trilateralresearch.com David Wright david.wright@trilateralresearch.com
Your organisation	Trilateral Research Ltd
Your country (again)	UK
Search conducted in which language	English
Acknowledgements (any researcher who helped you to complete this task)	-

TABLE 2: LIST OF ALL RELEVANT PROFESSIONAL ETHICS CODES (PECs) (AI&R)

SIENNA area	Title of document (original + English translation)	URL	Year	Author/organisation	Stated audience	comments
AI&R	Data Ethics Framework	https://www.gov.uk/government/publications/data-ethics-framework/data-ethics-framework	2018	UK Government Department for Digital, Culture, Media & Sport	Anyone working directly or indirectly with data in the public sector, including data	

					practitioners (statisticians, analysts and data scientists), policymakers, operational staff and those helping produce data-informed insight.	
AI&R	Technology Code of Practice	https://www.gov.uk/government/publications/technology-code-of-practice/technology-code-of-practice	Updated 2018	UK Government Digital Service	Government departments	The Technology Set of criteria to help government design, build and buy better technology. It's used as a cross-government agreed standard in the spend control process.
General	Ethical Guidelines for Educational Research	https://www.bera.ac.uk/wp-content/uploads/2018/06/BERA-Ethical-Guidelines-for-Educational-Research_4thEdn_2018.pdf?noredirect=1	2018	British Educational Research Association (BERA)	BERA members and those engaged in carrying out, sponsoring or using educational research who are not BERA members.	
AI&R	Statement of Ethical Principles	https://www.engc.org.uk/standards-guidance/guidance/statement-of-ethical-principles/	2005 (revised 2017)	The Engineering Council and the Royal Academy of Engineering	"engineering professionals" i.e., "professional engineers and those technicians, tradespeople, students, apprentices and trainees engaged in engineering". Non-engineers managing or teaching engineering professionals should be	

					made aware of this Statement.	
AI&R	Rules of Conduct	https://www.theiet.org/about/governance/rules-conduct/index.cfm?	2017	Institution of Engineering and Technology (IET)	Members	
General	Five Ethics Principles for Social Science Research	https://www.acss.org.uk/developing-generic-ethics-principles-social-science/academy-adopts-five-ethical-principles-for-social-science-research/	2015	Academy of Social Sciences (ACSS)	Member Learned Societies and the community of social science researchers.	
AI&R	Code Of Conduct For British Computer Society Members/BCS Code of Conduct	https://www.bcs.org/upload/pdf/conduct.pdf	2015	British Computer Society (known as BCS, the Chartered Institute for IT)	Its members	
AI&R	Principles of robotics	https://epsrc.ukri.org/research/ourportfolio/themes/engineering/activities/principlesofrobotics/?desktop=1	2010	Engineering and Physical Sciences Research Council (EPSRC)	Those who design, sell and use robots	

TABLE 3: LIST OF ALL RELEVANT DOCUMENTS FROM NATIONAL ADVISORY/ETHICS GROUPS (NAEGs) (AI&R)

SIENNA area	Title of document (original + English translation)	URL	Year	Author/organization	Stated audience	comments
AI&R	Biometric Technologies	http://researchbriefings.parliament.uk/ResearchBriefing/Summary/POST-PN-0578	2018	Parliamentary Office of Science and Technology (POST)	Parliamentarians	
AI&R	Government response to House of Lords	https://www.parliament.uk/documents/lords-committees/Artificial-	2018	UK Government (Department for Business, Energy and Industrial Strategy)	Parliament	

	Artificial Intelligence Select Committee's Report on AI in the UK: Ready, Willing and Able?	Intelligence/AI-Government-Response2.pdf				
AI&R	AI in the UK: ready, willing and able?	https://publications.parliament.uk/pa/ld201719/ldselect/ldai/100/100.pdf	2018	House of Lords Select Committee on Artificial Intelligence	Policy-makers, regulators	Covers ethical implications/makes ethics-related recommendations. Suggests five overarching principles for an AI Code.
AI&R	Data governance: landscape review	https://royalsociety.org/~/media/policy/projects/data-governance/data-governance-landscape-review.pdf?la=en-GB	2017	British Academy and Royal Society	Undefined	
AI&R	Machine learning: the power and promise of computers that learn by example	https://royalsociety.org/~/media/policy/projects/machine-learning/publications/machine-learning-report.pdf	2017	Royal Society	Addresses government, mathematics and computing communities, businesses, and education professionals	
AI&R	Growing the artificial intelligence industry in the UK	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/652097/Growing_the_artificial_intelligence_industry_in_the_UK.pdf	2017	UK Government Department for Digital, Culture, Media & Sport and Department for Business, Energy & Industrial Strategy	Government, industry and academia	

AI&R	Algorithms in decision-making: A response to the House of Commons Science and Technology Committee inquiry into the use of algorithms in decision-making	https://www.raeng.org.uk/publications/responses/algorithms-in-decision-making	2017	Royal Academy of Engineering	House of Commons Science and Technology Committee	
AI&R	Automation and the workforce	http://researchbriefings.files.parliament.uk/documents/POST-PN-0534/POST-PN-0534.pdf	2016	Parliamentary Office of Science and Technology (POST)	Parliamentarians	
AI&R	BS 8611:2016: Robots and robotic devices. Guide to the ethical design and application of robots and robotic systems	https://shop.bsigroup.com/ProductDetail/?pid=000000000030320089	2016	British Standards Institution (BSI)	Robot and robotics device designers and managers and the general public	
AI&R	Robotics and artificial intelligence: A response to the House of Commons Science and Technology Committee inquiry into	https://www.raeng.org.uk/publications/responses/robotics-and-artificial-intelligence	2016	Royal Academy of Engineering	House of Commons Science and Technology Committee	

	robotics and artificial intelligence					
AI&R	BSI PAS 277: 2015 Health and wellness apps. Quality criteria across the life cycle. Code of practice	https://shop.bsigroup.com/ProductDetail?pid=00000000000030303880	2015	The British Standards Institution (BSI)	App developers, health care professionals selecting apps to recommend, providers, charities, and community organizations commissioning bespoke apps.	
AI&R	Autonomous Systems: Social, Legal and Ethical Issues	https://www.raeng.org.uk/publications/reports/autonomous-systems-report	2009	Royal Academy of Engineering	Undefined	

TABLE 4: LIST OF ALL RELEVANT GUIDANCE DOCUMENTS ON HOW TO WRITE RESEARCH ETHICS PROTOCOLS (GDREC) (AI&R)

Name of national REC **(**please note not all below listed are NRECs as defined)**	**Title of document (original + English translation)**	**Ethical issues addressed in which SIENNA area (HG, HE, AI&R)?**	**URL**	**Stated audience**	**comments**
Economic and Social Research Council (ESRC)	Ethics review application forms and protocols	Not AI&R specific but could apply.	https://esrc.ukri.org/funding/guidance-for-applicants/research-ethics/useful-resources/ethics-review-application-forms-and-protocols/	Researchers	Suggests research proposals, including student proposals, submitted for review to a REC should include the information it recommends

Social Research Association (SRA)	Ethical Guidelines	Not AI&R specific but could apply.	http://the-sra.org.uk/wp-content/uploads/ethics03.pdf	Social research community	Covers standard protocols for checking ethical considerations including a protocol checklist
Scottish Government	Social Research Ethics Guidance and Sensitivity checklist	Not AI&R specific but could apply.	http://www.gov.scot/Topics/Research/About/Social-Research/Guidance-for-Contractors/Ethical-Sensitivity-Check	Scottish Government researchers and social research contractors	Includes a social research ethics checklist & privacy impact assessment template

TABLE 5: MOST RELEVANT DOCUMENTS IN AI & Robotics

Document found via (national associations or Google or another database)	UK government website
Title of the document	Data Ethics Framework
Kind of document (PEC, NAEG, GDREC)	PEC
Document developed by whom (organisation, profession)?	HM Government Department for Digital, Culture, Media a& Sport
Year of publication (between 2005-2018)	2018
Document saved in folder as	UK DCMS_Data Ethics Framework_2018
Who is the stated audience	Anyone working directly or indirectly with data in the public sector, including data practitioners (statisticians, analysts and data scientists), policymakers, operational staff and those helping produce data-informed insight.
What definition of AI&R is used in the document?	-
What forms of AI&R are described/covered in the document?	Refers to new data and techniques, data science, data processors, data science models, machine learning, synthetic data, algorithms
Which ethical issues are addressed in the document?	The Framework has seven principles: 1. Start with clear user need and public benefit 2. Be aware of relevant legislation and codes of practice 3. Use data that is proportionate to the user need 4. Understand the limitations of the data 5. Ensure robust practices and work within your skillset 6. Make your work transparent and be accountable 7. Embed data use responsibly
How are the ethical issues addressed? Are solutions offered? If so, which ones?	Additional guidance is provided for each principle in the Framework along with a workbook to help record ethical decisions.
Format of the document (checklist, continuous text, other)?	Continuous text and workbook. The workbook is available in HTML,
How is the document structured?	The Data Ethics Framework consists of 3 parts: the data ethics principles additional guidance for each principle in the framework a workbook to help record the ethical decisions made about a project

Why is the document important/useful for your country?	As stated by The Rt. Hon Matt Hancock MP, Secretary of State for Digital, Culture, Media and Sport, "Increasingly public servants from across disciplines will need to understand insights from data and emerging technologies. It is crucial that public servants are equipped to use data-informed insight responsibly and processes must be in place to support this." https://www.gov.uk/government/publications/data-ethics-framework/data-ethics-framework
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes, from the data ethics point of view.

Document found via (national associations or Google or another database)	Institution of Engineering and Technology website
Title of the document	Rules of Conduct
Kind of document (PEC, NAEG, GDREC)	PEC
Document developed by whom (organisation, profession)?	Institution of Engineering and Technology (IET)
Year of publication (between 2005-2018)	2017
Document saved in folder as	IET_Rules of conduct_2017
Who is the stated audience	Members
What definition of AI&R is used in the document?	
What forms of AI&R are described/covered in the document?'	Mentions 'science, engineering and technology', 'equipment intended for the defence of a nation'.
Which ethical issues are addressed in the document?	The document covers a number of ethical issues such as dignity and reputation of the profession, fairness and integrity, safeguarding the public interest in matters of health, safety, the environment , professional skill and judgement, professional responsibilities and behaviour, limiting any danger of death, injury or ill health to any person that may result from their work and the products of their work, reasonable steps to avoid waste of natural resources, damage to the environment, and damage or destruction of man-made products, misuse of designatory letters to which members are not entitled, public awareness and understanding of the impact and benefits of engineering and technology achievements, conflict or potential conflict that may exist or arise between their personal interests and the interests of their employer, disclosure of any confidential

	information, acceptance of payments or without their employer's consent; improper inducement to secure work as independent advisers or consultants etc.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	The Rules of Conduct are expressed in terms of mandatory obligations and prohibitions.
Format of the document (checklist, continuous text, other)?	Continuous (numbered) text.
How is the document structured?	There is an introduction, followed by an extract from the 'bye-laws', followed by 23 clauses.
Why is the document important/useful for your country?	The IET is one of the world's largest engineering institutions with over 168,000 members in 150 countries. It is also multi-disciplinary – to reflect the increasingly diverse nature of engineering in the 21st century. The IET is authorised to establish professional registration for the titles of Chartered Engineer, Incorporated Engineer, Engineering Technician, and ICT Technician, as a licensed member institution of the Engineering Council. Therefore, its Code of Conduct will have good influence. (https://www.theiet.org/about/index.cfm?origin=foot-about)
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Potentially.

Document found via (national associations or Google or another database)	Royal Academy of Engineering website
Title of the document	Statement of Ethical Principles
Kind of document (PEC, NAEG, GDREC)	PEC
Document developed by whom (organisation, profession)?	The Engineering Council and the Royal Academy of Engineering
Year of publication (between 2005-2018)	2005 (revised 2017)
Document saved in folder as	EC_RAE_Statement of ethical principles_2017
Who is the stated audience	"engineering professionals", i.e., "professional engineers and those technicians, tradespeople, students, apprentices and trainees engaged in engineering". Non-engineers managing or teaching engineering professionals should be made aware of this Statement
What definition of AI&R is used in the document?	

What forms of AI&R are described/covered in the document?	Mentions: physical and cybersecurity and data protection, technology.
Which ethical issues are addressed in the document?	Sets out four fundamental principles for ethical behaviour and decision-making: 1. Honesty and integrity 2. Respect for life, law, the environment and public good 3. Accuracy and rigour 4. Leadership and communication
How are the ethical issues addressed? Are solutions offered? If so, which ones?	The four fundamental principles for ethical behaviour and decision-making are supported by examples of how each should be applied.
Format of the document (checklist, continuous text, other)?	Continuous text.
How is the document structured?	As a statement with and introduction followed by the four principles.
Why is the document important/useful for your country?	It is a basis for engineering professionals to work to enhance the wellbeing of society by maintaining and promoting high ethical standards and challenge unethical behaviour. (https://www.engc.org.uk/media/2334/ethical-statement-2017.pdf)
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes. Good example of a well-recognised and accepted Code.

Document found via (national associations or Google or another database)	Gov.uk
Title of the document	Technology Code of Practice
Kind of document (PEC, NAEG, GDREC)	PEC
Document developed by whom (organisation, profession)?	UK Government Digital Service
Year of publication (between 2005-2018)	Updated 2018
Document saved in folder as	UK Gov_Technology Code of Practice_2018
Who is the stated audience	Government departments
What definition of AI&R is used in the document?	
What forms of AI&R are described/covered in the document?	Mentions: technology projects or programmes, infrastructure and systems, cloud, data and software components.

Which ethical issues are addressed in the document?	User needs, accessibility, openness, accountability, security, privacy, technology integration, better use of data.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	For each point in the Code, further explanation and guidance is provided.
Format of the document (checklist, continuous text, other)?	Continuous and numbered text.
How is the document structured?	The purpose of the Technology Code of Practice Using the Technology Code of Practice The Technology Code of Practice 1. Define user needs 2. Make things accessible 3. Be open and use open source 4. Make use of open standards 5. Use cloud first 6. Make things secure 7. Make privacy integral 8. Share and reuse technology 9. Integrate and adapt technology 10. Make better use of data 11. Define your purchasing strategy 12. Meet the Digital Service Standard for digital services Who to contact for help
Why is the document important/useful for your country?	The Technology Code of Practice suggests it will help gain approval to spend from your department spend control process, or from the GDS Standards Assurance team, avoiding activities that'll result in an application being rejected. It will also help introduce technology that:meets user needs, based on research with your users; can be shared across government; is easily maintained; scales for future use; is less-dependent on single third-party suppliers, and provides better value for money. (https://www.gov.uk/government/publications/technology-code-of-practice/technology-code-of-practice)
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Partially. Covers principles relevant to AI&R.

Document found via (national associations or Google or another database)	British Computer Society website
Title of the document	Code Of Conduct For BCS Members/BCS Code of Conduct
Kind of document (PEC, NAEG, GDREC)	PEC
Document developed by whom (organisation, profession)?	British Computer Society (known as BCS, the Chartered Institute for IT)
Year of publication (between 2005-2018)	2015
Document saved in folder as	BCS_Code of conduct_2015
Who is the stated audience	Members of the BCS
What definition of AI&R is used in the document?	
What forms of AI&R are described/covered in the document?	Mentions technological developments, procedures, and standards
Which ethical issues are addressed in the document?	Public interest, professional competence and integrity, duty to relevant authority, and duty to profession.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	Elements of each aspect mentioned above are outlined in the Code.
Format of the document (checklist, continuous text, other)?	Continuous (numbered) text.
How is the document structured?	Includes an introduction, followed by information on how breaches are handled, followed by the enunciation of the Code and an Appendix on interpretation of Code (i.e., explanatory notes offered for guidance, not exhaustive)
Why is the document important/useful for your country?	The BCS is widely recognised as a professional body for IT professionals and computer engineers in the UK. As of 30 July 2018, it has 112 regional and specialist groups, 70,000+ members in its global network, and has 151 countries with members. The Code sets out the professional standards required by BCS as a condition of membership and applies to all members, irrespective of their membership grade, the role they fulfil, or the jurisdiction where they are employed or discharge their contractual obligations. https://www.bcs.org/category/6030
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes, in as much as it prescribes professional standards for IT (information technology) professionals.

Document found via (national associations or Google or another database)	Gov.uk
Title of the document	AI in the UK: ready, willing and able?
Kind of document (PEC, NAEG, GDREC)	NAEG
Document developed by whom (organisation, profession)?	House of Lords Select Committee on Artificial Intelligence
Year of publication (between 2005-2018)	2018
Document saved in folder as	HLSCAI_AI in the UK_2018
Who is the stated audience	Policy-makers, regulators (and others)
What definition of AI&R is used in the document?	The reports states: there is no widely accepted definition of artificial intelligence but adopts for practical purposes the definition used by the Government in its Industrial Strategy White Paper: "Technologies with the ability to perform tasks that would otherwise require human intelligence, such as visual perception, speech recognition, and language translation".
What forms of AI&R are described/covered in the document?	It summarises the following technical terms/common terms used in AI: algorithm, expert system, machine learning, neural network, deep learning.
Which ethical issues are addressed in the document?	The report covers ethical implications/makes ethics-related recommendations. In particular, it covers issues such as access to and control of data, anonymisation, technical transparency, explainability, addressing prejudice, data monopolies, impact on social and political cohesion, and inequality.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	The ethical issues are introduced, then the views (on issue/consequences/solutions) of witnesses (evidence-givers) are incorporated and finally, the committee presents its position on the issue (including recommendations).
Format of the document (checklist, continuous text, other)?	Continuous text.
How is the document structured?	It has an executive summary, nine chapters and ten appendices.
Why is the document important/useful for your country?	The report proposes five principles that could become the basis for a shared ethical AI framework. It suggests that while AI-specific regulation is not appropriate at this stage, such a framework provides clarity in the short term, and could underpin regulation, should it prove to be necessary, in the future.

Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	The report recommends that a cross-sector ethical code of conduct, or 'AI code', suitable for implementation across public and private sector organisations which are developing or adopting AI, be drawn up and promoted by the Centre for Data Ethics and Innovation, with input from the AI Council and the Alan Turing Institute, with a degree of urgency. (this should be taken into account in SIENNA).

Document found via (national associations or Google or another database)	Gov.uk
Title of the document	Government response to House of Lords Artificial Intelligence Select Committee's Report on AI in the UK: Ready, Willing and Able?
Kind of document (PEC, NAEG, GDREC)	NAEG
Document developed by whom (organisation, profession)?	UK Government (Department for Business, Energy and Industrial Strategy)
Year of publication (between 2005-2018)	2018
Document saved in folder as	UKGov_Response to HL AI report_2018
Who is the stated audience	Parliament
What definition of AI&R is used in the document?	
What forms of AI&R are described/covered in the document?	AI
Which ethical issues are addressed in the document?	Access to, and control of, data; transparency of algorithms addressing prejudice, data monopolies, impact on labour market, Impact on social and political cohesion, inequality, mitigating the risks of artificial intelligence
How are the ethical issues addressed? Are solutions offered? If so, which ones?	The document, inter alia, presents the government position and responses to the above which were raised in the House of Lords Select Committee on Artificial Intelligence report on AI in the UK: ready, willing and able?
Format of the document (checklist, continuous text, other)?	Continuous (numbered) text.
How is the document structured?	It has an introduction followed by responses to the recommendations of the House of Lords Artificial Intelligence Select Committee's Report on AI in the UK: Ready, Willing and Able?
Why is the document important/useful for your country?	It presents the government position on some of the key ethical, legal and societal issues pertaining to AI.

Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	No.

Document found via (national associations or Google or another database)	Royal Society website
Title of the document	Machine learning: the power and promise of computers that learn by example
Kind of document (PEC, NAEG, GDREC)	NAEG
Document developed by whom (organisation, profession)?	Royal Society
Year of publication (between 2005-2018)	2017
Document saved in folder as	Royal Society_Machine learning_2017
Who is the stated audience	Addresses government, mathematics and computing communities, businesses, and education professionals
What definition of AI&R is used in the document?	Algorithm: A set of rules a computer follows to solve a problem. Artificial intelligence: An umbrella term for the science of making machines smart. Machine intelligence: A general term for machines that have been programmed to be smart, or otherwise artificially intelligent. Machine learning: A set of rules that allows systems to learn directly from examples, data and experience. Other related terms are also defined, e.g., neural networks, big data.
What forms of AI&R are described/covered in the document?	Machine learning
Which ethical issues are addressed in the document?	Governance of data use, interpretability and transparency, verification and robustness, privacy and sensitive data, dealing with real-world data: fairness and the full analytics pipeline, causality, human-machine interaction, security and control.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	All of the above are addressed in detail including with recommendations.
Format of the document (checklist, continuous text, other)?	Continuous text.
How is the document structured?	An executive summary and Recommendations section precede chapters that examine in detail: machine learning, emerging applications, extracting value from data, creating value from machine learning, machine

	learning in society, a new wave of machine learning research. This is followed by Annex / Glossary / Appendices.
Why is the document important/useful for your country?	This report was used/built upon by the report AI in the UK: ready, willing and able?. The report discusses the key challenges and opportunities of machine learning, along with societal issues and makes specific recommendations (favouring a specific sectoral approach for regulating AI).
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes (in terms of the issues covered).

Document found via (national associations or Google or another database)	Royal Academy of Engineering website
Title of the document	Robotics and artificial intelligence: A response to the House of Commons Science and Technology Committee inquiry into robotics and artificial intelligence
Kind of document (PEC, NAEG, GDREC)	NAEG
Document developed by whom (organisation, profession)?	Royal Academy of Engineering
Year of publication (between 2005-2018)	2016
Document saved in folder as	RAE_robotics and artificial intelligence_2016
Who is the stated audience	House of Commons Science and Technology Committee
What definition of AI&R is used in the document?	
What forms of AI&R are described/covered in the document?	Robotics and artificial intelligence (AI)
Which ethical issues are addressed in the document?	Wrong assumptions about users and their behaviour, responsibility for safe operation, autonomy, appropriately engaging the public.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	Some are mentioned, for others some potential solutions are proposed (e.g., in relation to safe operation, mandating chartered status as a legal requirement to practise in this field; disciplines involved in robotics and AI considering the ethical implications of their work; open dialogue with the public on these issues so that concerns about social, legal and ethical issues are addressed in a timely way.

Format of the document (checklist, continuous text, other)?	Continuous (numbered) text
How is the document structured?	Key messages are presented focussed on: workforce and job market, shift in the skills base, funding, research and innovation landscape, and social, legal and ethical issues.
Why is the document important/useful for your country?	The evidence was submitted by the Royal Academy of Engineering (RAE) and compiled with the input of its Fellows working in relevant fields. The RAE is the UK's national academy for engineering and brings together engineers from across the engineering sectors for a shared purpose: to advance and promote excellence in engineering.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes, as it addresses both AI&R.

Document found via (national associations or Google or another database)	Royal Academy of Engineering website
Title of the document	Autonomous Systems: Social, Legal and Ethical Issues
Kind of document (PEC, NAEG, GDREC)	NAEG
Document developed by whom (organisation, profession)?	Royal Academy of Engineering
Year of publication (between 2005-2018)	2009
Document saved in folder as	RAE_Autonomous Systems_Social Legal and Ethical Issues_2009
Who is the stated audience	
What definition of AI&R is used in the document?	Defines autonomous systems as "ones that are adaptive, learn and can make 'decisions'".
What forms of AI&R are described/covered in the document?	Autonomous systems, autonomous road vehicles, artificial companions and smart homes.
Which ethical issues are addressed in the document?	It raises some general ethical questions about the acceptability of autonomous systems, choice, risk, human intervention, trust and responsibility. Ethical issues raised in relation to autonomous road vehicles: potential for exclusion of those who do not want to be part of the system, marginalise road users in older vehicles, responsibility for failures and accidents. Ethical issues in relation to artificial companions and smart homes:

	social isolation of users, effects on autonomy, proper use of those data, control of technology, manipulation of vulnerable people.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	The ethical issues are discussed and recommended actions are presented.
Format of the document (checklist, continuous text, other)?	Continuous text.
How is the document structured?	1. Introduction 1.1 What is an autonomous system? 1.2 The ethical, legal and social implications of autonomous systems 2. Autonomous road vehicles 2.1 Technologies – from GPS and car-to-car communication to centrally controlled autonomous highways 2.2 Timescales and transformation 2.3 Barriers: ethical, legal and social 2.4 Recommended actions 3. Artificial companions and smart homes 3.1 Technologies – from blood pressure monitoring to Second Life 3.2 Timescales and transformation 3.3 Barriers: ethical, legal and social 3.4 Recommended actions 4. Conclusions 4.1 Communication and engagement 4.2 Regulation and governance 4.3 Ethical considerations 4.4 Looking for applications 4.5 The wider landscape 5. Appendices 5.1 Working group and acknowledgement 5.2 Statement of Ethical Principles
Why is the document important/useful for your country?	This document is a report of the discussion at a roundtable meeting held at the Royal Academy of Engineering on the social, legal and ethical issues surrounding the development and use of autonomous systems. The meeting involved stakeholders from a range of areas, including medicine and healthcare, transport, defence, systems engineering, computer science, financial systems, public engagement and policy development. Despite it being dated 2009, its concerns and recommendations are very current.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes. For reasons cited above.

5.13 USA

TABLE 1: INDIVIDUAL AND COUNTRY INFORMATION

Names and emails of persons who did the work (if different from above)	Adam Holland, Christopher Bavitz aholland@cyber.harvard.edu, cbavitz@cyber.harvard.edu
Your organisation	Berkman Klein Center for Internet & Society, Harvard University
Your country (again)	The United States of America
Search conducted in which language	English
Acknowledgements (any researcher who helped you to complete this task)	Andrea Nishi

TABLE 2: LIST OF ALL RELEVANT PROFESSIONAL ETHICS CODES

SIENNA area	Title of document (original + English translation)	URL	Year	Author/organisation	Stated audience	comments
AI&R	On Being A Scientist	https://www.nap.edu/download/12192	2009	The National Research Council of the National Academies of Science, Engineering and Medicine	Scientists and researchers	A report that describes the ethical foundations of scientific practices, and describes some of the personal and professional issues that researchers encounter in their work; does not specifically mention AI&R
AI&R	ABA Model Rules of Professional Conduct	https://www.americanbar.org/groups/professional_responsibility/publications/model_rules_of_professional_conduct/model_rules_of_professional_conduct_table_of_contents.html	2016	American Bar Association	lawyers	ethical guidelines for practicing lawyers; does not specifically mention AI&R
AI&R	AMA Code of Medical Ethics	https://www.ama-assn.org/delivering-care/ama-code-medical-ethics	2016	American Medical Association	doctors; medical	General ethical guidelines for practicing doctors does not specifically mention

					professionals generally	AI&R; see also https://www.ama-assn.org/about-us/modernization-code-medical-ethics-ceja-reports
AI&	AMA First Policy Recommendations on Augmented Intelligence	https://www.ama-assn.org/ama-passes-first-policy-recommendations-augmented-intelligence	2018	American Medical Association	"health and technology stakeholders"	Spurred by "a range of concerns about the novel challenges in the design, implementation, and use—especially how AI will be incorporated into the practice of medicine and affect patients"
AI&R	REPORT 41 OF THE BOARD OF TRUSTEES (A-18) - Augmented Intelligence (AI) in Health Care	https://www.ama-assn.org/sites/default/files/media-browser/public/hod/a18-refcomm-b.pdf	2018	American Medical Association	medical profession generally	Addresses "augmented intelligence. See BOT 41 in larger document
AI	Data Science Code of Professional Conduct	http://www.datascienceassn.org/code-of-conduct.html	2018	Data Science Association	Data scientists	References "big data,": "machine learning," and "algorithms". Strong focus on confidentiality, client relationship and avoidance of harm.

AI&R	The Ethics Codes Collection	http://ethicscodescollection.org/	2018	Center for the Study of Ethics in the Professions	Multi-stakeholder; various	Enormous collection of 2500+ ethical codes- not all current, incl. those of varying scale and impact for professional organizations, including, e.g,: American Association of Engineering Societies Academy of Criminal Justice Sciences Code of Ethics for Robotics Engineers (2010) Most will not specifically mention AI&R
AI&R	ACM Code of Ethics and Professional Conduct	https://www.acm.org/binaries/content/assets/about/acm-code-of-ethics-and-professional-conduct.pdf	2018	Association for Computing Machinery	computing professionals	Also "serves as a basis for remediation when violations occur."
AI&R	Global Data Ethics Pledge (GDEP)	https://github.com/Data4Democracy/ethics-resources	2018	Data For Democracy	data scientists and technologists	"[A]n inclusive community for data scientists and technologists to volunteer and collaborate on projects that make a positive impact on society. "

AI&R	Jurisdictional Guidelines for the Safe Testing and Deployment of Highly Automated Vehicles	https://www.aamva.org/GuidelinesTestingDeploymentHAVs-May2018/	2018	American Association of Motor Vehicle Administrators - "Autonomous Vehicle Information Sharing Group	state-level officials, private sector	"AAMVA) is a tax-exempt, nonprofit organization developing model programs in motor vehicle administration, law enforcement, and highway safety.

TABLE 3: LIST OF ALL RELEVANT DOCUMENTS FROM NATIONAL ADVISORY/ETHICS GROUPS (AI&R Only)

SIENNA area	**Title of document (original + English translation)**	**URL**	**Year**	**Author/ organization**	**Stated audience**	**comments**
AI&R	THE NATIONAL ARTIFICIAL INTELLIGENCE RESEARCH AND DEVELOPMENT STRATEGIC PLAN (NAIRDSP)	https://www.nitrd.gov/PUBS/national_ai_rd_strategic_plan.pdf	2016	National Science and Technology Council (NSTC) Select Committee on Artificial Intelligence	Executive branch of U.S. federal govt.	See especially "Strategy 3" This is a document created by an advisory body of the government aimed at a governmental audience. Its goal is to "defines a high-level framework that can be used to identify scientific and technological needs in AI, and to track the progress and maximize the impact of R&D investments to fill those needs. It also establishes priorities for Federally-funded R&D in AI, looking beyond near-term AI capabilities toward long-term transformational impacts of AI on society and the world."
AI&R	Artificial Intelligence Research at National Science Foundation	https://nsf.gov/cise/ai.jsp	2018	the NSF	AI researchers	This is a compilation of AI-related resources, and among others links out to the NAIRDSP, above
AI&R	Conflicts of Interest and Standards of Ethical Conduct	https://www.nsf.gov/pubs/manuals/manual15.pdf	2018	NSF	AI researchers	Part of larger NSF AI-related resources above

AI&R	Responsible Conduct of Research	https://www.nsf.gov/bfa/dias/policy/rcr.jsp	2018	NSF	researchers and students	does not specifically mention AI&R
AI&R	Scientific Integrity Policy	https://www.nsf.gov/bfa/dias/policy/si/sipolicy.pdf	2018	NSF	scientific researchers generally	Does not specifically mention AI&R
AI&R	Shaping Robotics Policy for the 21st Century	https://mcmprodaaas.s3.amazonaws.com/s3fs-public/reports/AAAS%20Robotics%20Report%209.27.17.pdf?_AvRRr5QtPKTVxlWc7W.10zgBxljjrMJ	2017	American Association for the Advancement of Science (AAAS)	policy makers	Robotics-specific compilation of multi-session multi-stakeholder meeting; asks ethics questions, and makes ethical recommendations
AI&R	Artificial Intelligence and National Security	https://www.belfercenter.org/publication/artificial-intelligence-and-national-security	2017	Belfer Center for Science and International Affairs	National security analysts, policy-makers, legislators	A study on behalf of the U.S. Intelligence Advanced Research Projects Activity (IARPA)
AI&R	A Roadmap for US Robotics - From Internet to Robotics-2016 Edition	http://jacobsschool.ucsd.edu/contextualrobotics/docs/rm3-final-rs.pdf; https://cra.org/ccc/wp-content/uploads/sites/2/2016/11/roadmap3-final-rs-1.pdf	2016	Computing Community Consortium; https://cra.org	various stakeholders; policymakers	See especially Section 10
AI&R	The Institute of Electrical and Electronics Engineers (IEEE) Global Initiative for Ethical	http://standards.ieee.org/develop/indconn/ec/ead_general_principles.pdf	2016	IEEE General Principles Committee	Scientists, engineers, researchers, policymakers	“high-level guiding principles”

	Considerations in Artificial Intelligence and Autonomous Systems - General Principles				and other stakeholders	
AI&R	Perspectives on Research in Artificial Intelligence and Artificial General Intelligence Relevant to DoD	https://fas.org/irp/agency/dod/jason/ai-dod.pdf	2017	the JASON group	US Govt, policy makers	"JASON is an independent scientific advisory group that provides consulting services to the U.S. government on matters of defense science and technology."
AI&R	Artificial Intelligence and Ethics- papers from 2015 AAAI Workshop	https://www.aaai.org/Library/Workshops/ws15-02.php	2015	Association for the Advancement of Artificial Intelligence.	multi-stakeholder	Various papers, forum to discuss the ethical questions implicit in discussion of AI; including papers such as "Toward Ensuring Ethical Behavior from Autonomous Systems: A Case-Supported Principle-Based Paradigm",
	Robot Ethics: The Ethical and Social Implications of Robotics (Intelligent Robotics and Autonomous Agents series)	https://www.amazon.com/Robot-Ethics-Implications-Intelligent-Autonomous/dp/0262016664		Ethics and Emerging Sciences Group	"policymakers, business, academia, as well as the broader public "	"[A] non-partisan organization focused on risk, ethical, and social concerns related to new sciences and technologies. Both are edited volumes

	Robot Ethics 2.0: From Autonomous Cars to Artificial Intelligence	https://www.amazon.com/dp/0190652950				
AI&R	"Best Practices for Protecting Privacy, Civil Rights & Civil Liberties In Unmanned Aircraft Systems Programs"	https://www.dhs.gov/sites/default/files/publications/UAS%20Best%20Practices.pdf	2015	U.S. Department of Homeland Security Privacy, Civil Rights & Civil Liberties Unmanned Aircraft Systems Working Group	government agencies, private sector, first responders	"Our goal, rather, is simply to share the best practices we have identified as helping to sustain privacy, civil rights, and civil liberties throughout the lifecycle of an unmanned aircraft systems program"
AI&R	A National Machine Intelligence Strategy for the United States	https://csis-prod.s3.amazonaws.com/s3fs-public/publication/180227_Carter_MachineIntelligence_Web.PDF?CLlXGgQQQoc78akgCk.2StKO7NsrC2J1	2018	Center for Strategic & International Studies	policymakers, government, private sector	See especially Sections D, E & F
AI&R	Artificial Intelligence Research, Development and Regulation	https://ieeeusa.org/wp-content/uploads/2017/07/FINALformattedIEEEUSAAIPS.pdf	2017	IEEE-USA	multi-stakeholder	
AI&R	Asilomar AI Principles	https://futureoflife.org/ai-principles/?cn-reloaded=1	2017	Future of Life Institute	multi-stakeholder	
AI&R	The AI Now Report: The Social and Economic Implications of Artificial Intelligence	https://ainowinstitute.org/AI_Now_2017_Report.pdf	2017	AI Now Institute	multi-stakeholder	Makes recommendations in four topics, including ethics and governance.

AI&R	Robots In American Law; Artificial Intelligence Policy: A Primer and Roadmap	https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2737598 ; https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3015350		Ryan Calo	lawyers, legal academy policy makers,	Although these pieces are by an individual author, Professor Calo is generally recognized as one of the leading experts and thinkers in the US on the legal and ethical implications of robots and AI
AI&R	Exploring or Exploiting? Social and Ethical Implications of Autonomous Experimentation in AI	https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2846909	2016	Sarah Bird, Solon Barocas, Kate Crawford, Fernando Diaz and Hanna Wallach	academics, AI researchers	Kate Crawford is generally recognized as one of the leading experts and thinkers in the US on the legal and ethical implications of robots and AI

TABLE 4: LIST OF ALL RELEVANT GUIDANCE DOCUMENTS ON HOW TO WRITE RESEARCH ETHICS PROTOCOLS

Name of national REC	**Title of document (original + English translation)**	**Ethical issues addressed in which SIENNA area (HG, HE, AI&R)?**	**URL**	**Stated audience**	**comments**
Markkula Center for Applied Ethics @ Santa Clara University	Ethics in Technology Practice	HG, HE, AI&R	https://www.scu.edu/ethics-in-technology-practice/	The materials are "designed specifically for practice-oriented ethics training programs within the tech industry"	This is a suite of generalized ethical design resources. "The materials include a workshop teaching guide, overviews of technology ethics and relevant conceptual frameworks for ethical decision-making, case studies, an ethical toolkit for integrating consideration

					of ethics throughout product development, a sample workflow integration of the tools, and a list of best practices in technology design and engineering."
IEEE - "Institute of Electrical and Electronics Engineers"	"ETHICALLY ALIGNED DESIGN - A Vision for Prioritizing Human Well-being with Autonomous and Intelligent Systems"	AI&R	http://standards.ieee.org/develop/indconn/ec/ead_v2.pdf	engineering and technology professionals, policymakers	Most saliently: "Embedding Values into Autonomous Intelligent Systems pp. 33-54; Methodologies to Guide Ethical Research and Design pp. 55-72 This is a draft version - final version to be published in 2019 See also the synthesis document in the row below

IEEE - “Institute of Electrical and Electronics Engineers”	Becoming a Leader in Global Ethics: Creating a Collaborative, Inclusive Path for Establishing Ethical Principles for Artificial Intelligence and Autonomous Systems	AI&R	http://standards.ieee.org/develop/indconn/ec/becoming_leader_global_ethics.pdf	engineering and technology professionals, policymakers	Drafted as a way to highlight insights inspired by the feedback received to v.1 of “Ethically Aligned Design” - the document above
multi-author	“Using Ethical Reasoning to Amplify the Reach and Resonance of Professional Codes of Conduct in Training Big Data Scientists	AI	https://www.ncbi.nlm.nih.gov/pubmed/25431219	scientists, researchers, professionals in the field.	“[I]nsufficient time, space, and thought have been dedicated to training these people to engage with the ethical, legal, and social issues in this new domain. Since Big Data practitioners come from, and work in, diverse contexts, neither a relevant professional code of conduct nor specific formal ethics training are likely to be readily available. This normative paper describes an approach to conceptualizing ethical reasoning and integrating

					it into training for Big Data use and research"
National Institutes of Health	Guiding Principles for Ethical Research	AI&R	https://www.nih.gov/health-information/nih-clinical-research-trials-you/guiding-principles-ethical-research	researchers generally	Doesn't mention AI&R specifically.
National Academies of Sciences, Engineering and Medicine	Fostering Integrity in Research" Ch. 9; "Identifying and Promoting Best Practices for Research Integrity"	AI&R	https://www.nap.edu/read/21896/chapter/14	Researchers	General guidelines for ethical research design

TABLE 7: MOST RELEVANT DOCUMENTS IN AI & Robotics

Document 1 –On Being A Scientist

Document found via (national associations or Google or another database)	National association/Google search
Title of the document	On Being A Scientist
Kind of document (PEC, NAEG, GDREC)	PEC
Document developed by whom (organisation, profession)?	The National Research Council of the National Academies of Science, Engineering and Medicine
Year of publication (between 2005-2018)	2009
Document saved in folder as	On Being A Scientist.pdf
Who is the stated audience	"graduate students, postdocs, and junior faculty in an academic Setting; scientists at all stages in their education and careers, including those working for industry and government"
What definition of AI&R is used in the document?	As a general overview of ethical practices in science, the document does not explicitly mention or define AI or robotics.

What forms of AI&R are described/covered in the document?	As a general overview of ethical practices in science, the document does not explicitly mention or define AI or robotics. Rather, the document addresses the unique challenges posed by practicing scientific research in the 21st Century
Which ethical issues are addressed in the document?	The entire range of ethical issues a scientist might face, from plagiarism to human subjects to the treatment of data- along with how to handle them.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	The document strongly promotes collaboration and discussion of standards and ethical challenges, as well as ongoing training and the integration of ethics into scientific curricula
Format of the document (checklist, continuous text, other)?	Book; continuous text PDF
How is the document structured?	As a book, with chapters devoted to individual topics; along with case studies
Why is the document important/useful for your country?	Authored by the National Academies, an important and influential group in United States research circles, the document provides an overview of the professional standards of science and explains why adherence to those standards is essential for continued scientific progress.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes, because it provides a comprehensive examination of what is considered to be ethical scientific practice in the United States, principles which will underlie any AI&R specific ethical codes or guidelines.

Document 2 – Data Science Code of Professional Conduct

Document found via (national associations or Google or another database)	National association/Google
Title of the document	Data Science Code of Professional Conduct
Kind of document (PEC, NAEG, GDREC)	PEC
Document developed by whom (organisation, profession)?	Data Science Association
Year of publication (between 2005-2018)	2018
Document saved in folder as	datasciencecodeofprofessionalconduct.pdf
Who is the stated audience	Data scientists
What definition of AI&R is used in the document?	The document does not use the terms “artificial intelligence” or “robotics,” but defines “big data,” “machine learning,” “algorithm,” “heuristics,” and “predictive analytics”

What forms of AI&R are described/covered in the document?	Those having to do with machine learning and working with large datasets
Which ethical issues are addressed in the document?	Confidentiality of data sets, obligations to clients, data quality, and general integrity.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	With proscriptive norms. Each rule in the document is of the "A data scientist shall…" or "may…" form
Format of the document (checklist, continuous text, other)?	Continuous text webpage; downloadable as a PDF
How is the document structured?	An introduction, a lengthy definitions section and then nine rules with explanations.
Why is the document important/useful for your country?	It is an example of a sub filed working squarely within the AI space creating its own targeted ethical norms
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	It will likely be useful, yes, since it is written as universal to data scientists, and will shed light on ethical practices within that aspect of the artificial intelligence space.

Document 3 – ACM Code of Ethics and Professional Conduct

Document found via (national associations or Google or another database)	National organization/Google
Title of the document	ACM Code of Ethics and Professional Conduct
Kind of document (PEC, NAEG, GDREC)	PEC
Document developed by whom (organisation, profession)?	Association for Computing Machinery
Year of publication (between 2005-2018)	2018
Document saved in folder as	acm-code-of-ethics-and-professional-conduct.pdf
Who is the stated audience	"all computing professionals, including current and aspiring practitioners, instructors, students, influencers, and anyone who uses computing technology in an impactful way."
What definition of AI&R is used in the document?	As a general overview of ethical practices in computer science and practice, the document does not explicitly mention or define AI or robotics.
What forms of AI&R are described/covered in the document?	Computing in general
Which ethical issues are addressed in the document?	General principles, professional responsibility, leadership roles, and compliance with the code itself.

How are the ethical issues addressed? Are solutions offered? If so, which ones?	The document seeks to offer guidelines and provide a principled a basis for ethical decision-making, rather than a "algorithm for solving ethical problems." It promotes accountability and transparency broadly.
Format of the document (checklist, continuous text, other)?	Continuous text, 10 pp document
How is the document structured?	Four major headings; each with one to eight subheadings.
Why is the document important/useful for your country?	Important because it is a code specific to a profession that is and will be at the heart of any and all AI&R practice.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Likely yes, it may provide a useful window into successfully addressing and incorporating the world-view of computing professionals when designing AI&R-specific codes.

Document 4 - American Medical Association documents: 5.1- REPORT 41 OF THE BOARD OF TRUSTEES (A-18) - Augmented Intelligence (AI) in Health Care; 5.2 - AMA Passes First Policy Recommendations on Augmented Intelligence; 5.3 - American Medical Association Code of Medical Ethics

Document found via (national associations or Google or another database)	National association; Google
Titles of the documents	REPORT 41 OF THE BOARD OF TRUSTEES (A-18) - Augmented Intelligence (AI) in Health Care; (2) AMA Passes First Policy Recommendations on Augmented Intelligence; (3) American Medical Association Code of Medical Ethics
Kind of document (PEC, NAEG, GDREC)	PEC
Document developed by whom (organisation, profession)?	American Medical Association
Year of publication (between 2005-2018)	2018; (2) 2018 (3) 2016
Document saved in folder as	A18-bot41.pdf; (2) AMA First Policy Recommendations; (3) N/A [purchase required]
Who is the stated audience	Medical professionals
What definition of AI&R is used in the document?	Documents (1) & (2) refer to ""computational methods that produce systems that perform tasks 27 normally requiring human intelligence. But prefer the term "augmented intelligence" for medicine and health care. As a comprehensive general overview of ethical practices in medicine, document (3) does not explicitly mention or define AI or robotics.
What forms of AI&R are described/covered in the document?	Among others, machine image recognition, natural language processing, and machine learning.

Which ethical issues are addressed in the document?	Bias, fairness, access, confidentiality, transparency and reproducibility; a responsibility to patients
How are the ethical issues addressed? Are solutions offered? If so, which ones?	Document 1, a report on augmented in intelligence in health care, contains policy recommendations, but they are general, including more education, deliberate and thoughtful development of healthcare AI; and an examination of the legal implications. Document 2 contains the five principles that were distilled from document 1. Document 3 is the
Format of the document (checklist, continuous text, other)?	Continuous text; (2) press release; (3) Book
How is the document structured?	Committee report; (2) press release with five bullets; (3) continuous text, 560 pp book.
Why is the document important/useful for your country?	Document 3 represents the latest iteration of the comprehensive distilled ethics of the American Medical Association, one of the largest and most influential professional association in the United States, while documents (2) and (3) represent that organization's thinking on how AI&R, specifically in the form of "augmented intelligence" will affect the medical profession.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	The documents will likely be useful with respect to crafting SIENNA codes and frameworks that explicitly or implicitly reference medicine, as well as professionals who have an already clearly instantiated code of ethics.

Document 5 - American Bar Association Model Rules of Professional Conduct

Document found via (national associations or Google or another database)	National association
Title of the document	ABA Model Rules of Professional Conduct
Kind of document (PEC, NAEG, GDREC)	PEC
Document developed by whom (organisation, profession)?	American Bar Association
Year of publication (between 2005-2018)	2016
Document saved in folder as	N/A - purchase required; full text available online at https://www.americanbar.org/groups/professional_responsibility/publications/model_rules_of_professional_conduct/model_rules_of_professional_conduct_table_of_contents.html
Who is the stated audience	Lawyers and legal practitioners
What definition of AI&R is used in the document?	The document does not specifically mention AI&R

What forms of AI&Rare described/covered in the document?	Does not specifically mention AI&R
Which ethical issues are addressed in the document?	All ethical issues that a member of the legal profession might encounter in their daily practice
How are the ethical issues addressed? Are solutions offered? If so, which ones?	A series of proscriptive model rules and behavioral standards win eight categories, each with sub-topics
Format of the document (checklist, continuous text, other)?	Webpage; pdf or bound volume
How is the document structured?	Eight rules and sub-topics with commentary
Why is the document important/useful for your country?	These are the guiding and binding principles for any practicing lawyer in the United States - practitioners who will almost certainly be involved in drafting any ethical guidelines, especially binding ones
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes, the document will serve as a legal frame of reference or touchstone for lawyer participating in drafting guidelines that will apply to US companies or that might involve US lawyers

Document 6 - THE NATIONAL ARTIFICIAL INTELLIGENCE RESEARCH AND DEVELOPMENT STRATEGIC PLAN (NAIRDSP)

Document found via (national associations or Google or another database)	Google
Title of the document	THE NATIONAL ARTIFICIAL INTELLIGENCE RESEARCH AND DEVELOPMENT STRATEGIC PLAN (NAIRDSP)
Kind of document (PEC, NAEG, GDREC)	NAEG
Document developed by whom (organisation, profession)?	National Science and Technology Council (NSTC) Select Committee on Artificial Intelligence
Year of publication (between 2005-2018)	2016
Document saved in folder as	national_ai_rd_strategic_plan
Who is the stated audience	The Executive Branch of the U.S. government; US govt researchers
What definition of AI&R is used in the document?	When “machines use language, form abstractions and concepts, solve the kinds of problems now reserved for humans, and improve themselves.” Robotics is defined as a type of AI system operating in the physical world.
What forms of AI&R are described/covered in the document?	The document discusses machine and deep learning, and a variety of AI implementations, including image recognition, language processing,

Which ethical issues are addressed in the document?	Ethical design and implementation of AI systems; research aimed at understanding ethical implications; fairness, transparency and accountability by design; public safety.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	"Strategy 3" is "Understand and Address the Ethical, Legal, and Societal Implications of AI" is explicitly devoted to ethics. It proposes: further multi-disciplinary research; explicit attention to ethics in design of AI systems and research protocols; developing acceptable ethics frameworks; proactive transparency and explainability.
Format of the document (checklist, continuous text, other)?	Continuous text
How is the document structured?	A report; Executive summary, introduction, seven Research Strategies and concluding recommendations.
Why is the document important/useful for your country?	Although commissioned by the prior administration, this is a comprehensive and thorough document drawing on a wide range of other sources that seeks to describe a national strategic plan for AI. In a more favorable climate for scientific research, it will undoubtedly be a template for any future U.S government sponsored research effort in the AI field, and is likely an input for ongoing private sector research.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes, it represents the so-far most developed thinking of the U S government on AI research and national strategy to date. In a more favourable climate for scientific research, it will undoubtedly be a template for any future U.S government sponsored research effort in the AI field, and is likely an input for ongoing private sector research.

Document 7 –Shaping Robotics Policy for the 21st Century-Insights from the 2016-17 Halcyon Dialogues

Document found via (national associations or Google or another database)	National Associations
Title of the document	Shaping Robotics Policy for the 21st Century-Insights from the 2016-17 Halcyon Dialogues
Kind of document (PEC, NAEG, GDREC)	NAEG
Document developed by whom (organisation, profession)?	American Association for the Advancement of Science (AAAS)
Year of publication (between 2005-2018)	2017
Document saved in folder as	AAAS Robotics Report 9.27.17.pdf
Who is the stated audience	Policy makers

What definition of AI&R is used in the document?	Robots are defined as “autonomous or semi-autonomous systems that interact directly with the physical world.”
What forms of AI&R are described/covered in the document?	AI is not defined separately, but is discussed as a component of big data and certain aspects of robotics. Per the report’s definition, “certain elements of the “internet of things” were included, but “bots” consisting purely of software were not considered. This focus, however, did not exclude consideration of software as essential to the functioning of robots”
Which ethical issues are addressed in the document?	The document covers a range of ethical issues in robotics, including “transitioning military robotic systems to the civilian sector;” healthcare data; issues surrounding human/robot emotional interaction and cybernetic enhancement; embedded ethics from a design perspective; accountability and trust for robotic systems; ethical enforcement, and the possibility of a national regulatory body concerned with ethical decision making;
How are the ethical issues addressed? Are solutions offered? If so, which ones?	The report identifies design and implementation, minimizing risk, and trust, communication and explainability as key ethical issues. It recommends deliberate cultivation of a diverse set of stakeholders in constant communication with each other who can then foster the development and implementation of best practices in all sectors to create and maintain trust throughout the robotics and AI space. Finally, it recommends the creation of a federal (national) interagency coordinating body to further the development of legal, regulatory, and ethical decision making along with enforcement mechanisms.
Format of the document (checklist, continuous text, other)?	Continuous text; a 64 pp report
How is the document structured?	A summary or recommendations, an executive summary, and then “chapters” on four specific focus areas: medical robots, military robots in the civilian sector, the implications of robotics for work and social justice, and the intersection of robots and policy.
Why is the document important/useful for your country?	The document represents the output of a large and diverse group of stakeholders on key topics in robotics and makes granular policy recommendations regarding: data, standards and best practices; funding and investment; further opportunities for dialogue; research; and governance and regulation
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes. The document explicitly discusses the issues surrounding the development of ethical systems, codes and frameworks, and makes recommendations in this space.

Document 8 - A Roadmap for US Robotics - From Internet to Robotics- 2016 Edition

Document found via (national associations or Google or another database)	Google
Title of the document	A Roadmap for US Robotics - From Internet to Robotics- 2016 Edition
Kind of document (PEC, NAEG, GDREC)	NAEG
Document developed by whom (organisation, profession)?	Workshop output by a consortium of Universities
Year of publication (between 2005-2018)	2016
Document saved in folder as	rm3-final-rs.pdf
Who is the stated audience	Anyone working within the robotics field; the US Government.
What definition of AI&R is used in the document?	No explicit definition of robotics- but an expansive concept of the word is implied throughout - likely anything capable of even partial autonomous action in the physical world.
What forms of AI&R are described/covered in the document?	No AI except as part of a robotic technology; a comprehensively inclusive definition of robotics and robotic applications, from manufacturing to vacuums to healthcare and autonomous vehicles. See pp 33-35
Which ethical issues are addressed in the document?	Although a primarily technical document, the authors believe that the development of robotics must place against a backdrop of law, policy, ethics, and economics—among other social, cultural, and political forces. They identify safety, liability, impact on labour, social interaction, privacy and security as key ethical issues.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	They are presented as a critical underlying framework for any research or discussion. The document therefore makes three basic broad recommendations: Greater expertise in government; Support of interdisciplinary research in government and academia; and a removal of research barriers
Format of the document (checklist, continuous text, other)?	Continuous text; an edited report of 109 pp
How is the document structured?	Presented as a report with sections arranged by topic
Why is the document important/useful for your country?	Represents input from a broad cross-section of experts in industry and academia; created for a multi-stakeholder audience; the latest iteration of an ongoing process and document [previous “editions” in 2009 and 2013]
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	It will likely be partially useful. It is a comprehensive and nuanced look at a national plan for the technical development of robotics in the United States. Although not specifically engaged with ethical issues, it presents a wide range of issues with which any ethical framework will need to be able to engage.

Document 9 - IEEE Global Initiative for Ethical Considerations in Artificial Intelligence and Autonomous Systems - General Principles

Document found via (national associations or Google or another database)	Google/National Association
Title of the document	IEEE Global Initiative for Ethical Considerations in Artificial Intelligence and Autonomous Systems - General Principles
Kind of document (PEC, NAEG, GDREC)	NAEG
Document developed by whom (organisation, profession)?	The Institute of Electrical and Electronics Engineers (IEEE)
Year of publication (between 2005-2018)	2016
Document saved in folder as	IEEE general principles.pdf
Who is the stated audience	General audience; authors of governance frameworks
What definition of AI&R is used in the document?	"physical robots (such as care robots or driverless cars) or software AIs (such as medical diagnosis systems, intelligent personal assistants, or algorithmic chat bots)."
What forms of AI&R are described/covered in the document?	"Artificial intelligence and autonomous systems"; no specific forms are discussed or covered, the document is comprised of high-level principles and recommendations.
Which ethical issues are addressed in the document?	Human benefit; accountability and responsibility; transparency, education and awareness;
How are the ethical issues addressed? Are solutions offered? If so, which ones?	Concise recommendations for each of the four ethical issues, along with a list of supplemental resources
Format of the document (checklist, continuous text, other)?	Continuous text, 7 pp
How is the document structured?	Introduction followed by
Why is the document important/useful for your country?	IEEE is a large an influential organization whose recommendations will be consulted and possibly followed by smaller entities
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Likely yes - it identifies high level or even universal ethical issues that will need to be addressed by any governance framework.; However, it does not go into sufficient levels of detail to make it a key resource.

Document 10 - Artificial Intelligence Research, Development and Regulation

Document found via (national associations or Google or another database)	Google/National Association
Title of the document	Artificial Intelligence Research, Development and Regulation
Kind of document (PEC, NAEG, GDREC)	NAEG
Document developed by whom (organisation, profession)?	The Institute of Electrical and Electronics Engineers (IEEE) - USA Ad Hoc Committee on Artificial Intelligence Policy
Year of publication (between 2005-2018)	2017
Document saved in folder as	FINALformattedIEEEUSAAIPS.pdf
Who is the stated audience	U.S Government; field experts
What definition of AI&Ris used in the document?	"Artificial Intelligence (AI) is the theory and development of computer systems that are able to perform tasks which normally require human intelligence such as, visual perception, speech recognition, learning, decision-making, and natural language processing."
What forms of AI&R are described/covered in the document?	No explicit forms
Which ethical issues are addressed in the document?	Fairness, transparency, safety, consumer and social acceptance; "public well-being"
How are the ethical issues addressed? Are solutions offered? If so, which ones?	The document offers broad, high-level recommendations to "provide effective regulation of AI to ensure public well-being while fostering a robust AI industry," including removing impediments to research on those topics; legal modernization, and the creation of an interagency govt. panel
Format of the document (checklist, continuous text, other)?	Continuous statement; position paper.
How is the document structured?	Short position paper arranged by topic.
Why is the document important/useful for your country?	Represents the IEEE's recommendations on AI R&D
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Partially yes; gives nuance to other IEEE recommendation and documents, including document 9 above.

Document 11 - A National Machine Intelligence Strategy for the United States

Document found via (national associations or Google or another database)	Google
Title of the document	A National Machine Intelligence Strategy for the United States
Kind of document (PEC, NAEG, GDREC)	NAEG
Document developed by whom (organisation, profession)?	Center for Strategic & International Studies Technology Program
Year of publication (between 2005-2018)	2018
Document saved in folder as	180227_Carter_MachineIntelligence_Web.PDF
Who is the stated audience	policy-makers and governmental
What definition of AI&Ris used in the document?	Machine intelligence is defined as "performing tasks that would normally require human intelligence"; data-based and task-specific
What forms of AI&R are described/covered in the document?	A wide variety, including image recognition, farm management, organ sensors,
Which ethical issues are addressed in the document?	Promoting safe and responsible development of machine intelligence technologies; proactively mitigating and managing risk; addressing liability for MI systems
How are the ethical issues addressed? Are solutions offered? If so, which ones?	Recommendation to fund research that promotes accountability and control of MI systems, along with transparency, and predictability; the creation of national and global ethical standards; an open data system; and articulating new and targeted legal principles, including training the judiciary and attorneys
Format of the document (checklist, continuous text, other)?	Continuous text
How is the document structured?	Report with topic-based sections, and a recommendations section.
Why is the document important/useful for your country?	The document was drafted to articulate a comprehensive national policy
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	It will likely be useful as a detailed example of an established and well-known policy group's response to the AI&R question as it pertains to the United States

Document 12- The AI Now Report: The Social and Economic Implications of Artificial Intelligence

Document found via (national associations or Google or another database)	Google
Title of the document	The AI Now Report: The Social and Economic Implications of Artificial Intelligence
Kind of document (PEC, NAEG, GDREC)	NAEG
Document developed by whom (organisation, profession)?	AI Now Institute
Year of publication (between 2005-2018)	2017
Document saved in folder as	AI_Now_2017_Report.pdf
Who is the stated audience	academics and stakeholders in the AI&R fields
What definition of AI&R is used in the document?	No explicit definition is given of either; a fairly broad one appears to be assumed.
What forms of AI&R are described/covered in the document?	Any and all - the document is written at a very general level with respect to relevant technologies
Which ethical issues are addressed in the document?	Labor, bias, human rights, explainability and transparency, diversity, cross-disciplinary design and research, and ethics broadly
How are the ethical issues addressed? Are solutions offered? If so, which ones?	The document is primarily a descriptive one, offering a detailed "state of the field." As such, it does not offer detailed solutions but instead points out a variety of ongoing efforts, and urges that close attention continue to be paid to the issus it identifies. The report recommends more research and monitoring, along with much more transparency and oversight, along with greater diversity of researcher background and outlook.
Format of the document (checklist, continuous text, other)?	Continuous text
How is the document structured?	Report form: Recommendations, executive summary, four topic-based sections
Why is the document important/useful for your country?	It is a detailed document by one of the leading national research groups that focuses explicitly on ethics.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes, it will likely be useful, since it is an ethics-specific document that examines and summarizes the recent scholarly literature in the field as to current work in the field. It is also a document that the organization plans to release annually, making any year -to-year changes especially useful and illuminating.

Document 13 - Ethics in Technology Practice -A Toolkit

Document found via (national associations or Google or another database)	Google
Title of the document	Ethics in Technology Practice
Kind of document (PEC, NAEG, GDREC)	GDREC
Document developed by whom (organisation, profession)?	Markkula Center for Applied Ethics at Santa Clara University
Year of publication (between 2005-2018)	
Document saved in folder as	Markkula Center_ToolkitOnlineFinal.pdf
Who is the stated audience	multi-stakeholder; especially designers and engineers
What definition of AI&Ris used in the document?	None specifically, this is a general "ethics in technology": set of resources
What forms of AI&R are described/covered in the document?	None specifically, this is a general "ethics in technology": set of resources
Which ethical issues are addressed in the document?	A variety are mentioned, including transparency, algorithmic bias and accountability, sustainability and machine autonomy
How are the ethical issues addressed? Are solutions offered? If so, which ones?	The resources available in the materials include: toolkits, case studies and hypotheticals teaching guides, a "framework for ethical decision making" and a set of best practices for ethical design. As a set of guidelines, it offers solutions for engaging with ethical concerns, rather than specific solutions to ethical conundrums
Format of the document (checklist, continuous text, other)?	continuous text with bulleted lists; slide deck
How is the document structured?	Website with links to text-based resources
Why is the document important/useful for your country?	This is a suite of generalized ethical design resources, including: "a workshop teaching guide, overviews of technology ethics and relevant conceptual frameworks for ethical decision-making, case studies, an ethical toolkit for integrating consideration of ethics throughout product development, a sample workflow integration of the tools, and a list of best practices in technology design and engineering."
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes. The richness and complexity of the materials available will be an excellent starting resource or reference for development of codes and other frameworks.

Annex 2: International search – detailed results

TABLE 1: LIST OF ALL RELEVANT PROFESSIONAL ETHICS CODES

SIENNA area	Title of document	URL	Year	Author/organisation	Stated audience	comments
AI&R	ACM Code of Ethics and Professional Conduct	https://www.acm.org/about-acm/acm-code-of-ethics-and-professional-conduct	1992 (2018 update)	Association for Computing Machinery (ACM)	Members of the ACM. All computing professionals, including current and aspiring practitioners, instructors, students, influencers, and anyone who uses computing technology in an impactful way.	
AI&R	DAMA International Code of Ethics and Conflict of Interest	https://dama.org/sites/default/files/DAMA%20I%202017%20Code%20of%20Ethics%20%26%20Conflict%20of%20Interest.pdf	2018	Data Management Association International (DAMA)	DAMA-I & DAMA Chapter Board Members, DAMA Central & DAMA Chapter Member Volunteers, and external Partner Representatives.	
AI&R	Charter on Robotics and Code of ethical conduct for robotics engineers	http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+TA+P8-TA-2017-0051+0+DOC+XML+V0//EN	2017	European Parliament	European Commission, researchers and designers	
AI&R	IEEE Code of Ethics	https://www.ieee.org/about/corporate/governance/p7-8.html	Undated (revised 2017)	IEEE	Members of the IEEE.	
AI&R	ASILOMAR AI PRINCIPLES	https://futureoflife.org/ai-principles/	2017	Future of Life Institute in conjunction	AI/Robotics researchers	

				with the 2017 Asilomar conference		
AI&R	The Montreal Declaration for a Responsible Development of Artificial Intelligence	https://www.montrealdeclaration-responsibleai.com/the-declaration	2017	Forum on the Socially Responsible Development of AI	Public, the experts and government decision-makers	
AI&R	Top 10 Principles For Ethical Artificial Intelligence	http://www.thefutureworldofwork.org/media/35420/uni_ethical_ai.pdf	2017	UNI Global Union	Unions, global alliances, shop stewards and workers, AI designers and management	
AI&R	Barcelona Declaration for the proper development and usage of artificial intelligence in Europe	http://www.iiia.csic.es/barcelonadeclaration/	2017	International experts in artificial intelligence at the B·Debate session, an initiative of Biocat and the "la Caixa" Foundation	AI practitioners (developers and users) in Europe	
AI&R	Humanitarian UAV Code of Conduct & Guidelines	https://uavcode.org	2014	Humanitarian UAV Network (UAViators)	All actors involved in the use of UAVs to support the delivery of humanitarian assistance in disasters and situations of conflict. E.g., donors, UAV operators, humanitarian organizations and development organizations.	

AI&R	Ethical Decision-Making and Internet Research: Recommendations from the AoIR Ethics Working Committee (Version 2.0)	https://aoir.org/reports/ethics2.pdf	2012	Association of Internet Researchers (AoIR)	Those responsible for making decisions about the ethics of internet research. Primarily directed at researchers, but provides a resource for a wide audience of other stakeholders such as review boards, ethicists, and students	
AI&R	Mission Statement and Berlin Statement	https://www.icrac.net/statements/	MS (2009); BS (2010)	International Committee for Robot Arms Control(ICRAC) [29]	MS – ICRAC members. BS -international community.	
AI&R	Software Engineering Code of Ethics	https://www.computer.org/web/education/code-of-ethics	1999	IEEE-CS/ACM joint task force on Software Engineering Ethics and Professional Practices (SEEPP)	Software engineers (also seen as a means to educate both the public and aspiring professionals about the ethical obligations of all software engineers).	
AI&R	Unmanned Aircraft System Operations Industry "Code of Conduct"	http://www.auvsi.org/code-conduct	Undated	Association for Unmanned Vehicle Systems	Members, and those who design, test, and operate UAS for public and civil use	

[29] ICRAC is an international committee of experts in robotics technology, artificial intelligence, robot ethics, international relations, international security, arms control, international humanitarian law, human rights law, and public campaigns, concerned about the pressing dangers that military robots pose to peace and international security and to civilians in war. Its members include academics, activists and legal advisors.

				International (AUVSI)		
AI&R	Statement of Ethics	http://www.iapr.org/constitution/soe.php	Undated	International Association for Pattern Recognition (IAPR)	Members of the IAPR and its member societies	Not covered in docs analysis.
AI&R	Ethics Statements	https://www.ibia.org/ethics-statements	Undated	International Biometric Industry Association (IBIA)	IBIA members	
AI&R	Code of Ethics	https://www.incose.org/about-incose/Leadership-Organization/code-of-ethics	Undated	The International Council on Systems Engineering (INCOSE)	Systems engineering professionals	
AI&R	Simulationist Code of Ethics	http://scs.org/wp-content/uploads/2015/12/Simulationist-Code-of-Ethics_English.pdf	Undated	The Society for Modeling & Simulation International (SCS)	Professionals involved in modeling and simulation activities,providing modeling and simulation products,providing modeling and simulation services.	
AI&R	10 Principles for Workers' Data Rights	http://www.thefutureworldofwork.org/opinions/10-principles-for-workers-data-rights/	Undated	UNI Global Union	Employers	

TABLE 2: LIST OF ALL RELEVANT DOCUMENTS FROM INTERNATIONAL ADVISORY/ETHICS GROUPS (IAEGs)

SIENNA area	Title of document	URL	Year	Author/organization	Stated audience	comments
AI&R	Opinion 3/2018 on online manipulation and personal data	https://edps.europa.eu/data-protection/our-work/publications/opinions/online-manipulation-and-personal-data_en	2018	European Data Protection Supervisor (EDPS)	Regulators	
AI&R	Report of COMEST on robotics ethics	http://unesdoc.unesco.org/images/0025/002539/253952e.pdf	2017	COMEST Working Group on Robot Ethics	Undefined (mentions or scientists and engineers, policy makers and ethicists)	
AI&R	Opinion 8/2016 on coherent enforcement of fundamental rights in the age of big data	https://edps.europa.eu/sites/edp/files/publication/16-09-23_bigdata_opinion_en.pdf	2016	European Data Protection Supervisor (EDPS)	EU institutions	
AI&R	Opinion 9/2016 EDPS Opinion on Personal Information Management Systems	https://edps.europa.eu/sites/edp/files/publication/16-10-20_pims_opinion_en.pdf	2016	European Data Protection Supervisor (EDPS)	EU institutions, data protection community; civil society, designers, companies, academics, public authorities and regulators.	

AI&R	Opinion 4/2015 Towards a new digital ethics: Data, Dignity and Technology	https://edps.europa.eu/sites/edp/files/publication/15-09-11_data_ethics_en.pdf	2015	European Data Protection Supervisor (EDPS)	Policy makers, technology developers, business developers	
AI&R	Opinion n°28 - 20/05/2014 Ethics of Security and Surveillance Technologies	https://publications.europa.eu/en/publication-detail/-/publication/6f1b3ce0-2810-4926-b185-54fc3225c969	2014	European Group on Ethics in Science and New Technologies (EGE)	European Commission	
AI&R	Opinion n°26 - Ethics of information and communication technologies	https://publications.europa.eu/en/publication-detail/-/publication/c35a8ab5-a21d-41ff-b654-8cd6d41f6794	2012	European Group on Ethics in Science and New Technologies (EGE)	European Commission	

TABLE 3: LIST OF ALL RELEVANT GUIDANCE DOCUMENTS ON HOW TO WRITE RESEARCH ETHICS PROTOCOLS

Not found.

TABLE 4: MOST RELEVANT PECs DOCUMENTS IN AI & Robotics

Document found via (national associations or Google or another database)	ACM
Title of the document	**ACM Code of Ethics and Professional Conduct**
Kind of document (PEC, NAEG, GDREC)	PEC

Document developed by whom (organisation, profession)?	Association for Computing Machinery (ACM)
Year of publication (between 2005-2018)	1992 (2018 update)
Document saved in folder as	ACM Code of Ethics and Professional Conduct_2018
Who is the stated audience	Members of the ACM. All computing professionals, including current and aspiring practitioners, instructors, students, influencers, and anyone who uses computing technology in an impactful way.
What definition of AI&R is used in the document?	-
What forms of AI&R are described/covered in the document?	Terms used include: computing, technology, machine learning systems, computer system, software, or data.
Which ethical issues are addressed in the document?	• Contribution to society and to human well-being • Avoiding harm • Honesty and trustworthiness. • Fairness and non-discrimination. • Respect for the work required to produce new ideas, inventions, creative works, and computing artefacts. • Privacy • Confidentiality.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	Ethical principles are supplemented by guidelines, which provide explanations to assist computing professionals in understanding and applying the principles.

Format of the document (checklist, continuous text, other)?	Text
How is the document structured?	Section 1 outlines fundamental ethical principles that form the basis for the remainder of the Code. Section 2 addresses additional, more specific considerations of professional responsibility. Section 3 guides individuals who have a leadership role, whether in the workplace or in a volunteer professional capacity. Commitment to ethical conduct is required of every ACM member, and principles involving compliance with the Code are given in Section 4.
Why is the document important/useful ?	Widely recognised code of ethics in information technology; covers many of the key ethical areas that are encountered in information technology practice. (Peslak, Alan R., "A Review of the Impact of ACM Code of Conduct on Information Technology Moral Judgment and Intent", *Journal of Computer Information Systems*, 47:3, pp. 1-10)
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes. See above.

Document found via (national associations or Google or another database)	Google
Title of the document	**DAMA International Code of Ethics and Conflict of Interest**
Kind of document (PEC, NAEG, GDREC)	PEC
Document developed by whom (organisation, profession)?	Data Management Association International (DAMA)
Year of publication (between 2005-2018)	2017
Document saved in folder as	DAMA_Code of Ethics & Conflict of Interest_2017

Who is the stated audience	DAMA-I & DAMA Chapter Board Members, DAMA Central & DAMA Chapter Member Volunteers, and external Partner Representatives.
What definition of AI&R is used in the document?	-
What forms of AI&R are described/covered in the document?	Data management
Which ethical issues are addressed in the document?	• Adherance to precepts • Professional behaviour • Refrain from harassment or bullying • Avoidance of personal and/or professional conflict of interest • Disclosure of personal and/or professional conflict of interest
How are the ethical issues addressed? Are solutions offered? If so, which ones?	Some explanatory statements of the above are provided.
Format of the document (checklist, continuous text, other)?	Continuous text
How is the document structured?	Statement of principles followed by provision for explanation and signature
Why is the document important/useful ?	Covers data management professionals
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	No

Document found via (national associations or Google or another database)	IEEE website
Title of the document	**IEEE Code of Ethics**
Kind of document (PEC, NAEG, GDREC)	PEC
Document developed by whom (organisation, profession)?	IEEE
Year of publication (between 2005-2018)	Undated (revised 2017)
Document saved in folder as	IEEE Code of ethics_undated
Who is the stated audience	Members of the IEEE
What definition of AI&R is used in the document?	-
What forms of AI&R are described/covered in the document?	Technologies, emerging technologies, intelligent systems
Which ethical issues are addressed in the document? *(summarised)*	• Safety, health, and welfare of the public • Ethical design and sustainable development practices • Conflicts of interest • Honesty • Rejection of bribery • Societal implications • Full disclosure of pertinent limitations • Scientific and research integrity aspects • Fairness and non-discrimination

	• Avoidance of injury • Assisting colleagues and co-workers
How are the ethical issues addressed? Are solutions offered? If so, which ones?	No
Format of the document (checklist, continuous text, other)?	Continuous text
How is the document structured?	As a statement
Why is the document important/useful?	Well-known and established code of ethics.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes – its ethical principles are relevant.

Document found via (national associations or Google or another database)	Google
Title of the document	**ASILOMAR AI PRINCIPLES**
Kind of document (PEC, NAEG, GDREC)	PEC
Document developed by whom (organisation, profession)?	Future of Life Institute in conjunction with the 2017 Asilomar conference
Year of publication (between 2005-2018)	2017

Document saved in folder as	Future of Life Institute_Asilomar AI Principles_2017
Who is the stated audience	AI/Robotics researchers
What definition of AI&R is used in the document?	Uses 'AI' but it's not defined.
What forms of AI&R are described/covered in the document?	Artificial intelligence, AI systems, autonomous weapons, autonomous system
Which ethical issues are addressed in the document?	• Safety • Failure transparency • Judicial transparency • Responsibility • Value alignment • Human values (human dignity, rights, freedoms, and cultural diversity) • Personal privacy • Liberty and privacy • Shared benefit • Shared prosperity • Human control • Non-subversion

	• AI arms race
How are the ethical issues addressed? Are solutions offered? If so, which ones?	The ethical issues are not addressed as such, nor are solutions offered.
Format of the document (checklist, continuous text, other)?	Continuous text
How is the document structured?	Has three categories: research issues, ethics and values and longer-term issues.
Why is the document important/useful ?	To date, the Principles have been signed by 1273 AI/Robotics researchers and 2541 others
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes. Its principles are highly relevant to AI.

Document found via (national associations or Google or another database)	Google/Twitter
Title of the document	**The Montreal Declaration for a Responsible Development of Artificial Intelligence**
Kind of document (PEC, NAEG, GDREC)	PEC
Document developed by whom (organisation, profession)?	Forum on the Socially Responsible Development of AI
Year of publication (between 2005-2018)	2017
Document saved in folder as	Montreal Declaration_Responsible Development of Artificial Intelligence_2017

Who is the stated audience	Public, the experts and government decision-makers
What definition of AI&R is used in the document?	-
What forms of AI&R are described/covered in the document?	Artificial intelligence (AI), non-human, autonomous and intelligent agents, artificial agents, self-driving cars, autonomous weapon, autonomous technologies, intelligent computer systems, algorithm
Which ethical issues are addressed in the document?	It addresses seven ethical values: well-being, autonomy, justice, personal privacy, knowledge, democracy and responsibility.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	The first phase of the Declaration identified the seven values. For each value, there are a series of questions that explore its relationship with the development of AI. This is followed by the presentation of a general general principle, one that does not directly answer the questions asked.
Format of the document (checklist, continuous text, other)?	Continuous text
How is the document structured?	Preamble followed by a list of values, questions, principles.
Why is the document important/useful ?	It aims to "spark public debate and encourage a progressive and inclusive orientation to the development of AI." (https://recherche.umontreal.ca/english/strategic-initiatives/montreal-declaration-for-a-responsible-ai/) The values were proposed by a group of ethics, law, public policy and artificial intelligence experts and informed by a deliberation process that included consultations held over three months, in 15 different public spaces, and exchanges between over 500 citizens, experts and stakeholders.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes. It is well-structured, directly relevant to AI, has a dedicated website. Its co-construction process might have some useful lessons for the development of codes in SIENNA. Note, the Declaration is (as of data collection, i.e., July 2018 in the analysis phase of consultations.

Document found via (national associations or Google or another database)	UNI Global Union website
Title of the document	**Top 10 Principles For Ethical Artificial Intelligence**
Kind of document (PEC, NAEG, GDREC)	PEC
Document developed by whom (organisation, profession)?	UNI Global Union
Year of publication (between 2005-2018)	
Document saved in folder as	UNI_top ten priniciples_2017
Who is the stated audience	Unions, gloal alliances, shop stewards and workers, AI designers and management
What definition of AI&R is used in the document?	Re-states the definition of AI by Arvind Narayanan, Princeton University, as "When behaviour comes not purely from the programmer, but some other means, e.g. knowledge bases.". Defines machine learning as follows: Machine learning is an application of artificial intelligence (AI) that provides systems the ability to automatically learn and improve from experience without being explicitly programmed. Machine learning focuses on the development of computer programs that can access data and use it to learn for themselves.
What forms of AI&R are described/covered in the document?	AI, robotics, data and machine learning, automated systems.
Which ethical issues are addressed in the document?	It covers transparency, accountability, principles of human dignity, integrity, freedom, privacy and cultural and gender diversity, as well as with fundamental human rights, responsibility, safety and usefulness, human in control, negative and harmful biases, benefit sharing and empowerment, just transition and ensuring support for fundamental freedoms and rights, bans on attribution of responsibility to robots and an AI arms race.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	All 10 principles are supported by specific points of action.

Format of the document (checklist, continuous text, other)?	Continuous text
How is the document structured?	An introduction followed by ten principles and specific points of action.
Why is the document important/useful ?	It offers 10 principles and specific points of action, which unions, shop stewards and global alliances must implement in collective agreements, global framework agreements and multinational alliances.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes, it covers many of the core AI ethical aspects.

Document found via (national associations or Google or another database)	Twitter
Title of the document	**Barcelona Declaration for the proper development and usage of artificial intelligence in Europe**
Kind of document (PEC, NAEG, GDREC)	PEC
Document developed by whom (organisation, profession)?	International experts in artificial intelligence at the B·Debate session held on 8 March 2017 in Barcelona, an initiative of Biocat and the “la Caixa” Foundation
Year of publication (between 2005-2018)	2017
Document saved in folder as	Barcelona Declaration for the proper development and usage of artificial intelligence in Europe_2017
Who is the stated audience	AI practitioners (developers and users) in Europe

What definition of AI&R is used in the document?	Artificial intelligence (AI) is a collection of computational components to build systems that emulate functions carried out by the human brain. Distinguishes between knowledge-based AI and data-driven AI.
What forms of AI&R are described/covered in the document?	AI, knowledge-based AI, data-driven AI, artificial systems, AI chat-bots, autonomous robots, AI systems, self-driving cars
Which ethical issues are addressed in the document?	1. Prudence 2. Reliabiility 3. Accountability 4. Responsibility 5. Constrained Autonomy 6. Human Role
How are the ethical issues addressed? Are solutions offered? If so, which ones?	The Declaration proposes elements towards a Code of Conduct for AI practitioners in Europe. Each point (see above) has some explanation.
Format of the document (checklist, continuous text, other)?	Continuous text.
How is the document structured?	Introductory explanations followed by presentation of six elements with explanations and a conclusion that calls for action.
Why is the document important/useful ?	The Declaration recognises that “AI can be a force for the good of society, but that there is also concern for inappropriate, premature or malicious use so as to warrant the need for raising awareness of the limitations of AI and for collective action to ensure that AI is indeed used for the common good in safe, reliable, and accountable ways.”
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes. See above.

Document found via (national associations or Google or another database)	Colleague recommendation

Title of the document	**Humanitarian UAV Code of Conduct & Guidelines**
Kind of document (PEC, NAEG, GDREC)	PEC
Document developed by whom (organisation, profession)?	Humanitarian UAV Network (UAViators)
Year of publication (between 2005-2018)	2014
Document saved in folder as	Uaviators_Humanitarian UAV Code of Conduct_2014
Who is the stated audience	All actors involved in the use of UAVs to support the delivery of humanitarian assistance in disasters and situations of conflict. E.g., donors, UAV operators, humanitarian organizations and development organizations.
What definition of AI&R is used in the document?	-
What forms of AI&R are described/covered in the document?	Humanitarian UAVs (unmanned aerial vehicles)
Which ethical issues are addressed in the document?	Safety, humanitarian principles (humanity, neutrality, impartiality and independence), do no harm, Developing trust and engaging local communities, compliance with law, responsibility, risk to the natural environment and wildlife, conflict sensitivity, responsible data management, transparency, openness and collaboration.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	Some explanations are provided. There are additional guidelines provided on specific topics.
Format of the document (checklist, continuous text, other)?	Continuous text
How is the document structured?	Statements with explanations.
Why is the document important/useful ?	Covers a variety of ethical aspects. Widely contributed to and recognised code. Has dedicated website and monitoring.

Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes. Both the format and the process might be useful to look at. As reported, the Code was revised by more than 60 organizations through multiple open, multi-stakeholder consultations over the course of two years. In 2015, dedicated guidelines were added to the Code of Conduct to provide further guidance on Data Protection, Community Engagement, Effective Partnerships and Conflict Sensitivity.

Document found via (national associations or Google or another database)	Google
Title of the document	**Mission Statement(MS) and Berlin Statement (BS)**
Kind of document (PEC, NAEG, GDREC)	PEC
Document developed by whom (organisation, profession)?	International Committee for Robot Arms Control (ICRAC)
Year of publication (between 2005-2018)	MS (2009); BS (2010)
Document saved in folder as	ICRAC_mission and Berlin statements_2009 2010
Who is the stated audience	MS – ICRAC members. BS -international community.
What definition of AI&R is used in the document?	-
What forms of AI&R are described/covered in the document?	Military robotics, armed autonomous unmanned systems, robot space weapons, tele-operated and autonomous systems, uninhabited systems, armed robots.
Which ethical issues are addressed in the document?	indiscriminate and disproportionate use of force and obscure the moral and legal responsibility for war crimes, responsiblity, accountability, loss of human control.

How are the ethical issues addressed? Are solutions offered? If so, which ones?	The Mission Statement calls for a discussion about an arms control regime to reduce the threat posed by these systems. The Berlin Statement calls for arms control regime to regulate the development, acquisition, deployment, and use of armed tele-operated and autonomous robotic weapons and makes recommendations on what the regime should prohibit.
Format of the document (checklist, continuous text, other)?	Continuous text
How is the document structured?	Mission statement: short bulleted text with a statement and a proposal. Berlin Statement: Statement of beliefs and call to action (prohibitions)
Why is the document important/useful ?	Covers long-term risks posed by the proliferation and further development of these weapon systems
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes (given its coverage of autonomous unmanned systems)

Document found via (national associations or Google or another database)	IEEE website
Title of the document	**Software Engineering Code of Ethics**
Kind of document (PEC, NAEG, GDREC)	PEC
Document developed by whom (organisation, profession)?	IEEE-CS/ACM joint task force on Software Engineering Ethics and Professional Practices (SEEPP)
Year of publication (between 2005-2018)	1999
Document saved in folder as	IEEEE-CS_software-engineering-code-of-ethics_1999

Who is the stated audience	Software engineers
What definition of AI&R is used in the document?	-
What forms of AI&R are described/covered in the document?	Software systems
Which ethical issues are addressed in the document?	• Public interest • Fairness • Safety • Privacy • Harm to the environment • Honesty • Confidentiality • Accuracy and integrity of data • Professionalism • Integrity and independence in professional judgment (e.g., declaration of conflict of interest) • Ethical management (including of risk, fair and just remuneration, due process, Not punish anyone for expressing ethical concerns about a project) • Fairness and supportiveness to colleagues (credit work, fair hearing etc)

	• Lifelong self-learning
How are the ethical issues addressed? Are solutions offered? If so, which ones?	The Code includes eight overarching principles with further statements on what should be done to ensure they are met.
Format of the document (checklist, continuous text, other)?	Continuous text
How is the document structured?	The Code contains eight Principles related to the behaviour of and decisions made by professional software engineers, including practitioners, educators, managers, supervisors and policy makers, as well as trainees and students of the profession. The Principles identify the ethically responsible relationships in which individuals, groups, and organizations participate and the primary obligations within these relationships. The Clauses of each Principle are illustrations of some of the obligations included in these relationships.
Why is the document important/useful for your country?	It is a professional standard for teaching and practicing software engineering.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes, SIENNA will need to consider what is already embedded in this Code so as not to duplicate or see where we can supplement it.

Document found via (national associations or Google or another database)	Google
Title of the document	**Unmanned Aircraft System Operations Industry "Code of Conduct"**
Kind of document (PEC, NAEG, GDREC)	PEC

Document developed by whom (organisation, profession)?	Association for Unmanned Vehicle Systems International (AUVSI)
Year of publication (between 2005-2018)	Undated
Document saved in folder as	AUVSI_Code of Conduct_undated
Who is the stated audience	Members, and those who design, test, and operate UAS for public and civil use
What definition of AI&R is used in the document?	-
What forms of AI&R are described/covered in the document?	Unmanned aircraft systems (UAS)
Which ethical issues are addressed in the document?	• Safety • Professionalism • Respect for rights of other users of airspace, privacy of individuals, concerns of the public as they relate to unmanned aircraft operations.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	The three themes (safety, professionalism, and respect) are accompanied by guidelines and recommendations.
Format of the document (checklist, continuous text, other)?	Continuous text (though they call it a checklist)
How is the document structured?	The code is built on three specific themes: safety, professionalism, and respect.

Why is the document important/useful ?	Covers essential aspects of UAS
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes, if we choose to focus on UAS.

Document found via (national associations or Google or another database)	Google
Title of the document	**Ethics Statements**
Kind of document (PEC, NAEG, GDREC)	PEC
Document developed by whom (organisation, profession)?	International Biometric Industry Association (IBIA)
Year of publication (between 2005-2018)	Undated
Document saved in folder as	IBIA_Ethics Statements_undated
Who is the stated audience	IBIA members
What definition of AI&R is used in the document?	-
What forms of AI&R are described/covered in the document?	Identification technologies and applications.
Which ethical issues are addressed in the document?	• Non-discrimination

	• Security • Privacy • Equal rights under the law • Competitor courtesy and civility • Truth • Accountability • Legitimacy • Free trade and open competition
How are the ethical issues addressed? Are solutions offered? If so, which ones?	As statements.
Format of the document (checklist, continuous text, other)?	Continuous text.
How is the document structured?	As principles and Code of ethics(as described by itself).
Why is the document important/useful ?	Covers important principles.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes. As above.

Document found via (national associations or Google or another database)	The International Council on Systems Engineering (INCOSE)
Title of the document	**Code of Ethics**
Kind of document (PEC, NAEG, GDREC)	
Document developed by whom (organisation, profession)?	The International Council on Systems Engineering (INCOSE)
Year of publication (between 2005-2018)	Undated
Document saved in folder as	INCOSE_Code of Ethics_undated
Who is the stated audience	Systems engineering professionals
What definition of AI&R is used in the document?	-
What forms of AI&R are described/covered in the document?	Systems engineering.
Which ethical issues are addressed in the document?	Honesty and impartiality Integrity Professional competence Protecting the environment, safety and welfare of those affected Public interest Responsibility

	Openess to ethical scrutiny and assessment Honour and justice Fairness Truthfulness Professional and technical integrity Trust Avoidance of conflict of interest
How are the ethical issues addressed? Are solutions offered? If so, which ones?	It prescribes rules of practice.
Format of the document (checklist, continuous text, other)?	Continuous text.
How is the document structured?	It has four sections: Preamble; Fundamental Principles; Fundamental Duties to Society and Public Infrastructure and Rules of Practice.
Why is the document important/useful ?	INCOSE has 16000 members,70 chapters, 45 working groups; its membership represents a broad spectrum – from student to senior practitioner, from technical engineer to program and corporate management, from science and engineering to business development.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes. Covers a number of ethical principles relevant to both AI and R.

Document found via (national associations or Google or another database)	Google
Title of the document	Simulationist Code of Ethics
Kind of document (PEC, NAEG, GDREC)	PEC
Document developed by whom (organisation, profession)?	The Society for Modeling & Simulation International (SCS)
Year of publication (between 2005-2018)	Undated
Document saved in folder as	SCS_Simulationist-Code-of-Ethics_undated
Who is the stated audience	Professionals involved in modeling and simulation activities, providing modeling and simulation products, providing modeling and simulation services.
What definition of AI&R is used in the document?	-
What forms of AI&R are described/covered in the document?	Modeling and simulation products.
Which ethical issues are addressed in the document?	Professional competence (including use of roper methodologies and technologies, proper and achievable goals for any project, accuracy in documentation, full disclosure of system design assumptions and known limitations and problems to authorized parties, explicitness about conditions of applicability of specific models and associated simulation results, caution against acceptance of modeling and simulation results when there is insufficient evidence of thorough validation and verification, assurance thorough and unbiased interpretations and evaluations of the results of modeling and simulation studies); fairness; assistance; reliable and credible use; clarify and counter false or misleading statements; trustworthiness; due credit; property and privacy rights.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	Expressed as statements – i.e., what a simulationist will do.

Format of the document (checklist, continuous text, other)?	
How is the document structured?	After the Preamble, the document has five categories: 1. Personal Development and Profession 2. Professional Competence 3. Trustworthiness 4. Property Rights and Due Credit 5. Compliance with the Code
Why is the document important/useful ?	Targets professionals involved in modeling and simulation activities.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Potentially.

Document found via (national associations or Google or another database)	UNI Global Union website
Title of the document	**10 Principles for Workers' Data Rights**
Kind of document (PEC, NAEG, GDREC)	
Document developed by whom (organisation, profession)?	UNI Global Union
Year of publication (between 2005-2018)	Undated
Document saved in folder as	UNI_10 Principles for Workers' Data Rights_undated
Who is the stated audience	Employers
What definition of AI&R is used in the document?	-

What forms of AI&R are described/covered in the document?	data, big data and data sets
Which ethical issues are addressed in the document?	Workers right of access to data collected, sustainable data processing safeguards, data minimisation, transparent data processing, respect for privacy laws and fundamental rights, right to explanation, limited use of biometric data, legitimacy of worker's location information, data governance.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	Via specific points of action.
Format of the document (checklist, continuous text, other)?	Continuous text.
How is the document structured?	Introduction followed by principles or ten specific action points.
Why is the document important/useful ?	The 10 operational principles for workers' data rights and protection are important for collective bargaining, Global Framework Agreements and multinational alliances. UNI Global Union suggest that the principles help address the imbalance created by the increasing use of big data and data sets by companies in managerial decision-making and the lack of workers' data protection and privacy rules. The document "offers concrete demands for corporate data gathering and use, these principles will empower workers and ensure an ethical and sustainable use of data".
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes (from workers' data rights and protection point of view).

TABLE 5: MOST RELEVANT IAEG DOCUMENTS IN AI & Robotics

Document found via (national associations or Google or another database)	Organisational website

Title of the document	Online manipulation and personal data
Kind of document (PEC, IAEG, GDREC)	IAEG
Document developed by whom (organisation, profession)?	European Data Protection Supervisor (EDPS)
Year of publication (between 2005-2018)	2018
Document saved in folder as	EDPS_online manipulation_2018
Who is the stated audience	Regulators, various players in the digital information ecosystem
What definition of AI&R is used in the document?	AI is covered but not defined. 'Robots' or 'robotics' not mentioned.
What forms forms of AI&R are described/covered in the document?	Machine-learning algorithms, social media bots, deepfakes, speech simulation and automated news reporting, connected devices
Which ethical issues are addressed in the document?	Unethical use of personal information and data processing, fundamental rights
How are the ethical issues addressed? Are solutions offered? If so, which ones?	The Opinion builds on the previous EDPS work and summarises the process whereby personal data fuels and determines the prevailing cycle of digital tracking, microtargeting and manipulation; it considers the roles of the various players in the digital information ecosystem and the fundamental rights at stake, the relevant data protection principles and other relevant legal obligations. It recommends that the problem of online manipulation is only likely to worsen, that no single regulatory approach will be sufficient on its own, and that regulators therefore need to collaborate urgently to tackle not only localised abuses but also both the structural distortions caused by excessive market concentration.
Format of the document (checklist, continuous text, other)?	Continuous text

How is the document structured?	It includes an executive summary, reasons for publication. it covers: how personal data is used to determine the online experience, the digital (mis)information ecosystem, fundamental rights and values at stake, relevant legal frameworks and includes recommendations.
Why is the document important/useful?	It specifically covers AI, the unethical use of personal information and data processing, and the fundamental rights and values at stake.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes. See above.

Document found via (national associations or Google or another database)	UNESCO
Title of the document	Report of COMEST on Robotics Ethics
Kind of document (PEC, IAEG, GDREC)	IAEG
Document developed by whom (organisation, profession)?	World Commission on the Ethics of Scientific Knowledge and Technology (COMEST) Working Group
Year of publication (between 2005-2018)	2017
Document saved in folder as	COMEST_robotics ethics_2017
Who is the stated audience	Undefined (mentions or scientists and engineers, policy makers and ethicists)
What definition of AI&R is used in the document?	Contemporary robots can be characterized by four central features: • *mobility*, which is important to function in human environments like hospitals and offices;

	• *interactivity,* made possible by sensors and actuators, which gather relevant information from the environment and enable a robot to act upon this environment; • *communication*, made possible *by* computer interfaces or voice recognition and speech synthesis systems; and • *autonomy,* in the sense of an ability to 'think' for themselves and make their own decisions to act upon the environment, without direct external control.
What forms forms of AI&R are described/covered in the document?	Robots, robotics applications, artificial intelligence, algorithms
Which ethical issues are addressed in the document?	Relevant ethical principles and values covered include: human dignity, autonomy, privacy, 'do not harm', principle of responsibility, beneficence, justice.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	The report explains the principles and values and proposes a technology-based ethical framework to consider recommendations on robotics ethics based on the distinction between deterministic and cognitive robots. The report also makes a number of specific recommendations concerning the application of robotic technologies which cover a wide variety of areas, from the further development of codes of ethics for roboticists, to the need for retraining and retooling of the work force, as well as to the advice against the development and use of autonomous weapons.
Format of the document (checklist, continuous text, other)?	Continuous text
How is the document structured?	The document has an introduction to robots, history, robots and society, robots in industry, military and civilian uses of mobile robotic systems, robots in transportation, health and welfare (medical robots, robots in healthcare, healthcare robots in elderly care, companion robots), education, household, agriculture and environment, ethical and legal regulation, ethical challenges (i.e., techno-pessimism, techno-optimism, robots and responsibility, non-human agency, the moral status of robots , value dynamism. it concludes with recommendations (general and specific).
Why is the document important/useful?	The report aims to raise awareness and promote public consideration and inclusive dialogue on ethical issues concerning the different use of contemporary robotic technologies in society. The report proposes a technology-based ethical framework to consider recommendations on robotics ethics based on the distinction between deterministic and cognitive robots. It further identifies ethical values and principles

	that can be helpful to set regulations at every level and in a coherent manner, from engineers' codes of conduct to national laws and international conventions.
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes. For reasons above.

Document found via (national associations or Google or another database)	EDPS website
Title of the document	**Opinion 8/2016 on coherent enforcement of fundamental rights in the age of big data**
Kind of document (PEC, IAEG, GDREC)	IAEG
Document developed by whom (organisation, profession)?	EDPS
Year of publication (between 2005-2018)	2016
Document saved in folder as	EDPS_Opinion coherent enforcement of fundamental rights in the age of big data_2016
Who is the stated audience	EU institutions
What definition of AI&R is used in the document?	-
What forms forms of AI&R are described/covered in the document?	Data and self-learning algorithms, machine-learning algorithms, big data applications, web-based service algorithms

Which ethical issues are addressed in the document?	Concentration and monopoly power (in digital markets), privacy and freedom of expression, respect for private life, non-discrimination, freedom to innovate amid concentration of profit and market power, consumer welfare, data protection, power and accountability, fairness, lawfulness and transparency of personal data processing, trust deficit.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	The Opinion suggests three practical steps to help use existing EU tools to create the conditions in which rights and freedoms can flourish and joined-up enforcement to exploit the synergies between the relevant areas of law: 1. Better reflect the interests of the individual in big data mergers 2. A digital enforcement clearing house 3. An EU values-based common area on the web.
Format of the document (checklist, continuous text, other)?	Continuous text
How is the document structured?	The Opinion includes and executive summary. It presents its background and structure, moving from analysis to action, strategic importance of this issue for data protection authorities, the 'value' of personal data in digital markets, power and accountability (scalable legal obligations, concentration of market and informational power), synergies ready to be exploited (common goals but limited cooperation, separate but related jurisdictions, opportunities for working together), fostering privacy and privacy-enhancing technologies as a competitive advantage (trust and tracking, privacy as a factor of quality, and determining the true price of 'free' services, imbalances within the digital transaction weak market for privacy-friendly services) and recommendations (shaping an EU cyberspace based on EU values)
Why is the document important/useful?	As above
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes, partly, as it covers ethical issues related to AI as outlined above.

Document found via (national associations or Google or another database)	EDPS website
Title of the document	**Opinion 9/2016 EDPS Opinion on Personal Information Management Systems**

Kind of document (PEC, IAEG, GDREC)	IAEG
Document developed by whom (organisation, profession)?	EDPS
Year of publication (between 2005-2018)	2016
Document saved in folder as	EDPS_Opinion_PIMS_2016
Who is the stated audience	EU institutions, data protection community; civil society, designers, companies, academics, public authorities and regulators.
What definition of AI&R is used in the document?	It defines 'personal information management system' (PIMS) as new technologies and ecosystems which aim to empower individuals to control the collection and sharing of their personal data.
What forms forms of AI&R are described/covered in the document?	New technologies and ecosystems, personal device, algorithm, automated mechanisms
Which ethical issues are addressed in the document?	Sustainable and ethical use of big data, user empowerment, consent and control over personal data sharing, information asymmetry between service providers and users, transparency for the individuals, authenticity and integrity of data and processing, rights to access and rectification, right to data portability, data quality, data security, transparency and traceability.
How are the ethical issues addressed? Are solutions offered? If so, which ones?	The Opinion analyses how PIMS can contribute to a better protection of personal data and what challenges they face, it identifies ways forward to build upon the opportunities they offer and draws some conclusions and next steps.
Format of the document (checklist, continuous text, other)?	continuous text
How is the document structured?	The document has four parts: 1. PIMS: Sharing data, sharing benefits? 2. Models and features of emerging PIMS 3. How PIMS can support data protection principles 4. Conclusions and next steps
Why is the document important/useful?	The document can help contribute to a sustainable and ethical use of big data and to the effective implementation of the principles of the GDPR.

Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes, for reasons cited above.

Document found via (national associations or Google or another database)	EDPS website
Title of the document	**Opinion 4/2015 Towards a new digital ethics: Data, Dignity and Technology**
Kind of document (PEC, IAEG, GDREC)	IAEG
Document developed by whom (organisation, profession)?	EDPS
Year of publication (between 2005-2018)	2015
Document saved in folder as	EDPS_Towards a new digital ethics_2015
Who is the stated audience	Policy makers, technology developers, business developers
What definition of AI&R is used in the document?	Artificial intelligence, like robotics, refers to a technological requirement for autonomous machines both stationary and mobile.
What forms forms of AI&R are described/covered in the document?	Covers big data, Internet of things, ambient computing, cloud computing, drones, autonomous vehicles. Also refer to autonomous machines, robots, driverless cars, self-learning algorithms.
Which ethical issues are addressed in the document?	Accountability for data processing, privacy, discrimination, control over personal information, transparency and accountability, freedom of expression, responsibility and liability, safeguarding of intellectual property, consumer protection, human dignity.

How are the ethical issues addressed? Are solutions offered? If so, which ones?	The Opinion outlines a four-tier 'big data protection ecosystem' to respond to the digital challenge: a collective effort, underpinned by ethical considerations. (1) Future-oriented regulation of data processing and respect for the rights to privacy and to data protection (2) Accountable controllers who determine personal information processing (3) Privacy conscious engineering and design of data processing products and services. (4) Empowered individuals.
Format of the document (checklist, continuous text, other)?	Continuous text
How is the document structured?	It has four parts: 1. Data everywhere: Trends, opportunities and challenges 2. A big data protection ecosystem 3. Dignity at the heart of a new digital ethics 4. Conclusion
Why is the document important/useful?	Addresses ethical issues pertiaining to big data, Internet of things, ambient computing, cloud computing, drones, autonomous vehicles
Is the document useful for the development of the SIENNA codes and other ethical frameworks? If yes, please explain.	Yes. As above. Also relevant as it announced the setting up of an Ethics Advisory Group to help the EDPS to better assess the ethical implications of how personal information is defined and used in the big data and artificial intelligence-driven world.

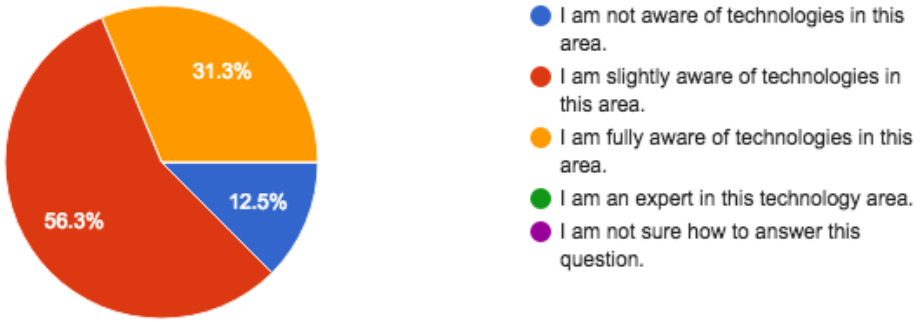
Annex 3: Online Survey – questions and answers

The online survey was developed for all three SIENNA areas, therefore questions are asked not only regarding AI&R, but also regarding HG and HE. The responses were stripped from identifying information.

Questions and answers

With respect to Human Genomics, to what extent are you aware of technologies in this area?

16 responses



With respect to Human Enhancement, to what extent are you aware of technologies in this area?

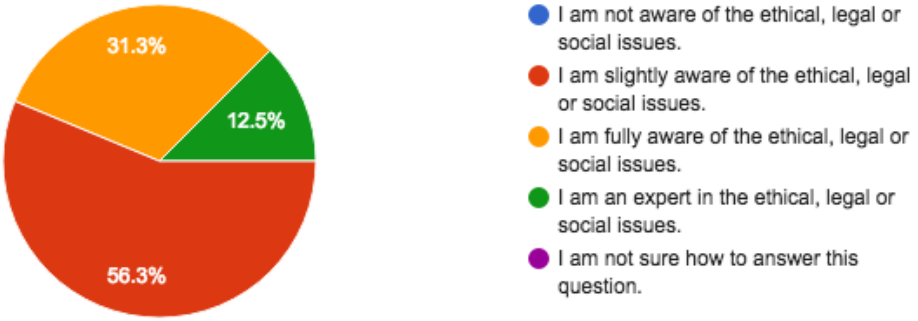
16 responses

With respect to Artificial Intelligence and Robotics to what extent are you aware of technologies in this area?

16 responses

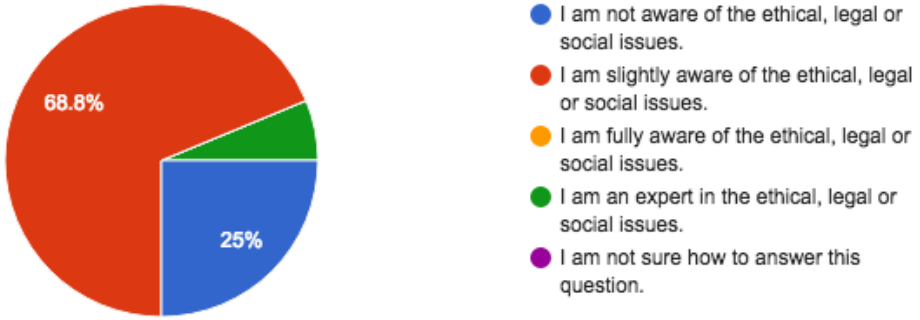
How aware are you of the ethical, legal and social issues relating to Human Genomics?

16 responses



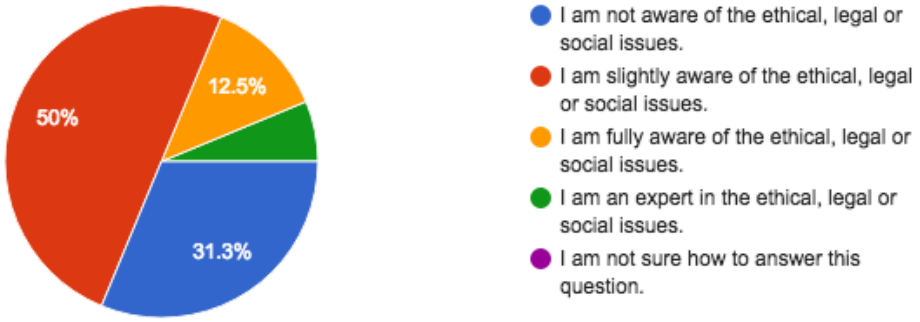
How aware are you of the ethical, legal and social issues relating to Human Enhancement?

16 responses



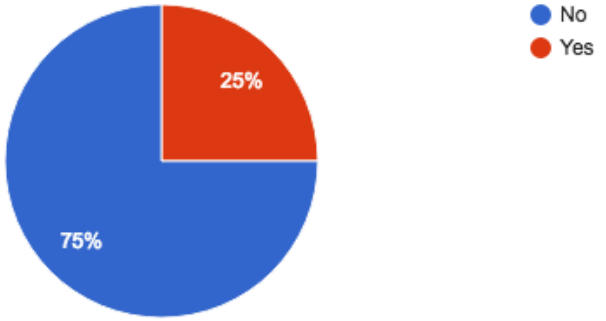
How aware are you of the ethical, legal and social issues relating to Artificial Intelligence and Robotics?

16 responses



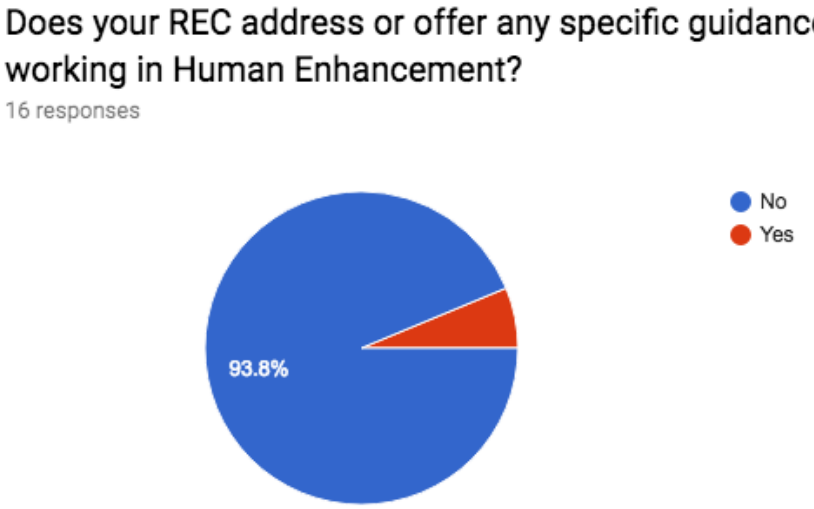
Does your REC address or offer any specific guidance for researchers working in Human Genomics?

16 responses



If yes, please provide links and/or information here: 4 responses

- The question is ambiguous as any REC has the responsibility to assess protocols on HG. Yet it does not necessarily require to draft specific guidance documents as there are already some available and the general principles of research ethics apply in any case which means that specific guidance documents may not be needed.
- we approve all medical research projects
- http://www.nvk.dk/~/media/NVK/Dokumenter/Guidelines-on-Genomics-Research.pdf?la=da
- Management of Incidental Findings in projects involving whole-genome sequencing (http://www.cner.lu/en-gb/procedures/incidentalfindings.aspx)

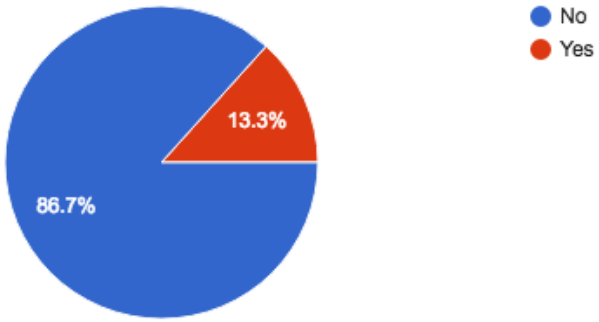


If yes, please provide links and/or information here:2 responses

- The question is ambiguous as any REC has the responsibility to assess protocols on "human enhancement" (whether they are identified as such or not). Yet it does not necessarily require to draft specific guidance documents as there are already some available and the general principles of research ethics apply in any case which means that specific guidance documents may not be needed. In addition, HE is as such a confusing concept as it implies that the research is actually enhancing human while some would argue that such technological enhancement may well be an impoverishment of mankind in a philosophical viewpoint. Innovation does not always equals progress.
- we have not received applications for this yet

Does your REC address or offer any specific guidance for researchers working in Artificial Intelligence and Robotics?

15 responses

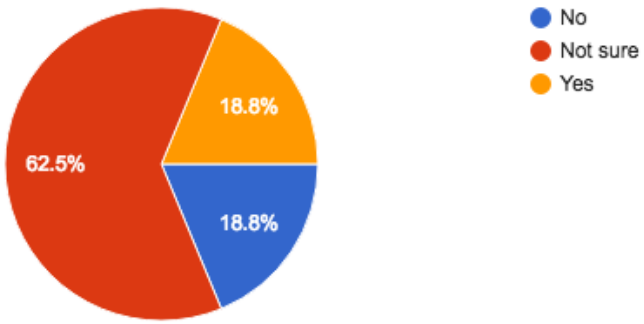


If yes, please provide links and/or information here: 2 responses

- The question is ambiguous as any REC has the responsibility to assess protocols on AI&R. Yet it does not necessarily require to draft specific guidance documents as there are already some available and the general principles of research ethics apply in any case which means that specific guidance documents may not be needed.
- when the projects use real patient data

Does your REC have future plans to specifically deal with ethical, legal and social issues of Human Genomics?

16 responses



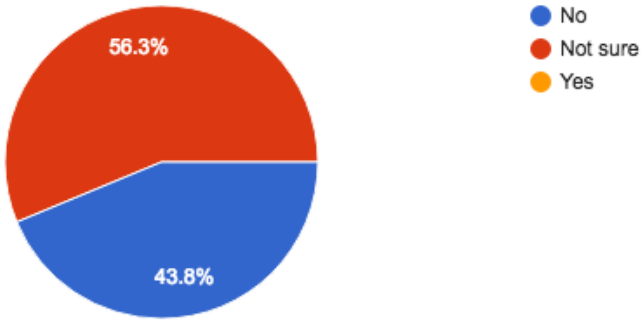
If yes, please specify here: 3 responses

- RECs normally have limited control on the researches submitted to them. The region around the lake Leman (aka Lake of Geneva) presents itself as the health valley. This is therefore

likely that there will be increased research activities in this field. The REC will then adapt itself to this evolution (see remarks above).
- we have published guidelines
- We plan to help researchers to balance health needs and risks of high expectations, exploitation

Does your REC have future plans to specifically deal with ethical, legal and social issues of Human Enhancement?

16 responses

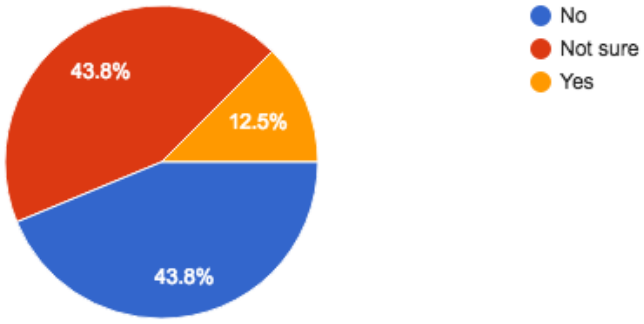


If yes, please specify here: 1 response

- It all depends on what is meant by HE. Advance research is done on exoskeleton and repairing brain damages. There is also a lot of activities around doping. This is therefore likely that there will more activities in this field in the future (see remark on HG).

Does your REC have future plans to specifically deal with ethical, legal and social issues of Artificial Intelligence and Robotics?

16 responses

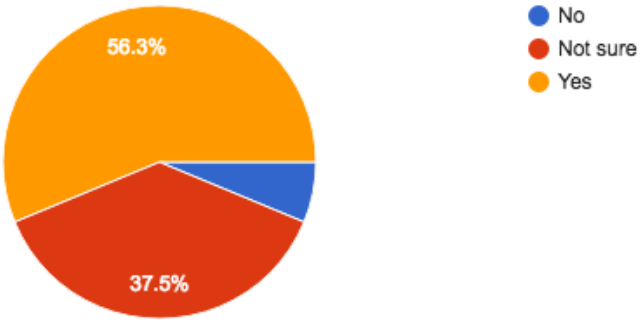


If yes, please specify here:3 responses

- RECs normally have limited control on the researches submitted to them. The region around the lake Leman (aka Lake of Geneva) presents itself as the health valley. This is therefore likely that there will be increased research activities in this field. The REC will then adapt itself to this evolution (see remarks above).
- swissethics is organising a symposium, specifically designed for members of the Swiss ethics committees, on ethical, legal and social issues of artificial intelligence, in Zurich on November 13, 2018. Link to the Agenda: https://swissethics.ch/doc/swissethics/fortbildung/2018/181113_Fortbildung_swissethics.pdf
- Topics like data protection and validation of research are more important in big data;

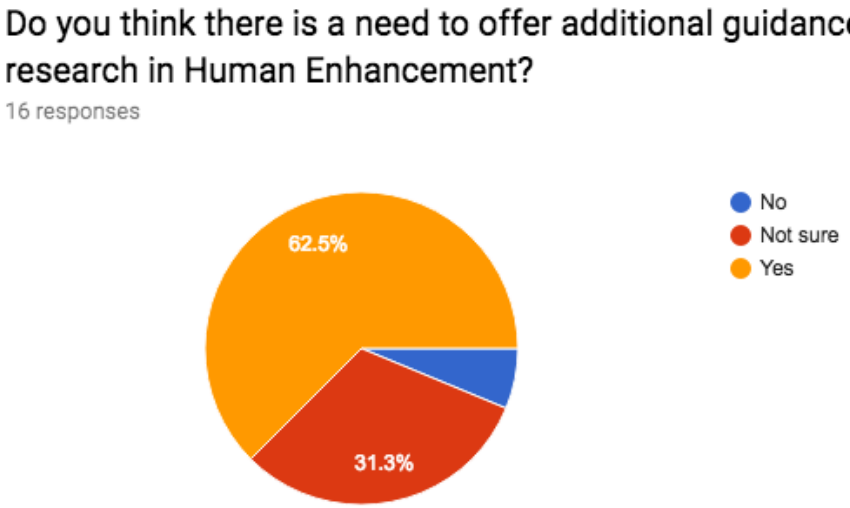
Do you think there is a need to offer additional guidance to people doing research in Human Genomics?

16 responses



If yes, please specify here: 4 responses

- As recent (and past) history, most abuses do not happen due to a lack of norms but rather a lack of consideration for them and their underlying principles. Producing more norms has been a trend in research ethics and regulation since WWII. As Jay Katz said in 1969: "The proliferation of such codes testifies to the difficulty of promulgating a set of rules that does not immediately raise more questions than it answers. At this stage of our confusion, it is unlikely that codes will resolve many of the problems, though they may serve a useful function later. Even the much endorsed Declaration of Helsinki – praised, perhaps, because it is the newest and therefore the least examined – will create problems for those who wish to implement it". There has been limited progress in raising the ethical mentality within research institutions. Of course, this would be less lucrative for ethics centres as the industry and others are less likely to finance virtues behaviour rather than workshops and other publications.
- There is a need for the informed consent in this field
- risk management, realistic expectations
- Ethically difficult issue with rapid development

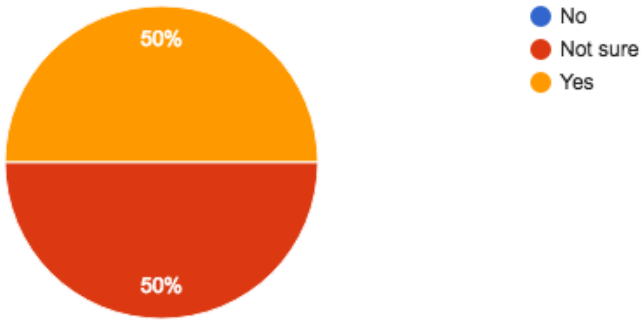


If yes, please specify here:5 responses

- Not only the same remarks apply than for HG, but the very concept of "human enhancement" is at best confusing, at worst the entry door to totalitarism. The very idea that humans need to be enhanced is worrying, especially if you refer to the previous time in history when similar proposals were formulated and, even worst, tested. As Hans Jonas said in 1969 (again), ""Let us not forget that progress is an optional goal, not an unconditional commitment, and that its tempo in particular, compulsive as it may become, has nothing sacred about it". The best guidance in fact would be to explain to researchers why "human enhancement" should be banned as a concept.
- a guide for REC members regarding the ethical concerns such research projects may raise and possible approaches to deal with them could be useful
- The knowledge about these issues and their development is scarce. Identifying the ethical problems they pose is the first step
- risk Management, use and abuse,
- It is necessary to draw a line between enhancement and mere addiction to anything new

Do you think there is a need to offer additional guidance to people doing research in Artificial Intelligence and Robotics?

16 responses

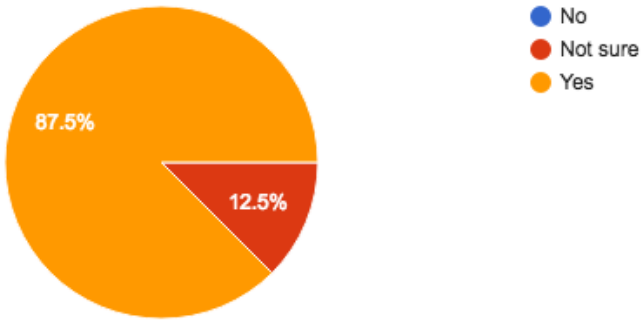


If yes, please specify here:5 responses

- see remarks on HG
- a guide for REC members regarding the ethical concerns such research projects may raise and possible approaches to deal with them could be useful
- The knowledge about these issues and their development is scarce. Identifying the ethical problems they pose is the first step
- consequences of automated decision support
- Quite dangerous research with unpredictable progress

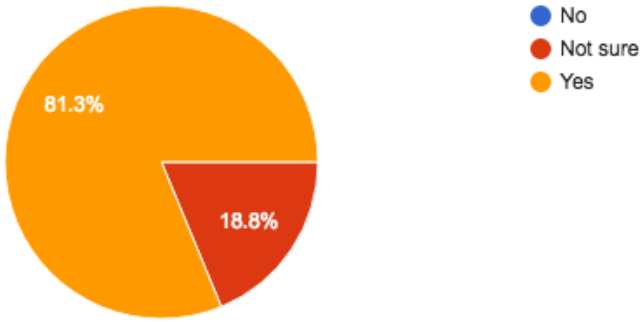
Do you think there is a need to offer additional education and training for REC members to learn more about ethi...nd social issues in Human Genomics?

16 responses



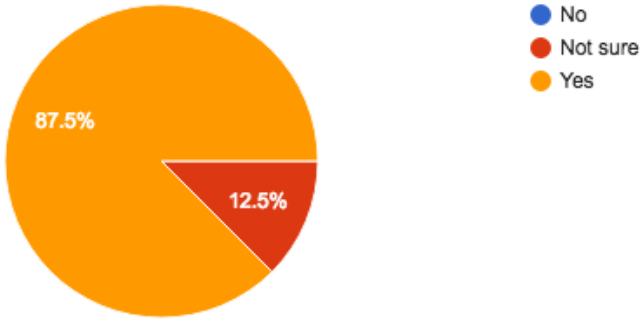
Do you think there is a need to offer additional education and training for REC members to learn more about eth...ocial issues in Human Enhancement?

16 responses



Do you think there is a need to offer additional education and training for REC members to learn more about ethica...Artificial Intelligence and Robotics?

16 responses



What do you think are the most pressing needs/challenges facing RECs in Europe today? (open question) 12 responses

- As Adam Smith shrewdly pointed out in 1775: “A degree can pretend to give security for nothing but the science of the graduate; and even for that it can give but a very slender security. For his good sense and discretion, qualities not discoverable by an academical examination, it can give no security at all”. promoting training of researchers and RECs' members is certainly a priority, but one can notice that such training does not offer much protection to research participants if its is not followed by a truly ethical evaluation of research with the aim to protect human participants before all other priorities. Instead of training, it seems time to educate all actors in the field that the rules they have learned actually apply to them and that they are morally and legally responsible to implement them.
- GDPR and open data
- In my opinion one of the major challenges is what happens in certain online communities of patients in which we assisted to two new phenomena: Lay crowdsourcing expertise and Patient Led Research. This bottom up kind of patient empowerment put in question the ethics regulation system.
- 1. lack of resources to adapt to new EU legal requirements; 2. fast advances in big data and genetic research; 3. lack of free international training offered to new REC members
- Do the RECs need to rethink the way they review the research projects to cope with the recent , and soon to come, changes in the EU legislations (CTR, MDR, IVDR)? Paediatric research, Data protection in an international research setting, New technologies: CAR-T cell therapy, CRISPR, AI and robots.
- Training
- The most pressing needs concern genomics and artificial intelligence
    - Training in emerging technologies and associated ethical issues
    - Resources for administration
    - Communication with RECs in other institutions and jurisdictions/regions.
- In my opinion, the major challenges for Italian RECs in this moment are to keep their independence and to assure reliable evaluations despite short timelines. Certainly, another important general need is to be updated with respect to new technologies and related ELSI
- there is no common legal base; there is no common social consent about "what is possible" and "what should be avoided"
- Lack of communication among RECs across Europe; theoretical background is gradually vanishing; education of members sharply differs in different countries.

If you have any other comments/suggestions/feedback which might help us, please specify here:4 responses

- The main difficulty in dealing with the latest innovation in biomedical progress is to confuse the technical enhancement they provide with a human one. Going back to the principles should always be the easiest solution. Yet, the scientific community and those expected to guide them in their action often prefer to create new rules to accommodate the so-called progress that industry, the market and the States are hoping for.
- I think that there are many new subjects that challenge the ethics regulation in force that's the need to reflect on these new issues is URGENT there not many expert that we have to set up meetings , workshops with the people that work in these domains
- n/a
- These methods will probably change the classical clinical trials, including biostatistical concepts, regulatory aspects, research methodology and social attitudes

6. References

- ACM, “Code of Ethics Enforcement Procedures”, undated. https://www.acm.org/code-of-ethics/enforcement-procedures
- AJUFE – ASSOCIAÇÃO DOS JUÍZES FEDERAIS DO BRASIL, “Juízes premiam projeto que propõe criar robôs para analisar petições”, 2016. https://www.ajufe.org.br/imprensa/ajufe-na-imprensa/6669-juizes-premiam-projeto-que-propoe-criar-robos-para-analisar-peticoes
- BIBLIOTECA VIRTUAL DA FAPESP. “Projeto CARINA - Carro Robótico Inteligente para Navegação Autônoma”, 2013. http://www.bv.fapesp.br/pt/auxilios/45200/projeto-carina-carro-robotico-inteligente-para-navegacao-autonoma/
- House of Lords. Select Committee on Artificial Intelligence. Report of Session 2017–19, “AI in the UK: ready, willing and able?”. https://publications.parliament.uk/pa/ld201719/ldselect/ldai/100/100.pdf
- https://publications.parliament.uk/pa/ld201719/ldselect/ldai/100/100.pdf
- https://www.montrealdeclaration-responsibleai.com/the-declaration
- IEEE, “Code of Ethics”, undated. https://www.ieee.org/about/corporate/governance/p7-8.html
- INCOSE Code of ethics. https://www.incose.org/about-incose/Leadership-Organization/code-of-ethics
- Lancaster University, “How to write a research protocol”, Undated. http://www.lancaster.ac.uk/shm/study/doctoral_study/dclinpsy/onlinehandbook/how_to_write_a_research_protocol/
- Leopoldina and G7 academies, “Realizing our digital future and shaping its impact on knowledge, industry, and the workforce”, 2018. https://www.leopoldina.org/uploads/tx_leopublication/2018_G7_Digital_EN.pdf
- NOTÍCIAS STF, “Inteligência artificial vai agilizar a tramitação de processos no STF”, 2018. http://www.stf.jus.br/portal/cms/verNoticiaDetalhe.asp?idConteudo=380038
- SENADO NOTICÍAS, “Projeto de lei geral de proteção de dados pessoais é aprovado no Senado”, 2018. https://www12.senado.leg.br/noticias/materias/2018/07/10/projeto-de-lei-geral-de-protecao-de-dados-pessoais-e-aprovado-no-senado
- Tractenberg, R.E., A.J., Russell, G.J. Morgan, et al., “Using Ethical Reasoning to Amplify the Reach and Resonance of Professional Codes of Conduct in Training Big Data Scientists”, Science and Engineering Ethics, Vol. 21, Issue 6, Dec 2015, pp. 1485-1507. https://doi.org/10.1007/s11948-014-9613-1
- UNESCO, “Report of COMEST on Robotics”, 2017. http://unesdoc.unesco.org/images/0025/002539/253952E.pdf
- University of Portsmouth, “Application for Ethics Review – Staff and Postgraduate Students”, Undated. http://www2.port.ac.uk/research/ethics/
- Univrsity of Montreal, “Montreal Decleration: responsibe AI”, undated.