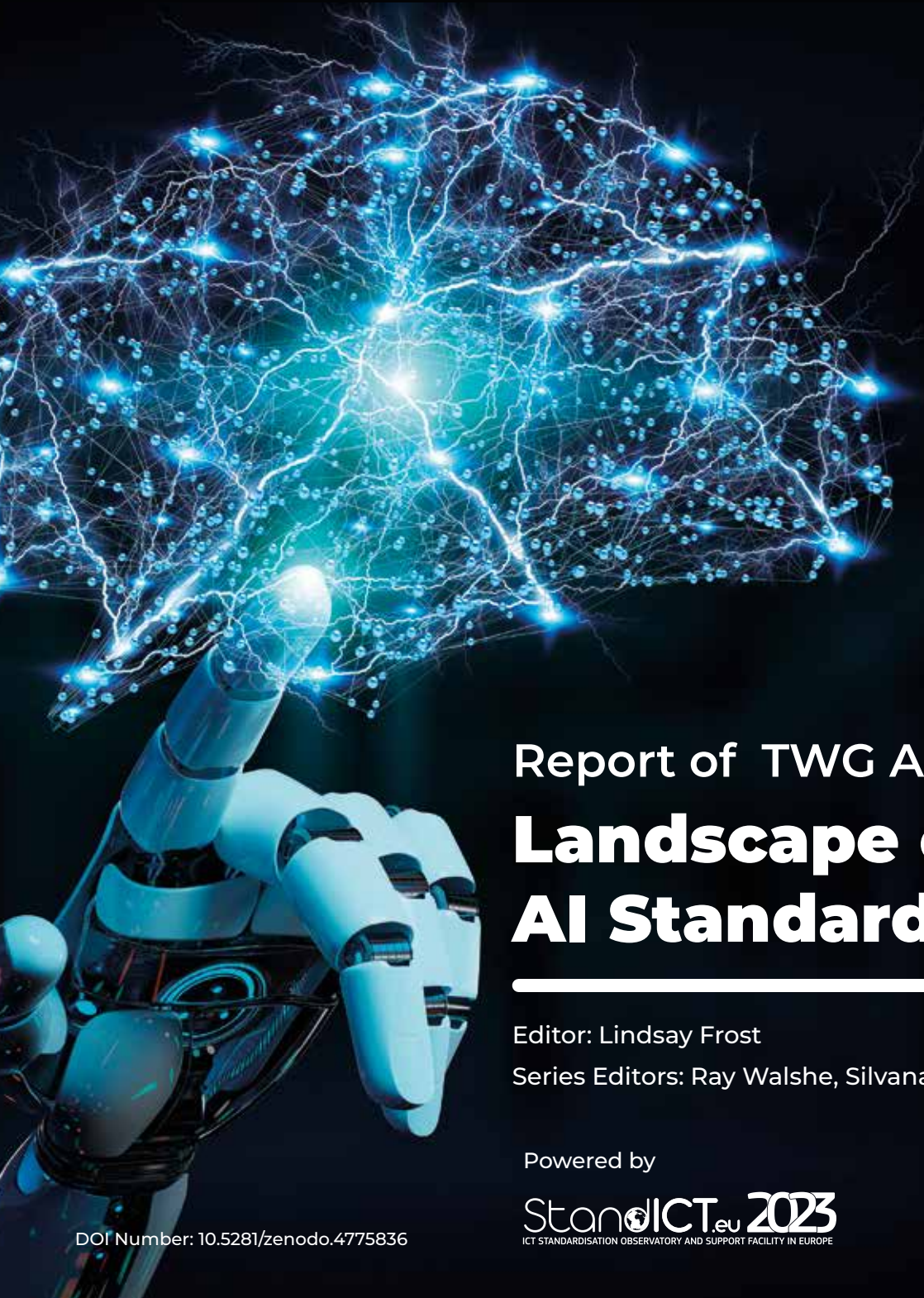


EUOS

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ICT Standardisation



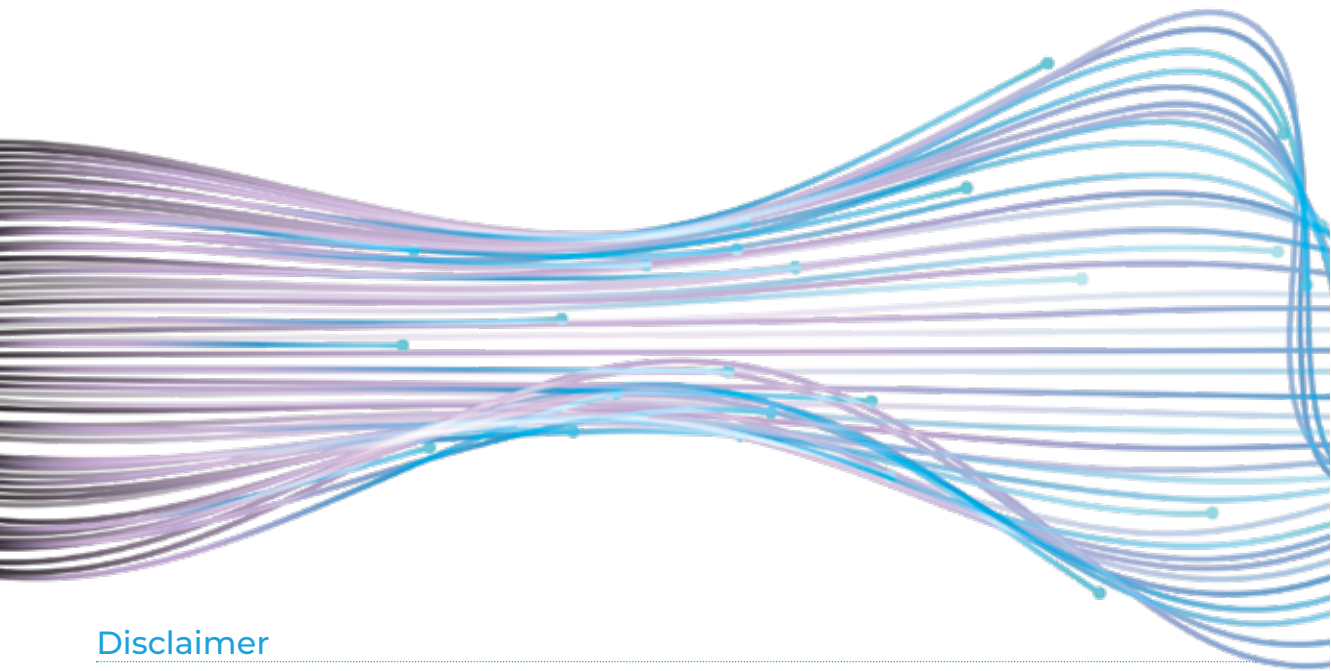
Report of TWG AI: **Landscape of AI Standards**

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Series Editors: Ray Walshe, Silvana Muscella

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1 Foreword TWG on AI

Artificial intelligence (AI) systems promise to bring many benefits, however considerations in the areas of trust, ethics and societal concerns stemming from the application domain, business requirements, regulatory policy, consumers and end users as well as society-at-large must first be addressed. AI systems need to ensure reliability, fairness and transparency. In other words, they need to be trustworthy. To help reach these objectives many standards development organisations worldwide work on norms for AI technologies and AI related processes, listed in this present AI Landscape report; at the same time, many governments and companies massively invest in research on AI.



As recently as April 2021, proposals for new rules and actions aiming to turn Europe into the global hub for trustworthy AI were released. The combination of the first-ever legal framework on AI and a new Coordinated Plan with Member States will guarantee the safety and fundamental rights of people and businesses, while strengthening AI uptake, investment and innovation across the EU. New rules on Machinery have complemented this approach by adapting existing safety rules to increase users' trust in the new, versatile generation of products. Developing standards which reflect the European perspective for the operation of AI based systems are essential to support these regulatory developments.

Although technological advances in AI (driven by high tech companies) are ahead of governance, standardisation organisations and other regulators are working significantly to also set technical guidelines for the design and development of AI. This needs to address interdependencies with existing standards for technologies. Scientifically speaking, open research questions are raised on whether AI standardisation appears to be mature, nevertheless the following report clearly shows that the number of AI and standardisation efforts undertaken by different standardisation organisations are already significant; this provides the necessary basis for scaling up efforts over the next few years and achieve a comprehensive landscape of standards which concretely support regulatory efforts as well as the activities of the operators in the field.

We look forward to welcoming thought leadership on core AI advancements through standardised efforts and continuing a structured dialogue between the EC, Member States and Standardisation organisations to stay at the forefront of artificial intelligence through the twin objectives of Europe in adopting a European approach to excellence in AI and a European approach to trust in AI.

Kilian GROSS

Head of unit in Artificial Intelligence
DG Connect European Commission

■ 2 Using this document

The StandICT.eu project, a H2020 Coordination & Support Action (CSA) funded under EC Grant 951972 [Sep 2020-Aug 2023], is dedicated to promoting standardisation within the EU and globally.

This document is part of a growing series designed to (a) create a dynamic overview of documents and activities relevant to standardisation, (b) identify gaps in the standardization where additional activity would greatly aid deployment of technologies and interoperability within the EU and globally.

This document considers the standardisation landscape for the technology area of AI. Companion documents for Blockchain, Big Data, Smart Cities and other themes are under development.

This overview or landscape document is a static “snap shot” of a dynamically updated database compiled within StandICT.eu. The database is inclusive (from many different SDOs and organizations), re-useable (available for liaison to other organisations), filterable (to choose a subset of documents and organisations appropriate to a particular use), and easily exportable (CSV, Word, ODT, Mind-map). All of the document titles and document abstracts included here are copied or directly derived from publicly available materials, however copyright of those original materials is retained by the respective owners. Errors or omissions in this report will be corrected in the database, to allow release of an updated document in a few months. It is intended to release updates of this landscape document as required and as more specifications are discovered or written.

This overview provides an easy “look up” regarding what AI standardisation is happening in various organizations and brief information on the organizations. There is no attempt to say here which documents are more fit-for-purpose than others: that will be considered in the next step, in a Gaps Analysis Report.

The “CATEGORY” that is assigned to each reference is intended as a broad guide. The database allows assigning multiple categories for different segmentation of the topics. For this report, the following broad categories were assigned:

- 🔖 Analysis: Landscapes, Roadmaps, Societal goals, Political goals, Sustainability goals,
 - 🔖 Fundamental: Definitions, Use Cases, Reference Architectures,
 - 🔖 Ethics: Trustworthiness, Explainability, Transparency, Bias, Accountability
 - 🔖 Governance: Policy, Regulations, Liability
 - 🔖 Data: Quality, Usage, Provenance, Checking, Ontologies
 - 🔖 Security: CyberSec, Privacy, Anonymization, Authentication, Access, Risk Analysis
 - 🔖 Algorithms: ML, TransferLearning, Reinforcement and Deep Learning
 - 🔖 Protocols: interoperability of information exchange and control signalling
 - 🔖 LifeCycle Management: Certification, Deployment, Operations, Testing and KPIs, Quality Management
 - 🔖 Citizen: Application-dependent Societal impact, Goals, Big picture, Citizen View, Financial impact
- Organisations are invited to create different or more detailed classifications, and to share them. Errors, omissions and suggestions for improvement should be reported to contact@standict.eu

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■ 4 Introduction to this report

This report blazes a trail for global standardisation. For the first time, representatives from many different SDOs and academic institutions have created an open-access database of specifications, reviews and guidelines for a particular theme (Artificial Intelligence) in a way that encourages future extensions, re-use, cross-comparisons and re-classification according to disparate needs.

Practitioners know very well that each specifications developing organization has a long legacy of how to approach problems, as well as an institutional knowledge of which problems are inside or outside their remit, so that sharing of approaches is never easy. By collecting disparate outcomes, from across the global community, and making them readily accessible, the team members who have collated this report and have developed the processes to make extensions dynamic have created a new problem-solving tool. The tool is just created and the database needs more work, but it is very promising.

However, the problems are legion. Even when limiting the discussion to the new technologies and applications of Artificial Intelligence, it is clear that we are at the beginning of a new age, akin to the age of electricity, of Maxwell, Edison and Tesla. It is not (yet) part of this report, but even as you read this paragraph, techniques are under development to efficiently compose machine learning (neural network) algorithms for implementation on quantum-mechanical systems. This sounds like combining the unexplainable with the inscrutable, however – like the combination of electricity with semiconductor junctions – the results will one day fill our lives.

The first use by StandICT.eu of the processes and expertise which compiled this report will be to match the collated standards against the needs for clear regulations on the use of AI. Where are the standards for monitoring reliability of AI systems? How can bias be detected in training data? What means allow proof of robustness? How can dynamically-updated systems be dynamically tested? Are generic test and certification methods possible, or will slow and expensive safety testing for each and every application area prove to be necessary? Where are the gaps? How do we fill them?

Finding the answers will be a global endeavour. The scientists and standardisation experts in the European Union can help ensure the success of our society and the well-being of citizens by prioritizing the work to fill the gaps most important in the EU.

StandICT.eu and the team of TWG AI thanks the European Commission for supporting this work, and invites experts and concerned citizens to join us in expanding the coverage of the database behind this report, and in using it to compare standards, improve them, and make your work more effective.

By the editor, **Lindsay Frost**



5 Landscape of Standards


Standardisation Documents



■ 5.1 European Initiatives


■ CEN


CEN-CENELEC Roadmap for AI Standardisation. Submitted 24th January 2019.

 ftp://ftp.cencenelec.eu/EN/News/SectorNews/2019/AI-Focus-Group/CEN-CLC_AI_FG%20N004_Roadmap.pdf

It calls for federal agencies to bolster AI standards-related knowledge, leadership, and coordination among agencies that develop or use AI; promote focused research on the trustworthiness of AI systems; support and expand public-private partnerships; and engage with international parties.


 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

 PUBLISHED 20190124

 KEYWORDS knowledge search

■ ETSI

ETSI Artificial Intelligence and future directions for ETSI. 1st edition - June 2020

 https://www.etsi.org/images/files/ETSIWhitePapers/etsi_wp34_Artificial_Intelligence_and_future_directions_for_ETSI.pdf

This White Paper explores key issues of AI that present both huge opportunities and new challenges for information and communication technologies (ICT). AI is becoming central to ETSI's mission of being at the heart of digital. Standardisation is understood to be a necessary tool in the efficient exploitation of these opportunities, both in Europe and globally. This White Paper details current initiatives and recommends future directions for the ETSI community and the ICT industry in general. ETSI technical bodies are already addressing numerous aspects of using AI in ICT systems. These include 5G systems, network planning and optimization, service provisioning and assurance, operator experience, security, IoT, data management and testing. eHealth and Human Factors technical bodies are considering the use cases for AI and their potential impact on people. This White Paper also discusses some activities of advisory groups, government-sponsored research projects, open-source AI projects, industry alliances and some SDOs, which are creating specifications. These groups are highly relevant as potential partners of ETSI in realizing the benefits of AI. This document recommends extending ETSI outreach activities towards them.

 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

 KEYWORDS data network search

ETSI Augmented Reality Framework (ARF); AR framework architecture

https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKL_ID=54070

The document specifies a functional reference architecture for AR components, systems and services. The structure of this architecture and the functionalities of its components have been derived from a collection of use cases (ETSI GR ARF 002) and an overview of the current landscape of AR standards (ETSI GR ARF 001). The document introduces the characteristics of an AR system and describes the functional building blocks of the AR reference architecture and their mutual relationships. The generic nature of the architecture is validated by mapping the workflow of several use cases to the components of this framework architecture.

📁 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED 20200301

ETSI Autonomic network engineering for the self-managing Future Internet (AFI); Artificial Intelligence (AI) in Test Systems and Testing AI models. Artificial Intelligence (AI) in Test System

https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKL_ID=58442

Artificial Intelligence (AI) in Test Systems, Testing AI Models and the ETSI GANA Model's Cognitive Decision Elements (DEs) via a Generic Test Framework for Testing ETSI GANA Multi-Layer Autonomics and their AI Algorithms for Closed-Loop Network Automation

📁 CATEGORY Governance Policy, Regulations, Liability

ETSI DES/eHEALTH-008 (ES 203 668) eHEALTH Data recording requirements for eHealth

https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKL_ID=56908

The aim of this work is to identify the requirements for recording eHealth events, i.e. those from ICT based eHealth devices and from health practitioners. On the understanding, as illustrated in the use case document and in the White Paper, that health records are subject to security and privacy constraints, but at the same time need to be available to many different stakeholders across time and space without pre-cognition of who those stakeholders are. The purpose of this technical specification is to very carefully specify at stage 1 and stage 2 level the normative framework for ensuring events transactions related to a patient are recorded accurately by identifiable entities (devices or health professionals) and made available with minimum delay to any other health professional (i.e. to ensure that actions taken by one health professional is visible to any other health professional irrespective of location without delay). The normative framework is intended to be adopted by all groups contributing to eHealth including CYBER, smartM2M, smartBAN

📁 CATEGORY Data Quality, Usage, Provenance, Checking, Ontologies

ETSI DGS/SAI-003 (in draft): Securing Artificial Intelligence (SAI); Security Testing of AI

https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKL_ID=58860

The purpose of this work item is to identify objectives, methods and techniques that are appropriate for security testing of AI-based components. The overall goal is to have guidelines for security testing of AI and AI-based components considering the different algorithms of symbolic and subsymbolic AI and addressing relevant threats from the work item AI threat ontology . Security testing of AI has some commonalities with security testing of traditional systems but provides new challenges and

requires different approaches, due to (a) significant differences between symbolic and subsymbolic AI and traditional systems that have strong implications on their security and on how to test their security properties, (b) non-determinism since AI-based systems may evolve over time (self-learning systems) and security properties may degrade, (c) test oracle problem, assigning a test verdict is different and more difficult for AI-based systems since not all expected results are known a priori, and (d) data-driven algorithms in contrast to traditional systems, (training) data forms the behaviour of subsymbolic AI.

🔗 CATEGORY Security CyberSec, Privacy, Anonymization, Authentication, Access, Risk Analysis

📅 KEYWORDS data learning techniques

ETSI EG 203 341 V1.1.1 (2016-10): Core Network and Interoperability Testing (INT); Approaches for Testing Adaptive Networks

🔗 https://www.etsi.org/deliver/etsi_eg/203300_203399/203341/01.01.01_60/eg_203341v010101p.pdf

The document, Approaches for Testing Adaptive Networks defines a framework of testing principles and guidelines that may be used to test networks that exhibit some form of autonomic adaptive behavior, which allows them to dynamically change their configuration, structure or operational parameters. The (re)-configuration is performed in response to stimuli such as changes in workload, operator policies that govern their operation, context (the network is context-aware and may have a degree of self-awareness); and challenges in the environment (i.e. conditions under which the network is operating, e.g. manifestations of faults, errors, failures in various parts of the network and its hardware and software components).

🔗 CATEGORY Governance Policy, Regulations, Liability

📅 PUBLISHED 20161001

📅 KEYWORDS autonomic behavior network

ETSI ENI GR 001 Experiential Networked Intelligence (ENI); Definition of Categories for AI Application to Networks

🔗 https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=56393

The document defines various categories for the level of application of Artificial Intelligence (AI) techniques to the management of the network, going from basic limited aspects, to the full use of AI techniques for performing network management. The requirements document ETSI GR ENI 007 on network classification of AI details the use of AI in a network into six stages, from No AI to full AI deployment.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED 20191101

📅 KEYWORDS classification network techniques

ETSI GR ARF 001 V1.1.1 (2019-04): Augmented Reality Framework (ARF); AR Standards Landscape

🔗 https://www.etsi.org/deliver/etsi_gr/ARF/001_099/001/01.01.01_60/gr_ARF001v010101p.pdf

The present document aims to identify the role of existing standards relevant to augmented reality and to contribute to identify any interoperability gaps. The activity summarized in the present document consisted in analysing the standardisation work related to augmented reality in various standards setting organizations. While some of these standards under review are directly addressing AR as a whole, others are addressing key technological components that can be useful to increase interoperability of AR applications and services.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 KEYWORDS logic

ETSI GR SAI 004 V1.1.1 (2020-12); Securing Artificial Intelligence (SAI); Problem Statement

https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKL_ID=59209

This work item describes the challenges of securing AI-based systems and solutions, including challenges relating to data, algorithms and models in both training and implementation environments. The focus will be on challenges which are specific to AI-based systems, including poisoning and evasion.

🔗 CATEGORY Security CyberSec, Privacy, Anonymization, Authentication, Access, Risk Analysis

📄 KEYWORDS data

ETSI GR/SAI-005: Securing Artificial Intelligence (SAI); Mitigation Strategy Report

https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKL_ID=59214

This work item aims to summarize and analyze existing and potential mitigation against threats for AI-based systems. The goal is to have guidelines for mitigating against threats introduced by adopting AI into systems. These guidelines will shed light on baselines of securing AI-based systems by mitigating against known or potential security threats. They also address security capabilities, challenges, and limitations when adopting mitigation for AI-based systems in certain potential use cases.

🔗 CATEGORY Security CyberSec, Privacy, Anonymization, Authentication, Access, Risk Analysis

ETSI GS CIM 009 V1.4.2 (2021-04): Context Information Management (CIM); NGSI-LD API; NGSI-LD v1.2.1

https://www.etsi.org/deliver/etsi_gs/CIM/001_099/009/01.04.02_60/gs_CIM009v010402p.pdf

The purpose of the document is the definition of a standard API for Context Information Management (NGSI-LD API) enabling close to real-time access to information coming from many different sources (not only IoT data sources). The document defines how such an API enables applications to perform updates on context, register context providers which can be queried to get updates on context, query information on current and historic context information and subscribe to receive notifications of context changes. ISG CIM has not so far defined reference points specifically to higher-layer AI reasoning platforms. NGSI-LD API uses linked open data and property graphs to reference data definitions ontologies) such as those in SAREF.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED 20200201

📄 KEYWORDS data

ETSI GS ENI 001 v2.1.1 (2019-09): Experiential Networked Intelligence (ENI); ENI use cases

https://www.etsi.org/deliver/etsi_gs/ENI/001_099/001/02.01.01_60/gs_ENI001v020101p.pdf

The specification ETSI GS ENI 001 demonstrates several use cases on service assurance, fault management and self-healing, resource configuration, performance configuration, energy optimization, security and mobility management.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED 20190901

ETSI GS ENI 005 v1.1.1 (2019-09): Experiential Networked Intelligence (ENI); System Architecture

https://www.etsi.org/deliver/etsi_gs/ENI/001_099/005/01.01.01_60/gs_ENI005v010101p.pdf

The specification ETSI GS ENI 005 shows as a functional architecture how the data is collected, normalized and recursively processed to extract knowledge and wisdom from it. This data is used for decision-making and the results are returned to the network, where the behavior is continually monitored.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED 20190901

🔖 KEYWORDS behavior data knowledge network

ETSI GS ZSM 002 , (2019-08): Zero-touch network and Service Management (ZSM); Reference Architecture

https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=54295

The document defines and describes the reference architecture for the end-to-end Zero-touch network and Service Management (ZSM) framework based on a set of user scenarios and requirements documented in ETSI GS ZSM 001.ISG ZSM (ISG Zero-touch Network and Service Management), was formed with the goal to introduce a new end-to-end architecture and related solutions that will enable automation at scale and at the required minimal total cost of ownership (TCO), as well as to foster a larger utilization of AI technologies. The ZSM end-to-end architecture framework has been designed for closed-loop automation and optimized for data-driven machine learning and AI algorithms.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED 20190801

🔖 KEYWORDS data learning machine network

ETSI ISG NFV Network Functions Virtualisation (NFV); Release 4 Management and Orchestration; Report on enabling autonomous management in NFV-MANO; Autonomous mgmt in MANO

https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=58467

The goal of the Work Item is to study and evaluate possible enhancements to NFV-MANO to improve its automation capabilities and introduce autonomous network mechanisms. This work will align with automation related work in organizations such as ETSI ISG ZSM, ETSI ISG ENI and 3GPP SA5. Recommendations for normative work to enable autonomous management in NFV-MANO will be made. Within ISG NFV (Network Function Virtualization), AI is being considered as a tool that eventually becomes part of the Management and Orchestration (MANO) stack. NFV virtualization is not explicitly considering AI, except in requirements to properly feed data and collect actions from AI modules.

🔗 CATEGORY Governance Policy, Regulations, Liability

🔖 KEYWORDS data network

ETSI ISG Securing Artificial Intelligence. Published 4th March 2020

https://portal.etsi.org/Portals/0/TBpages/SAI/Docs/2020-03-ETSI_SAI_Introduction.pdf

This work item aims to describe some of the main challenges of securing AI-based systems and solutions. including challenges relating to data, algorithms and models in both training and

implementation environments. The focus will be on challenges which are specific to AI-based systems, including poisoning and evasion.

🔗 CATEGORY Security CyberSec, Privacy, Anonymization, Authentication, Access, Risk Analysis

📅 PUBLISHED 20200304

📖 KEYWORDS data

[ETSI presentation on AI to the GSC-22. Contributed 26th March 2019](#)

🔗 <https://www.itu.int/en/ITU-T/gsc/22/Documents/GSC-22-S05-002.pdf>

ETSI puts the focus on cognitive in the context of standards development activities. Cognitive technologies are considered to be a major technology driver including development in applications. ETSI's Long Term Strategy sets the framework for looking at cognitive technology across the board in ETSI.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED 20190326

[ETSI SAREF Smart Applications Reference Ontology](#)

🔗 <https://saref.etsi.org>

An enhancement of the SAREF portal, being finalized in 2020, concerns the double role of AI in semantics as a facilitator of the development and alignment of ontologies and semantics meanings, supporting human experts. The SAREF family of ontologies also supports IoT information discovery, enrichment and validation, therefore enabling the provision of AI services to support IoT semantic interoperability, based on a common understanding of IoT information (both for people and machines).

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED 19050712

📖 KEYWORDS machine

[ETSI Securing Artificial Intelligence \(SAI\); AI Threat Ontology AI Threat Ontology](#)

🔗 https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=58856

The purpose of this work item is to define what would be considered an AI threat and how it might differ from threats to traditional systems. The starting point that offers the rationale for this work is that currently, there is no common understanding of what constitutes an attack on AI and how it might be created, hosted and propagated. The AI Threat Ontology deliverable will seek to align terminology across the different stakeholders and multiple industries. This document will define what is meant by these terms in the context of cyber and physical security and with an accompanying narrative that should be readily accessible by both experts and less informed audiences across the multiple industries.

🔗 CATEGORY Security CyberSec, Privacy, Anonymization, Authentication, Access, Risk Analysis

[ETSI Securing Artificial Intelligence \(SAI\); Data Supply Chain Report; Data Supply Chain Report](#)

🔗 https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=58857

Data is a critical component in the development of AI systems. This includes raw data as well as information and feedback from other systems and humans in the loop, all of which can be used to

change the function of the system by training and retraining the AI. However, access to suitable data is often limited causing a need to resort to less suitable sources of data. Compromising the integrity of training data has been demonstrated to be a viable attack vector against an AI system. This means that securing the supply chain of the data is an important step in securing the AI. The report will summarise the methods currently used to source data for training AI along with the regulations, standards and protocols that can control the handling and sharing of that data. It will then provide gap analysis on this information to scope possible requirements for standards for ensuring traceability and integrity in the data, associated attributes, information and feedback, as well as the confidentiality of these.

🔗 CATEGORY Security CyberSec, Privacy, Anonymization, Authentication, Access, Risk Analysis

📅 KEYWORDS data

ETSI SmartM2M AI for IoT: A Proof of Concept; PoC AI4IoT

🔗 https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=57867

The following points are discussed (1) Description of the Use Case implemented as a Proof of Concept, (2) Description of the implementation architecture, oneM2M platform used, open source support, etc. (3) Main findings regarding the impact on the oneM2M architecture. (4) Lessons learned, guidelines and recommendations.

🔗 CATEGORY Protocols interoperability of information exchange and control signalling

ETSI SmartM2M; Artificial Intelligence and the oneM2M architecture

🔗 https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=57866

The present document is addressing the issues related to the introduction of AI into IoT systems and, as first priority, into the oneM2M architecture. The following points are discussed

1. Identification of Relevant use case related to the introduction of AI in IoT systems.
2. Analysis of the main implications of this use case to the oneM2M architecture.
3. The selection of a relevant use case in view of its implementation as a Proof-of-Concept.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

ETSI Summit on Artificial Intelligence. Published 4th April 2017

🔗 <https://www.etsi.org/events/1474-etsi-summit-on-artificial-intelligence#pane-2>

Artificial Intelligence has been present in our society for decades, but can now be considered as coming of age . The increasing application of Artificial Intelligence (AI) technologies in many Industries is in part due to the progress made in AI technologies, the availability of highly powerful computing resources, as well as the existence of the massive amounts of Big Data that are needed to facilitate algorithmic learning. The ETSI summit on AI sought to separate the hype from the science and provide better understanding of Artificial Intelligence, Machine Learning and Deep Learning, as well as describing where AI is currently deployed using practical examples.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED 20170404

📅 KEYWORDS learning science

ETSI TR 103 674 (in draft): SmartM2M; Artificial Intelligence and the oneM2M architecture

https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKL_ID=57866

Detailed description of selected use cases and identification of architectural evolutions (components, required mappings, etc.) to the oneM2M framework. It addresses the introduction of AI/ML into IoT systems and the opportunities for improving AI/ML performance through use of the horizontal oneM2M standard and its family of common service functions (CSFs).

📁 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

ETSI TR 103 675 (in draft): SmartM2M AI for IoT: A Proof of Concept; PoC AI4IoT

https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKL_ID=57867

Detailed description of the use cases design and implementation; instructions for the (re-)creation of the prototypes from the selected framework and components; lessons learned; improving AI/ML performance through use of the horizontal oneM2M standard and its family of common service functions (CSFs). Its aim is to build and test a proof of concept that targets two technical innovations. One innovation involves extensions of existing CSFs to support new AI/ML-related functional requirements. The second innovation is to test the concept of new CSFs that offer AI/ML capabilities on an as-a-service basis. This could take the form of a configurable classification algorithm, for example, that one or more IoT solutions could access on a oneM2M-compliant IoT platform.

📁 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📄 KEYWORDS classification

ETSI TR 103 821 (DTR/INT-008_AFI AI Testing) (in draft): Autonomic network engineering for the self-managing Future Internet (AFI); Artificial Intelligence (AI) in Test Systems and Testing AI models. Artificial Intelligence (AI) in Test Systems

https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKL_ID=58442

This work item covers the following points (a) A general guide on the benefits of AI in Test Systems, with illustrations of AI in Test Systems, (b) A general guide for testing AI, (c) Models in general, and the definitions of standardised metrics for measurements and assessments in Testing and Certification of AI Models, including certification of AI models of Autonomic Components Systems, (d) Testing ETSI GANA Models Cognitive Decision Elements (DEs) as AI Models for Autonomic (Closed-Loop) Network Automation, in the space of Autonomic Management and Control (AMC) of Networks and Services, with illustrations of AI Models for Autonomic Management and Control of 5G Network Slices, (e) Generic Test Framework for Testing ETSI GANA Multi-Layer Autonomics and their AI Algorithms for Closed-Loop Network Automation (see EG 203 341).

📁 CATEGORY Governance Policy, Regulations, Liability

ETSI TS 103 194 (2014-10): Network Technologies (NTECH); Autonomic network engineering for the self-managing Future Internet (AFI); Scenarios, Use Cases and Requirements for Autonomic/Self-Managing Future Internet

https://www.etsi.org/deliver/etsi_ts/103100_103199/103194/01.01.01_60/ts_103194v010101p.pdf

The document contains a description of scenarios, use cases, and definition of requirements for the autonomic self-managing future internet. Scenarios and use cases selected in the present document reflect real-world problems which can benefit from the application of autonomic self-management principles. TC INT specifications consider events that can trigger a network to dynamically change network properties. Events vary depending on the specific AI systems deployed in the network and the level where they operate, external or internal to the network. These events can occur in a chain-like fashion, e.g. policy change can trigger several secondary events in lower-level functional units.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED 20141001

🔑 KEYWORDS autonomic network

ETSI TS 103 327 V1.1.1 (2019-04): Smart Body Area Networks (SmartBAN); Service and application standardised enablers and interfaces, APIs and infrastructure for interoperability management

https://www.etsi.org/deliver/etsi_ts/103300_103399/103327/01.01.01_60/ts_103327v010101p.pdf

TC SmartBAN considers interfaces which would allow semantic interoperability of eHealth sensors with external systems (including by default AI).

🔗 CATEGORY Protocols interoperability of information exchange and control signalling

📅 PUBLISHED 20190401

ETSI TS 103.195-2 (2018-05): Autonomic network engineering for the self-managing Future Internet (AFI); Generic Autonomic Network Architecture; Part 2: An Architectural Reference Model for Autonomic Networking, Cognitive Networking and Self-Management

https://www.etsi.org/deliver/etsi_ts/103100_103199/10319502/01.01.01_60/ts_10319502v010101p.pdf

The scope of the present document is to provide the definition of the Generic Autonomic Network Architecture (GANA) as an architectural reference model for autonomic networking, cognitive networking and self-management that addresses the requirements defined in ETSI TS 103 194 [1] - a compilation of example requirements which reflect realworld problems that benefit from the application of automated management, autonomic management and selfmanagement principles for networks and services delivered by the network to applications. The objective of the present document is to describe the GANA reference model with its associated Functional Blocks (FBs) and their associated reference points that can be instantiated onto target currently existing, emerging or future reference network architectures (including their management and control architectures) to create autonomics-enabled reference network architectures and their associated management and control architectures. The present document builds on the ETSI GS AFI 002 [2] specification by extracting key concepts of the GANA model and adding additional aspects that were not covered in ETSI GS AFI 002 [2] and also providing pointers on where to find details on the integration of the GANA model with reference models for other emerging complementary networking paradigms other than autonomics, namely SON (Self-Organizing Networks), SDN (Software-Defined Networking),

NFV (Network Functions Virtualisation), E2E Orchestration, Network Analytics, Big-Data Analytics for Autonomic Management and Control (AMC) of networks and services; and Closed-Loop Service Assurance. This means it is recommended that the present document is used together with ETSI GS AFI 002 [2], which contains valuable complementary details. The other goal is to describe how the human network operator could govern end-to-end autonomic networks and their management and control architectures.

📁 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📄 KEYWORDS autonomic cognitive network

[ETSI WHITEPAPER #5: Artificial Intelligence \(AI\) in Test Systems, Testing AI Models and ETSI GANA Model's Cognitive Decision Elements \(DEs\) via a Generic Test Framework for Testing GANA Multi-Layer Autonomics and their AI Algorithms for Closed-Loop Network Automation. Published 29th March 2020](#)

📄 https://intwiki.etsi.org/images/ETSI_5G_PoC_White_Paper_No_5.pdf

This White Paper lays the groundwork for the newly launched Work Item (WI) in ETSI TC INT on AI in Testing Systems and Testing AI Models that is to address the various aspects linked to this topic through developing ETSI assets such as Specifications that can be used by the industry. The Work Item has now been created in ETSI (https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=58442), and organizations are invited to contribute to the work and deliverables of the Newly Launched Work Item in ETSI as described in Chapter 1 of this White Paper. Such Specifications should cover the definition of Metrics pertaining to selected classes of AI Models that can be targeted for Testing and Assessment since such Metrics Definitions are missing in the work being done in the various Standardisation Groups today. As an example, Metrics for assessing GANA Cognitive DEs as Deployable AI Models.

📁 CATEGORY Governance Policy, Regulations, Liability

📅 PUBLISHED 20200329

[ETSI Whitepaper Nr.4 - ETSI GANA Multi-Layer Autonomics and their AI Algorithms for Closed-Loop Network Automation](#)

📄 https://intwiki.etsi.org/images/ETSI_5G_PoC_White_Paper_No_4_v3.1.pdf

Towards a Market Place for GANA Cognitive Decision-making Elements (DEs) as Procurable and Deployable AI Models (powered by Algorithms for Machine Learning (ML), Deep Learning (DL), Computational Intelligence, etc.) for realizing the AMC Paradigm.

📁 CATEGORY Algorithms ML, Transfer Learning, Reinforcement and Deep Learning

■ 5.2 Government / Public Bodies / Agencies

■ European Commission

Commission Report on safety and liability implications of AI, the Internet of Things and Robotics

<https://eur-lex.europa.eu/legal-content/EN/TXT/DOC/?uri=CELEX:52020DC0064&from=en>

The overall objective of the safety and liability legal frameworks is to ensure that all products and services, including those integrating emerging digital technologies, operate safely, reliably and consistently and that damage having occurred is remedied efficiently. High levels of safety for products and systems integrating new digital technologies and robust mechanisms remedying occurred damage (i.e. the liability framework) contribute to better protect consumers. They also create trust in these technologies, a prerequisite for their uptake by industry and users. This in turn will leverage the competitiveness of our industry and contribute to the objectives of the Union. A clear safety and liability framework is particularly important when new technologies like AI, the IoT and robotics emerge, both with a view to ensure consumer protection and legal certainty for businesses.

🔗 CATEGORY Ethics Trustworthiness, Explainability, Transparency, Bias, Accountability

📅 PUBLISHED 20200219

Coordinated Plan on Artificial Intelligence. Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. COM(2018) 795 final

https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=56018

In its strategy on AI for Europe, the Commission proposed to work with Member States on a coordinated plan on AI by the end of 2018, with the aim to maximise the impact of investments at EU and national levels, encourage synergies and cooperation across the EU, exchange best practices and collectively define the way forward to ensure that the EU as a whole can compete globally. The proposal of a coordinated plan built on the declaration of cooperation on AI launched in April 2018 at the Digital Day and signed by all Member States and Norway. It was endorsed by the European Council in June 2018. Member States (as part of the group on digitising European industry and AI), Norway, Switzerland and the Commission prepared the plan during several meetings between June and November 2018. Exchanges also took place during Competitiveness Council meetings under the Austrian Presidency of the EU. During these meetings, Member States and the Commission identified a series of common actions to increase investments, pool data - the raw material for AI -, foster talent and ensure trust, building on the European strategy. They prioritised areas of public interest, such as healthcare, transport and mobility, safety, security and energy, as well as important economic sectors such as manufacturing and financial services.

🔗 CATEGORY Citizen Application-dependent Societal impact, Goals, Big picture, Citizen View, Financial impact

📅 PUBLISHED 20181207

📖 KEYWORDS data

Digital Europe Programm

http://europa.eu/rapid/press-release_IP-18-4043_en.htm

The European Commission is to create the first ever Digital Europe programme and invest Euro9.2 billion to align the next long-term EU budget 2021-2027 with increasing digital challenges. With the Digital Single Market strategy we have established a regulatory framework that is fit for the digital age. This needs to be matched with equally ambitious funding and investments in the Digital Europe programme for increasing EU's international competitiveness as well as developing and reinforcing Europe's strategic digital capacities. These key capacities concern high-performance computing, artificial intelligence, cybersecurity and advanced digital skills and ensuring their wide use and accessibility across the economy and society by businesses and the public sector alike.

🔗 CATEGORY Citizen Application-dependent Societal impact, Goals, Big picture, Citizen View, Financial impact

📄 KEYWORDS artificial intelligence intelligence

EC Rolling Plan for ICT Standardisation, Published annually.

<https://joinup.ec.europa.eu/collection/rolling-plan-ict-standardisation/rolling-plan-2021>

The Rolling Plan addresses technology areas in need of ICT standards and explores the role that standards and technical specifications can play in achieving the policy objectives. It reaches out to both European Standardisation Organisations (ESOs) -ETSI, CEN and CENELEC and aforementioned global standard development bodies that can respond to the proposed actions and support the respective policy objectives with standardisation deliverables. The Commission publishes the Rolling Plan annually for ICT Standardisation to consolidate the different ICT standardisation needs and activities in support of EU policies into a single document.

🔗 CATEGORY Citizen Application-dependent Societal impact, Goals, Big picture, Citizen View, Financial impact

📅 PUBLISHED April 2021

EC. Artificial Intelligence for Europe. COM(2018) 237 final. Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. Published 25th April 2018.

https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=51625

Supporting and conducting AI research and development

🔗 CATEGORY Citizen Application-dependent Societal impact, Goals, Big picture, Citizen View, Financial impact

📅 PUBLISHED 20180425

📄 KEYWORDS search

EC Fostering a European approach to Artificial Intelligence. A communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee Of The Regions.

<https://digital-strategy.ec.europa.eu/en/library/communication-fostering-european-approach-artificial-intelligence>

Faced with the rapid technological development of AI and a global policy context where more and more countries are investing heavily in AI, the EU must act as one to harness the many opportunities and address challenges of AI in a future-proof manner. Starting with the launch of the European AI strategy in April 2018, the Commission's two-pronged policy has been to make the EU a world-class hub for AI, while ensuring that AI is human-centric and trustworthy. Today's AI package represents a key milestone in both policy dimensions. To promote the development of AI and address the potential high risks it poses to safety and fundamental rights equally, the Commission is presenting both a proposal for a regulatory framework on AI and a revised coordinated plan on AI.

🔗 CATEGORY Citizen: Application-dependent Societal impact, Goals, Big picture, Citizen View, Financial impact

📅 PUBLISHED 21.04.2021

🔍 KEYWORDS policy planning

Liability for Artificial Intelligence and other emerging digital technologies. Expert Group on Liability and New Technologies. Published 18th November 2019.

<https://ec.europa.eu/transparency/regexpert/index.cfm?do=groupDetail.groupMeetingDoc&docid=36608>

Actively engaging in AI standards development

🔗 CATEGORY Ethics Trustworthiness, Explainability, Transparency, Bias, Accountability

📅 PUBLISHED 20191118

WHITE PAPER On Artificial Intelligence - A European approach to excellence and trust. COM(2020) 65 final. Published 19th February 2020.

https://ec.europa.eu/info/files/white-paper-artificial-intelligence-european-approach-excellence-and-trust_en

The purpose of this White Paper is to set out policy options on how to achieve EU objectives on AI. It does not address the development and use of AI for military purposes. The Commission invites Member States, other European institutions, and all stakeholders, including industry, social partners, civil society organisations, researchers, the public in general and any interested party, to react to the options below and to contribute to the Commission's future decision-making in this domain.

🔗 CATEGORY Citizen Application-dependent Societal impact, Goals, Big picture, Citizen View, Financial impact

📅 PUBLISHED 20200219

🔍 KEYWORDS search

■ European Data Portal - EDP

The Economic Impact of Open Data - Opportunities for value creation in Europe

<https://www.europeandataportal.eu/sites/default/files/the-economic-impact-of-open-data.pdf>

The 7 key learnings 1. The specification and implementation of high-value datasets as part of the new Open Data Directive is a promising opportunity to address quality and quantity demands of open data. 2. Addressing quality and quantity demands is important, yet not enough to reach the full potential of open data. 3. Open data re-users have to be aware and capable of understanding and leveraging the potential. 4. Open data value creation is part of the wider challenge of skill and process transformation a lengthy process whose change and impact are not always easy to observe and measure. 5. Sector-specific initiatives and collaboration in and across private and public sector foster value creation. 6. Combining open data with personal, shared, or crowdsourced data is vital for the realisation of further growth of the open data market. 7. For different challenges, we must explore and improve multiple approaches

of data re-use that are ethical, sustainable, and fit-for-purpose.

🔗 CATEGORY Data Quality, Usage, Provenance, Checking, Ontologies

📅 PUBLISHED 20200225

🔑 KEYWORDS data learning

■ European Parliament

EU guidelines on ethics in artificial intelligence: Context and implementation. Published 19th September 2019

[http://www.europarl.europa.eu/RegData/etudes/BRIE/2019/640163/EPRS_BRI\(2019\)640163_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/BRIE/2019/640163/EPRS_BRI(2019)640163_EN.pdf)

Procuring and deploying standards-based products and services, and

🔗 CATEGORY Ethics Trustworthiness, Explainability, Transparency, Bias, Accountability

📅 PUBLISHED 20190919

European Parliament. A governance framework for algorithmic accountability and transparency

[https://www.europarl.europa.eu/stoa/en/document/EPRS_STU\(2019\)624262](https://www.europarl.europa.eu/stoa/en/document/EPRS_STU(2019)624262)

Developing and implementing supportive policies, including regulatory policies where needed.

🔗 CATEGORY Governance Policy, Regulations, Liability

📅 PUBLISHED 20190404

Regulation (EU) 2019/1150 of the European Parliament and of the Council of 20 June 2019 on promoting fairness and transparency for business users of online intermediation services (Text with EEA relevance)

<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019R1150>

While the AI community has agreed that these issues must factor into AI standards, many decisions still need to be made about whether there is yet enough scientific and technical basis to develop those standards provisions.

🔗 CATEGORY Governance Policy, Regulations, Liability

📅 PUBLISHED 20190620

■ HLEG-AI

Ethics Guidelines for Trustworthy AI . High-Level Expert Group on AI. Published 8th April 2019.

<https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai>

On 8 April 2019, the High-Level Expert Group on AI presented Ethics Guidelines for Trustworthy Artificial Intelligence. This followed the publication of the guidelines first draft in December 2018 on which more than 500 comments were received through an open consultation. According to the Guidelines, trustworthy AI should be

- (1) lawful - respecting all applicable laws and regulations
- (2) ethical - respecting ethical principles and values
- (3) robust - both from a technical perspective while taking into account its social environment

🔗 CATEGORY Ethics Trustworthiness, Explainability, Transparency, Bias, Accountability

📅 PUBLISHED 20190408

Policy and investment recommendations for trustworthy Artificial Intelligence

https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=60343

Artificial intelligence and other emerging digital technologies, such as the Internet of Things or distributed ledger technologies, have the potential to transform our societies and economies for the better. However, their rollout must come with sufficient safeguards, to minimise the risk of harm these technologies may cause, such as bodily injury or other harm. In the EU, product safety regulations ensure this is the case. However, such regulations cannot completely exclude the possibility of damage resulting from the operation of these technologies. If this happens, victims will seek compensation. They typically do so on the basis of liability regimes under private law, in particular tort law, possibly in combination with insurance. Only the strict liability of producers for defective products, which constitutes a small part of this kind of liability regimes, is harmonised at EU level by the Product Liability Directive, while all other regimes - apart from some exceptions in specific sectors or under special legislation - are regulated by the Member States themselves.

🔗 CATEGORY Ethics Trustworthiness, Explainability, Transparency, Bias, Accountability

📅 PUBLISHED 20190626

🔑 KEYWORDS intelligence

■ Joint Research Council - JRC

Van Roy, Vincent. AI Watch: National strategies on Artificial Intelligence: A European perspective in 2019. No. JRC119974. Joint Research Centre (Seville site), 2020.

 <https://op.europa.eu/en/publication-detail/-/publication/1ff59ed4-5914-11ea-8b81-01aa75ed71a1/language-en>

The objective of this report is to present and gather information on all EU Member States national AI strategies in a structured and comprehensive way. It aims to help Member States to compare their strategy and to identify areas for strengthening synergies and collaboration. Published national AI strategies are analysed to identify the most relevant policy areas and to develop a common AI Policy Framework that can be used for the presentation of policy initiatives.

 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

 PUBLISHED 20200225

■ 5.3 Global Standardisation Initiatives

■ IEC

IEC 62243:2012 - Artificial Intelligence Exchange and Service Tie to All Test Environments (AI-ESTATE)

<https://webstore.iec.ch/publication/6631>

EC 62243 2012(E) defines formal specifications for supporting system diagnosis. These specifications support the exchange and processing of diagnostic information and the control of diagnostic processes. Diagnostic processes include, but are not limited to, testability analysis, diagnosability assessment, diagnostic reasoning, maintenance support, and diagnostic maturation.

🔗 CATEGORY Protocols interoperability of information exchange and control signalling

📅 PUBLISHED 20120621

🔍 KEYWORDS processing

■ IEEE

IEEE 7010-2020 - IEEE Recommended Practice for Assessing the Impact of Autonomous and Intelligent Systems on Human Well-being

📅 <https://standards.ieee.org/content/ieee-standards/en/standard/7010-2020.html>

This recommended practice establishes wellbeing metrics relating to human factors directly affected by intelligent and autonomous systems and establishes a baseline for the types of objective and subjective data these systems should analyze and include (in their programming and functioning) to proactively increase human wellbeing.

🔗 CATEGORY Citizen Application-dependent Societal impact, Goals, Big picture, Citizen View, Financial impact

📅 PUBLISHED 20200501

🔍 KEYWORDS data programming

IEEE IC16-002 - Ethically Aligned Design

<https://ethicsinaction.ieee.org/>

Ethically Aligned Design, First Edition is a comprehensive report that combines a conceptual framework addressing universal human values, data agency, and technical dependability with a set of principles to guide AI creators and users through a comprehensive set of recommendations.

🔗 CATEGORY Ethics Trustworthiness, Explainability, Transparency, Bias, Accountability

📅 PUBLISHED 20190601

🔍 KEYWORDS data

IEEE IC18-004 - IC18-004 - Ethics Certification Program for Autonomous and Intelligent Systems (ECPAIS)

<https://standards.ieee.org/industry-connections/ecpais.html>

The goal of The Ethics Certification Program for Autonomous and Intelligent Systems (ECPAIS) is to provide the world's first (based on our research) specification and body of its kind to enable a badge or mark for AI products, services and systems. Specifically, ECPAIS will enable evaluation based on the processes and outcomes of an organization's products services and systems using a risk-based approach.

CATEGORY Ethics Trustworthiness, Explainability, Transparency, Bias, Accountability

PUBLISHED 20200201

KEYWORDS search

IEEE IC20-006 - The IEEE Applied AIS Risk and Impact Framework Initiative

<https://standards.ieee.org/industry-connections/ais-risk-impact-framework.html>

In accordance with the evolving regulation around Artificial Intelligence Systems (AIS), this group would understand and propose an applied risk framework or assessment. In order to achieve these goals, the group would understand existing risk approaches in the fields of finance, cybersecurity, and more, identify gaps introduced by AI, and determine an approach to create a fit-to-purpose applied assessment for AI to determine riskiness and identify approaches to mitigate risk. Goals for this IC include the creation of a general platform for AIS risk assessment reports, white papers, the development of multiple PARs (likely as Recommended Practices or Guides versus Standards) and general coordination activities with leading global policy makers and organizations.

CATEGORY Security CyberSec, Privacy, Anonymization, Authentication, Access, Risk Analysis

IEEE IC20-008 - The IEEE Trusted Data and Artificial Intelligence Systems (AIS) Playbook for Finance Initiative

<https://standards.ieee.org/industry-connections/ais-finance-playbook.html>

The purpose of the Financial Service Playbook is to curate, summarize and contextualize Trusted Data and AI best practices for the financial sector around design principles, standards and certifications. The 1st edition of the Playbook will focus on Personalized Marketing Offers, Loan and Deposit Pricing, Credit Adjudication, Customer Sentiment Tracking, Customer Lifetime Value, Customer Segmentation, Securities - High Frequency Trading, Robo-Advisors, etc. IEEE's Ethically Aligned Design, P7000 Standards and ECPAIS certifications will be incorporated to align with anticipated European Singapore Canadian monetary regulatory authorities and policy frameworks.

CATEGORY Ethics Trustworthiness, Explainability, Transparency, Bias, Accountability

IEEE P1872.2 - Standard for Autonomous Robotics (AuR) Ontology

https://standards.ieee.org/project/1872_2.html

This standard is a logical extension to IEEE 1872-2015 Standard for Ontologies for Robotics and Automation. The standard extends the CORA ontology by defining additional ontologies appropriate for Autonomous Robotics (AuR) relating to (1) The core design patterns specific to AuR in common R and A sub-domains; (2) General ontological concepts and domain-specific axioms for AuR; and (3) General use cases and or case studies for AuR.

CATEGORY Data Quality, Usage, Provenance, Checking, Ontologies

KEYWORDS logic

IEEE P2089 - Standard for Age Appropriate Digital Services Framework - Based on the 5Rights Principles for Children

<https://standards.ieee.org/project/2089.html>

This standard is the first in a family of standards focused on the 5Rights principles, and establishes a framework for developing age appropriate digital services for situations where users are children. The framework centers around the following key areas a) recognition that the user is a child, b) has considered the capacity and upholds the rights of children, c) offers terms appropriate to children, d) presents information in an age appropriate way and e) thereby offers a level of validation for service design decisions. The standard provides a specific impact rating system and evaluation criteria, and sets out how vendors, public institutions and the educational sector can meet the criteria.

🔗 CATEGORY Citizen Application-dependent Societal impact, Goals, Big picture, Citizen View, Financial impact

IEEE P2247.1 - Standard for the Classification of Adaptive Instructional Systems

https://standards.ieee.org/project/2247_1.html

This standard defines and classifies the components and functionality of adaptive instructional systems (AIS). This standard defines parameters used to describe AIS and establishes requirements and guidance for the use and measurement of these parameters.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

IEEE P2247.2 - Interoperability Standards for Adaptive Instructional Systems (AISs)

https://standards.ieee.org/project/2247_2.html

This standard defines interactions and exchanges among the components of adaptive instructional systems (AISs). This standard defines the data and data structures used in these interactions and exchanges and parameters used to describe and measure them and establishes requirements and guidance for the use and measurement of the data, data structures, and parameters.

🔗 CATEGORY Protocols interoperability of information exchange and control signalling

📖 KEYWORDS data

IEEE P2247.3 - Recommended Practices for Evaluation of Adaptive Instructional Systems

https://standards.ieee.org/project/2247_3.html

This recommended practice defines and classifies methods of evaluating adaptive instructional systems (AIS) and establishes guidance for the use of these methods. This best practice incorporates and promotes the principles of ethically aligned design for the use of artificial intelligence (AI) in AIS.

🔗 CATEGORY Data Quality, Usage, Provenance, Checking, Ontologies

📖 KEYWORDS artificial intelligence intelligence

IEEE P2660.1 - Recommended Practices on Industrial Agents: Integration of Software Agents and Low Level Automation Functions

https://standards.ieee.org/standard/2660_1-2020.html

This recommended practice describes integrating and deploying the Multi-agent Systems (MAS) technology in industrial environments for use in building the intelligent decision-making layer on top of legacy industrial control platforms. The integration of software agents with the low-level real-time control systems, mainly based on the Programmable Logic Controllers (PLCs) running the IEC 61131-3 control programs (forming in this manner a new component known as industrial agents) are also identified. In addition, the integration of software agents with the control applications based on IEC 61499 standard or executed on embedded controllers is described. This recommended practice supports and helps the engineers leverage the best practices of developing industrial agents for specific automation control problems and given application fields. Therefore, corresponding rules, guidelines and design patterns are provided.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

IEEE P2671 - Standard for General Requirements of Online Detection Based on Machine Vision in Intelligent Manufacturing

<https://standards.ieee.org/project/2671.html>

This standard specifies through the general requirements of online detection based on machine vision, including requirements for data format, data transmission processes, definition of application scenarios and performance metrics for evaluating the effect of online detection deployment.

🔗 CATEGORY Data Quality, Usage, Provenance, Checking, Ontologies

📖 KEYWORDS data machine

IEEE P2672 - Guide for General Requirements of Mass Customization

<https://standards.ieee.org/project/2672.html>

This guide provides the definitions, terminologies, operation procedures, system architectures, key technological requirements, data requirements and applications of and related to user-oriented mass customization. This guide provides reference information to be used by manufacturing enterprises for designing and implementing business models of mass customization.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📖 KEYWORDS data logic

IEEE P2751 - 3D Map Data Representation for Robotics and Automation

<https://standards.ieee.org/project/2751.html>

This standard extends the IEEE 1873-2015 Standard for Robot Map Data Representation from two-dimensional (2D) maps to three-dimensional (3D) maps. The standard develops a common representation and encoding for 3D map data, to be used in applications requiring robot operation, like navigation and manipulation, in all domains (space, air, ground surface, underwater, and underground). The standard encoding is devoted to exchange map data between robot systems, while allowing robot systems to use their private internal representations for efficient map data processing. The standard places no constraints on where map data comes from nor on how maps are constructed.

🔗 CATEGORY Protocols interoperability of information exchange and control signalling

📖 KEYWORDS data processing

IEEE P2755.2 - Recommended Practice for Implementation and Management Methodology for Software Based Intelligent Process Automation (SBIPA)

<https://ieeexplore.ieee.org/abstract/document/9199584>

Utilizing terminology as established in IEEE 2755-2017 and technology taxonomy as established in IEEE 2755.1 - 2019, this Recommended Practice provides a comprehensive methodology for technology domain exploration, development of strategy, technology evaluation, Implementation, management, operations, program optimization and successful enterprise scaling for IPA programs. This Recommended Practice provides the reader a compilation of best practices from industry leaders on the proven methods from the initial discovery and exploration of the transformative capabilities of IPA technology through to developing and running an enterprise-wide program. SCOPE This recommended practice describes implementation and management approaches and methods for enterprise implementation of Software Based Intelligent Process Automation (SBIPA) technologies. The recommended practice includes the exploration of technology capabilities, development of strategy, product evaluation, platform implementation, management and governance for service providers and end users. PURPOSE This recommended practice provides guidance for implementation and management of SBIPA capabilities. Best practices are needed in this emerging and rapidly growing technology domain to advance industry capabilities in the implementation and management of SBIPA technologies.

🔗 CATEGORY Governance Policy, Regulations, Liability

📅 PUBLISHED PAR Approval

IEEE P2801 - Recommended Practice for the Quality Management of Datasets for Medical Artificial Intelligence

<https://standards.ieee.org/project/2801.html>

The recommended practice identifies best practices for establishing a quality management system for datasets used for artificial intelligence medical device.

The recommended practice covers a full cycle of dataset management, including items such as but not limited to data collection, transfer, utilization, storage, maintenance and update. The recommended practice recommends a list of critical factors that impact the quality of datasets, such as but not limited to data sources, data quality, annotation, privacy protection, personnel qualification training evaluation, tools, equipment, environment, process control and documentation.

🔗 CATEGORY Governance Policy, Regulations, Liability

🔍 KEYWORDS artificial intelligence data intelligence

IEEE P2802 - Standard for the Performance and Safety Evaluation of Artificial Intelligence Based Medical Device: Terminology

<https://standards.ieee.org/project/2802.html>

The standard establishes terminology used in artificial intelligence medical device, including definitions of fundamental concepts and methodology that describe the safety, effectiveness, risks and quality management of artificial intelligence medical device. The standard provides definitions using the following forms, such as but not limited to literal description, equations, tables, figures and legends. The standard also establishes a vocabulary for the development of future standards for artificial intelligence medical device.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

🔍 KEYWORDS artificial intelligence intelligence

IEEE P2805.3 - Cloud-Edge Collaboration Protocols for Machine Learning

https://standards.ieee.org/project/2805_3.html

This standard specifies the collaboration protocols of enabling machine learning on the edge computing node with support from industrial clouds. This standard provides implementation reference of machine learning upon lower powered, cheaper, embedded devices, a specific hardware-based method of accepting the introduced machine learning models and then online optimization, i.e. comparing the models with incoming live data.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📖 KEYWORDS data learning machine

IEEE P2807 - Framework of Knowledge Graphs

<https://standards.ieee.org/project/2807.html>

This standard defines the framework of knowledge graphs (KGs). The framework describes the input requirement of KG, construction process of KG, i.e., extraction, storage, fusion and understanding, performance metrics, applications of KG, verticals, KG related artificial intelligence (AI) technologies and other required digital infrastructure.

🔗 CATEGORY Protocols interoperability of information exchange and control signalling

📖 KEYWORDS artificial intelligence knowledge

IEEE P2807.1 - Standard for Technical Requirements and Evaluation of Knowledge Graphs

https://standards.ieee.org/project/2807_1.html

This standard defines technical requirements, performance metrics, evaluation criteria and test cases for knowledge graphs. The mandatory test cases include data input, metadata, data extraction, data fusion, data storage and retrieval, inference and analysis, and knowledge graph display.

🔗 CATEGORY Data Quality, Usage, Provenance, Checking, Ontologies

📖 KEYWORDS data knowledge

IEEE P2817 - Guide for Verification of Autonomous Systems

<https://standards.ieee.org/project/2817.html>

This Guide for Verification of Autonomous Systems enables the user to define a customized process for verification of their autonomous system based on their available resources. It documents best practices across all levels of abstraction within a given system. It describes a conceptual model that assists in the development of new verification processes for autonomous systems and provides both integration guidance for developing a verification process and techniques, methodologies, and tool types supporting verification process development.

🔗 CATEGORY Data Quality, Usage, Provenance, Checking, Ontologies

📖 KEYWORDS techniques

IEEE P2830 - Standard for Technical Framework and Requirements of Shared Machine Learning

<https://standards.ieee.org/project/2830.html>

This standard defines a framework and architectures for machine learning in which a model is trained using encrypted data that has been aggregated from multiple sources and is processed by a third party trusted execution environment. A distinctive feature of this technique is the essential use of a third party trusted execution environment for computations. The standard specifies functional components, workflows, security requirements, technical requirements, and protocols.

➤ CATEGORY Algorithms ML, TransferLearning, Reinforcement and Deep Learning

📖 KEYWORDS data learning machine

IEEE P2840 - Standard for Responsible AI Licensing

<https://standards.ieee.org/project/2840.html>

The standard describes specifications for the factors that shall be considered in the development of a Responsible Artificial Intelligence (AI) license.

Possible elements in the specification include (but are not limited to) (1) What a Responsible AI License means and what its aims are; (2) Standardised definitions for referring to components, features and other such elements of AI software, source code and services; (3) Standardised reference to geography specific AI Technology specific legislation and laws (such as the EU General Data Protection Regulation - GDPR) as well as identification of violation detection, penalties, and legal remedies; (4) The specification lists domain specific considerations that may be applied in developing a responsible AI license. The proposed standard shall not require the use of any specific legal text or clauses nor shall the proposed standard offer legal advice.

➤ CATEGORY Ethics Trustworthiness, Explainability, Transparency, Bias, Accountability

IEEE P2841 - Framework and Process for Deep Learning Evaluation

<https://standards.ieee.org/project/2841.html>

This document defines best practices for developing and implementing deep learning algorithms and defines a framework and criteria for evaluating algorithm reliability and quality of the resulting software systems.

➤ CATEGORY Algorithms ML, TransferLearning, Reinforcement and Deep Learning

📖 KEYWORDS deep learning

IEEE P2842 - Recommended Practice for Secure Multi-party Computation

<https://standards.ieee.org/project/2842.html>

This recommended practice specifies governance criteria such as safety, transparency, accountability, responsibility and minimizing bias, and process steps for effective implementation, performance auditing, training and compliance in the development or use of artificial intelligence within organizations.

➤ CATEGORY Ethics Trustworthiness, Explainability, Transparency, Bias, Accountability

📖 KEYWORDS artificial intelligence intelligence

IEEE P2846 - Assumptions for Models in Safety-Related Automated Vehicle Behavior

<https://standards.ieee.org/project/2846.html>

This standard describes the minimum set of reasonable assumptions used in foreseeable scenarios to be considered for road vehicles in the development of safety-related models that are part of automated driving systems (ADS). The standard includes consideration of rules of the road and their regional and or temporal dependencies. This standard is not necessarily exhaustive to guarantee the safety of the ADS. In accordance with the IEEE SA Operations Manual Patent (6.3) and Structure (6.4) Sections, the Informative portion of the standard identifies attributes of suitable models including best practices for balancing ADS assumptions with rules of the road used in the context of the Dynamic Driving Task. The Informative portion also identifies methods that may be used to verify whether an implementation conforms to the minimum set of required reasonable assumptions used in foreseeable scenarios, and defines an example model conformant with the standard. Out of scope are the algorithms or technologies in an ADS that the assumptions and attributes defined in this standard impact.

🔗 CATEGORY Data Quality, Usage, Provenance, Checking, Ontologies

IEEE P2863 - Recommended Practice for Organizational Governance of Artificial Intelligence

<https://standards.ieee.org/project/2863.html>

This recommended practice specifies governance criteria such as safety, transparency, accountability, responsibility and minimizing bias, and process steps for effective implementation, performance auditing, training and compliance in the development or use of artificial intelligence within organizations.

🔗 CATEGORY Ethics Trustworthiness, Explainability, Transparency, Bias, Accountability

📖 KEYWORDS artificial intelligence intelligence

IEEE P2894 - Guide for an Architectural Framework for Explainable Artificial Intelligence

<https://standards.ieee.org/project/2894.html>

This guide specifies an architectural framework that facilitates the adoption of explainable artificial intelligence (XAI). This guide defines an architectural framework and application guidelines for XAI, including 1) description and definition of explainable AI, 2) the categorizes of explainable AI techniques; 3) the application scenarios for which explainable AI techniques are needed, 4) performance evaluations of XAI in real application systems.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📖 KEYWORDS artificial intelligence intelligence techniques

IEEE P3333.1.3 - Standard for the Deep Learning Based Assessment of Visual Experience Based on Human Factors

https://standards.ieee.org/project/3333_1_3.html

This standard defines deep learning-based metrics of content analysis and Quality of Experience (QoE) assessment for visual contents, which is an extension of Standard for the Quality of Experience (QoE) and Visual-Comfort Assessments of Three-Dimensional (3D) Contents Based on Psychophysical Studies (IEEE STD 3333.1.1) and Standard for the Perceptual Quality Assessment of Three Dimensional (3D) and Ultra High Definition (UHD) Contents (IEEE 3333.1.2).

The scope covers the following

- (a) Deep learning models for QoE assessment (multilayer perceptrons, convolutional neural networks, deep generative models);
- (b) Deep metrics of visual experience from High Definition (HD), UHD, 3D, High Dynamic Range (HDR), Virtual Reality (VR) and Mixed Reality (MR) contents;
- (c) Deep analysis of clinical (electroencephalogram (EEG), electrocardiogram (ECG), electrooculography (EOG), and so on) and psychophysical (subjective test and simulator sickness questionnaire (SSQ)) data for QoE assessment;
- (d) Deep personalized preference assessment of visual contents, (e) Building image and video databases for performance benchmarking purpose if necessary

🔗 CATEGORY Algorithms ML, TransferLearning, Reinforcement and Deep Learning

📖 KEYWORDS convolutional data deep learning network neural

IEEE P3652.1 - Guide for Architectural Framework and Application of Federated Machine Learning

🔗 https://standards.ieee.org/standard/3652_1-2020.html

Federated learning defines a machine learning framework that allows a collective model to be constructed from data that is distributed across data owners. This guide provides a blueprint for data usage and model building across organizations while meeting applicable privacy, security and regulatory requirements. It defines the architectural framework and application guidelines for federated machine learning, including

- 1) description and definition of federated learning,
- 2) the types of federated learning and the application scenarios to which each type applies,
- 3) performance evaluation of federated learning, and
- 4) associated regulatory requirements.

🔗 CATEGORY Algorithms ML, TransferLearning, Reinforcement and Deep Learning

📖 KEYWORDS data learning machine

IEEE P7000 - Standard for Model Process for Addressing Ethical Concerns During System Design

🔗 <https://standards.ieee.org/project/7000.html>

The standard establishes a process model by which engineers and technologists can address ethical consideration throughout the various stages of system initiation, analysis and design. Expected process requirements include management and engineering view of new IT product development, computer ethics and IT system design, value-sensitive design, and, stakeholder involvement in ethical IT system design.

🔗 CATEGORY Ethics Trustworthiness, Explainability, Transparency, Bias, Accountability

📖 KEYWORDS engineering

IEEE P7001 - Standards for Transparency of Autonomous Systems

🔗 <https://standards.ieee.org/project/7001.html>

This standard describes measurable, testable levels of transparency, so that autonomous systems can be objectively assessed and levels of compliance determined.

🔗 CATEGORY Ethics Trustworthiness, Explainability, Transparency, Bias, Accountability

IEEE P7002 - Standard for Data Privacy Process

<https://standards.ieee.org/project/7002.html>

This standard defines requirements for a systems software engineering process for privacy oriented considerations regarding products, services, and systems utilizing employee, customer or other external user's personal data. It extends across the life cycle from policy through development, quality assurance, and value realization. It includes a use case and data model (including metadata). It applies to organizations and projects that are developing and deploying products, systems, processes, and applications that involve personal information. By providing specific procedures, diagrams, and checklists, users of this standard will be able to perform a conformity assessment on their specific privacy practices. Privacy impact assessments (PIAs) are described as a tool for both identifying where privacy controls and measures are needed and for confirming they are in place.

🔗 CATEGORY Security CyberSec, Privacy, Anonymization, Authentication, Access, Risk Analysis

📖 KEYWORDS data engineering

IEEE P7003 - Standard for Algorithmic Bias Considerations

<https://standards.ieee.org/project/7003.html>

This standard describes specific methodologies to help users certify how they worked to address and eliminate issues of negative bias in the creation of their algorithms, where negative bias infers the usage of overly subjective or uninformative data sets or information known to be inconsistent with legislation concerning certain protected characteristics (such as race, gender, sexuality, etc); or with instances of bias against groups not necessarily protected explicitly by legislation, but otherwise diminishing stakeholder or user well being and for which there are good reasons to be considered inappropriate. Possible elements include (but are not limited to) benchmarking procedures and criteria for the selection of validation data sets for bias quality control; guidelines on establishing and communicating the application boundaries for which the algorithm has been designed and validated to guard against unintended consequences arising from out-of-bound application of algorithms; suggestions for user expectation management to mitigate bias due to incorrect interpretation of systems outputs by users (e.g. correlation vs. causation).

🔗 CATEGORY Ethics Trustworthiness, Explainability, Transparency, Bias, Accountability

📖 KEYWORDS data

IEEE P7005 - Standard for Transparent Employer Data Governance

<https://standards.ieee.org/project/7005.html>

The standard defines specific methodologies to help employers to certify how they approach accessing, collecting, storing, utilizing, sharing, and destroying employee data. The standard provides specific metrics and conformance criteria regarding these types of uses from trusted global partners and how vendors and employers can meet them.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📖 KEYWORDS data

IEEE P7006 - Standard for Personal Data Artificial Intelligence (AI) Agent

<https://standards.ieee.org/project/7006.html>

This standard describes the technical elements required to create and grant access to a personalized Artificial Intelligence (AI) that will comprise inputs, learning, ethics, rules and values controlled by individuals.

➤ CATEGORY Ethics Trustworthiness, Explainability, Transparency, Bias, Accountability

📖 KEYWORDS learning

IEEE P7007 - Ontological Standard for Ethically Driven Robotics and Automation Systems

<https://standards.ieee.org/project/7007.html>

The standard establishes a set of ontologies with different abstraction levels that contain concepts, definitions and axioms which are necessary to establish ethically driven methodologies for the design of Robots and Automation Systems.

➤ CATEGORY Data Quality, Usage, Provenance, Checking, Ontologies

IEEE P7008 - Standard for Ethically Driven Nudging for Robotic, Intelligent and Autonomous Systems

<https://standards.ieee.org/project/7008.html>

Nudges as exhibited by robotic, intelligent or autonomous systems are defined as overt or hidden suggestions or manipulations designed to influence the behavior or emotions of a user. This standard establishes a delineation of typical nudges (currently in use or that could be created). It contains concepts, functions and benefits necessary to establish and ensure ethically driven methodologies for the design of the robotic, intelligent and autonomous systems that incorporate them.

➤ CATEGORY Ethics Trustworthiness, Explainability, Transparency, Bias, Accountability

📖 KEYWORDS behavior

IEEE P7009 - Standard for Fail-Safe Design of Autonomous and Semi-Autonomous Systems

<https://standards.ieee.org/project/7009.html>

This standard establishes a practical, technical baseline of specific methodologies and tools for the development, implementation, and use of effective fail-safe mechanisms in autonomous and semi-autonomous systems. The standard includes (but is not limited to) clear procedures for measuring, testing, and certifying a system's ability to fail safely on a scale from weak to strong, and instructions for improvement in the case of unsatisfactory performance. The standard serves as the basis for developers, as well as users and regulators, to design fail-safe mechanisms in a robust, transparent, and accountable manner.

➤ CATEGORY Governance Policy, Regulations, Liability

IEEE P7011 - Standard for the Process of Identifying and Rating the Trustworthiness of News Sources

<https://standards.ieee.org/project/7011.html>

This standard provides semi-autonomous processes using standards to create and maintain news purveyor ratings for purposes of public awareness. It standardises processes to identify and rate the factual accuracy of news stories in order to produce a rating of online news purveyors and the online portion of multimedia news purveyors. This process will be used to produce truthfulness scorecards through multi-faceted and multi-sourced approaches. The standard defines an algorithm using open source software and a score card rating system as methodology for rating trustworthiness as a core tenant in an effort to establish trust and acceptance.

🔗 CATEGORY Citizen Application-dependent Societal impact, Goals, Big picture, Citizen View, Financial impact

IEEE P7012 - Standard for Machine Readable Personal Privacy Terms

<https://standards.ieee.org/project/7012.html>

The standard identifies addresses the manner in which personal privacy terms are proffered and how they can be read and agreed to by machines.

🔗 CATEGORY Data Quality, Usage, Provenance, Checking, Ontologies

📖 KEYWORDS machine

IEEE P7013 - Inclusion and Application Standards for Automated Facial Analysis Technology

<https://spectrum.ieee.org/the-institute/ieee-products-services/standards-working-group-takes-on-facial-recognition>

Chair of IEEE Standards Association working group explains what the organization is doing to help ensure the technology is used ethically

🔗 CATEGORY Security CyberSec, Privacy, Anonymization, Authentication, Access, Risk Analysis

📅 PUBLISHED PAR Approval

IEEE P7014 - Standard for Ethical considerations in Emulated Empathy in Autonomous and Intelligent Systems

<https://standards.ieee.org/project/7014.html>

This standard defines a model for ethical considerations and practices in the design, creation and use of empathic technology, incorporating systems that have the capacity to identify, quantify, respond to, or simulate affective states, such as emotions and cognitive states. This includes coverage of affective computing , emotion Artificial Intelligence and related fields.

🔗 CATEGORY Ethics Trustworthiness, Explainability, Transparency, Bias, Accountability

📖 KEYWORDS cognitive

ISO

ISO/TR 22100-5 - Safety of machinery - Relationship with ISO 12100 - Part 5: Implications of embedded artificial intelligence machine learning

<https://www.iso.org/standard/80778.html>

This document addresses how artificial intelligence machine learning can impact the safety of machinery and machinery systems. This document describes how hazards being associated with AI applications and machine learning in machinery or machinery systems (and designed to act within specific limits) can be considered in the risk assessment process. This document is not applicable to machinery or machinery systems with AI applications machine learning designed to act beyond specified limits that can result in unpredictable effects. This document does not address safety systems with AI, for example, safety-related sensors and other safety-related parts of control systems.

🔗 CATEGORY Citizen Application-dependent Societal impact, Goals, Big picture, Citizen View, Financial impact

📖 KEYWORDS artificial intelligence intelligence learning machine

ISO/TR 9241-810 - Ergonomics of human-system interaction - Part 810: Robotic, intelligent and autonomous systems

<https://www.iso.org/standard/76577.html>

This document addresses physically embodied RIA systems, such as robots and autonomous vehicles with which users will physically interact; systems embedded within the physical environment with which users do not consciously interact, but which collect data and or modify the environment within which people live or work such as smart building and, mood-detection; intelligent software tools and agents with which users actively interact through some form of user interface; intelligent software agents which act without active user input to modify or tailor the systems to the users behaviour, task or some other purpose, including providing context specific content information, tailoring adverts to a user based on information about them, user interfaces that adapt to the cognitive or physiological state, ambient intelligence ; the effect on users resulting from the combined interaction of several RIA systems such as conflicting behaviours between the RIA systems under the same circumstances; the complex system-of-systems and sociotechnical impacts of the use of RIA systems, particularly on society and government. This document is not an exploration of the philosophical, ethical or political issues surrounding robotics, artificial intelligence, machine learning, and intelligent machines or environments.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED 2020-09

📖 KEYWORDS artificial intelligence cognitive data intelligence learning logic machine

ISO/IEC

ISO/IEC 20546:2019 Information technology - Big data - Overview and vocabulary

<https://www.iso.org/standard/68305.html>

This document provides a set of terms and definitions needed to promote improved communication and understanding of Big Data. It provides a terminological foundation for big data-related standards.

This document provides a conceptual overview of the field of big data, its relationship to other technical areas and standards efforts, and the concepts ascribed to big data that are not new to big data.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED 2019

🔖 KEYWORDS data logic

ISO/IEC 20547-3:2020 Information technology - Big data reference architecture - Part 3: Reference architecture

🔗 <https://www.iso.org/standard/71277.html>

This document specifies the big data reference architecture (BDRA). The reference architecture includes concepts and architectural views.

The reference architecture specified in this document defines two architectural viewpoints

(a) a user view defining roles sub-roles, their relationships, and types of activities within a big data ecosystem;

(b) a functional view defining the architectural layers and the classes of functional components within those layers that implement the activities of the roles sub-roles within the user view.

The BDRA is intended to

- (1) provide a common language for the various stakeholders; (
- 2) encourage adherence to common standards, specifications, and patterns;
- (3) provide consistency of implementation of technology to solve similar problem sets;
- (4) facilitate the understanding of the operational intricacies in big data;
- (5) illustrate and understand the various big data components, processes, and systems, in the context of an overall big data conceptual model; (
- 6) provide a technical reference for government departments, agencies and other consumers to understand, discuss, categorize and compare big data solutions; and
- (7) facilitate the analysis of candidate standards for interoperability, portability, reusability, and extensibility.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED 2020

🔖 KEYWORDS data language

ISO/IEC 20547-4:2020 - Information technology - Big data reference architecture - Part 4: Security and privacy

🔗 <https://www.iso.org/standard/71278.html>

This document specifies the security and privacy aspects applicable to the big data reference architecture (BDRA) including the big data roles, activities and functional components and also provides guidance on security and privacy operations for big data.

🔗 CATEGORY Security CyberSec, Privacy, Anonymization, Authentication, Access, Risk Analysis

📅 PUBLISHED 2020-09

🔖 KEYWORDS data

ISO/IEC 22989 Information technology - Artificial intelligence - Artificial intelligence concepts and terminology

<https://www.iso.org/standard/74296.html>

This document establishes terminology for Artificial Intelligence (AI) and describes concepts in the field of AI. This document can be used in the development of other standards and in support of communications among diverse, interested parties stakeholders. This document is applicable to all types of organizations (e.g., commercial enterprises, government agencies, not-for-profit organizations).

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED WIP

ISO/IEC 23894 - Information Technology - Artificial Intelligence - Risk Management

<https://www.iso.org/standard/77304.html>

To provide guidelines on managing risk faced by organizations during the development and application of artificial intelligence (AI) techniques and systems. The guidelines also aim to assist organizations to integrate risk management into their AI-related activities and functions. It moreover describes processes for the effective implementation and integration of AI risk management. The application of these guidelines can be customized to any organization and its context.

🔗 CATEGORY Ethics Trustworthiness, Explainability, Transparency, Bias, Accountability

📅 PUBLISHED WD

🔑 KEYWORDS artificial intelligence intelligence techniques

ISO/IEC 25024:2015. Systems and software engineering - Systems and software Quality Requirements and Evaluation (SQuaRE) - Measurement of data quality

<https://www.iso.org/standard/35749.html>

ISO IEC 25024 2015 contains the following (a) a basic set of data quality measures for each characteristic; (b) a basic set of target entities to which the quality measures are applied during the data-life-cycle; (c) an explanation of how to apply data quality measures; (d) a guidance for organizations defining their own measures for data quality requirements and evaluation. It includes, as informative annexes, a synoptic table of quality measure elements defined in this International standard (Annex A), a table of quality measures associated to each quality measure element and target entity (Annex B), considerations about specific quality measure elements (Annex C), a list of quality measures in alphabetic order (Annex D), and a table of quality measures grouped by characteristics and target entities (Annex E).

🔗 CATEGORY Data Quality, Usage, Provenance, Checking, Ontologies

🔑 KEYWORDS data

ISO/IEC 38507 - Information technology - Governance of IT - Governance implications of the use of artificial intelligence by organizations

<https://www.iso.org/standard/56641.html>

This document provides guidance for members of the governing bodies of organizations on the effective, efficient, and acceptable uses of artificial intelligence within their organizations. This document also provides guidance to a wider community, including executive managers; external businesses or technical specialists, such as legal or accounting specialists, retail or industrial associations, or professional bodies; public authorities and policy-makers; internal and external service providers (including consultants); auditors. This document is applicable to the governance of current and future uses of artificial intelligence as well as the implications of such use for the organization itself. This document is applicable to all organizations, including public and private companies, government entities, and not-for-profit organizations. This document is applicable to organizations of all sizes from the smallest to the largest, regardless of the extent of their dependence on data or information technologies.

📁 CATEGORY Governance Policy, Regulations, Liability

📅 PUBLISHED CD

🔍 KEYWORDS artificial intelligence data intelligence

ISO/IEC AWI 24029-2 Artificial intelligence (AI) - Assessment of the robustness of neural networks - Part 2: Methodology for the use of formal methods

<https://www.iso.org/standard/79804.html>

This document provides methodology on the use of formal methods to assess robustness properties of neural networks. The document focuses on how to manage and put in place formal methods to prove robustness properties.

📁 CATEGORY Algorithms ML, TransferLearning, Reinforcement and Deep Learning

📅 PUBLISHED WIP

🔍 KEYWORDS network neural

ISO/IEC AWI 25059 Software engineering - Systems and software Quality Requirements and Evaluation (SQuaRE) - Quality model for AI-based systems

<https://www.iso.org/standard/80655.html>

This document outlines a quality model for AI systems and is an application-specific extension to the SQuaRE series. The characteristics and sub-characteristics detailed in the model provide consistent terminology for specifying, measuring and evaluating AI system quality. The characteristics and sub-characteristics detailed in the model also provide a set of quality characteristics against which stated quality requirements can be compared for completeness.

📁 CATEGORY Data Quality, Usage, Provenance, Checking, Ontologies

📅 PUBLISHED WIP

ISO/IEC AWI 42001 Information Technology - Artificial intelligence - Management system

<https://www.iso.org/standard/81230.html>

Awareness of the 42001 Artificial Intelligence Management Systems AIMS project, and how it fits into an organization's GRC (governance, risk, compliance) ecosystem, and how it fits into larger standards ecosystem including SC42.

↗ CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED WIP

ISO/IEC AWI 5259-1 Data quality for analytics and ML - Part 1: Overview, terminology, and examples

<https://www.iso.org/standard/81088.html>

This document provides the means for understanding and associating the individual documents of the ISO IEC Artificial intelligence - Data quality for analytics and ML, series and is the foundation for conceptual understanding of data quality for analytics and machine learning. It also discusses associated technologies and examples (e.g. use cases and usage scenarios).

↗ CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED WIP

ISO/IEC AWI 5259-2 Data quality for analytics and ML - Part 2: Part 2: Data quality measures

<https://www.iso.org/standard/81860.html>

This document provides a data quality model, data quality measures, and guidance on reporting data quality in the context of analytics and machine learning (ML). This document builds on ISO 8000 series, ISO IEC 25012 and ISO IEC 25024. The aim of this document is to enable organizations to achieve their data quality objectives and is applicable to all types of organizations.

↗ CATEGORY Data Quality, Usage, Provenance, Checking, Ontologies

📅 PUBLISHED WIP

ISO/IEC AWI 5259-3 Data quality for analytics and ML - Part 3: Data quality management requirements and guidelines

<https://www.iso.org/standard/81092.html>

This document specifies requirements and provides guidance for establishing, implementing, maintaining and continually improving the quality for data used in the areas of analytics and machine learning. This document does not define a detailed process, methods or metrics. Rather it defines the requirements and guidance for a quality management process along with a reference process and methods that can be tailored to meet the requirements in this document. The requirements and recommendations set out in this document are generic and are intended to be applicable to all organizations, regardless of type, size or nature.

↗ CATEGORY Data Quality, Usage, Provenance, Checking, Ontologies

📅 PUBLISHED WIP

ISO/IEC AWI 5259-4 Data quality for analytics and ML - Part 4: Data quality process framework

<https://www.iso.org/standard/81093.html>

This document provides general common organizational approaches, regardless of type, size or nature of the applying organization, to ensure data quality for training and evaluation in analytics and machine learning. It includes guidelines for (1) supervised machine learning with regard to the labelling of data used for training machine learning; (2) systems, including common organizational approaches for training data labelling; (3) unsupervised machine learning; (4) semi-supervised machine learning; (5) reinforcement machine learning. This document is applicable to training and evaluation data that comes from different sources, including data acquisition and data composition, data pre-processing, data labelling, evaluation, and data use. This document does not define specific services, platforms or tools.

🔗 CATEGORY Data Quality, Usage, Provenance, Checking, Ontologies

📅 PUBLISHED WIP

ISO/IEC AWI 5338 Information technology - Artificial intelligence - AI system life cycle processes

<https://www.iso.org/standard/81118.html>

This document defines a set of processes and associated terminology for describing the life cycle of AI systems. It forms the foundation of a detailed AI system life cycle specification. It is based on ISO IEC IEEE 15288 and ISO IEC IEEE 12207 with substitutes for and additions of AI specific processes, whose foundation is based on ISO IEC 22989 and ISO IEC 23053. Selected sets of these processes can be applied throughout the life cycle for managing and performing the stages of an AI system's life cycle. This document provides processes that support the definition, control and improvement of the AI system life cycle processes used within an organization or a project. Organizations and projects can use these processes when developing or acquiring AI systems. When an element of an AI system is traditional software or a traditional system, the software life cycle processes in ISO IEC IEEE 12207 and the system life cycle processes in ISO IEC IEEE 15288 may be used to implement that element.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED WIP

ISO/IEC AWI TR 24368 - Information technology - Artificial intelligence - Overview of ethical and societal concerns

<https://www.iso.org/standard/78507.html?browse=tc>

UNDER DEVELOPMENT ISO IEC AWI TR 24368

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

ISO/IEC AWI TR 5469 Artificial intelligence - Functional safety and AI systems

<https://www.iso.org/standard/81283.html>

This document describes the properties, related risk factors, available methods and processes relating to (a) Use of AI inside a safety related function to realise the functionality, (b) Use of non-AI safety related functions to ensure safety for an AI controlled equipment, (c) Use of AI systems to design and develop safety related functions.

🔗 CATEGORY Security CyberSec, Privacy, Anonymization, Authentication, Access, Risk Analysis

📅 PUBLISHED WIP

ISO/IEC CD 24668 Information technology - Artificial intelligence -Process management framework for Big data analytics

<https://www.iso.org/standard/78368.html>

The standard provides a framework for developing processes to effectively leverage big data analytics across the organization irrespective of the industries sectors This standard specifies process management for big data analytics with its various process categories taken into account along with their interconnectivities. These process categories are Organization Stakeholder processes, Competency Development processes, Data Management processes, Analytics Development processes and Technology Integration processes. This standard describes processes to acquire, describe, store and process data at an organization level which provides Big Data analytics services.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED WIP

ISO/IEC DTR 24027 - Information technology - Artificial Intelligence (AI) - Bias in AI systems and AI aided decision making

<https://www.iso.org/standard/77607.html?browse=tc>

UNDER DEVELOPMENT ISO IEC DTR 24027 Stage 30.60

🔗 CATEGORY Governance Policy, Regulations, Liability

ISO/IEC DTR 24027 Information technology - Artificial Intelligence (AI) - Bias in AI systems and AI aided decision making

<https://www.iso.org/standard/77607.html>

This document addresses bias in relation to AI systems, especially with regards to AI-aided decision making. Measurement techniques and methods for assessing bias are described, with the aim to address bias related vulnerabilities, and mitigation thereof. All AI system lifecycle phases are in scope, including but not limited to data collection, training, continual learning, design, testing, evaluation, and use.

🔗 CATEGORY Algorithms ML, TransferLearning, Reinforcement and Deep Learning

📅 PUBLISHED WIP

ISO/IEC DTR 24372 Information technology - Artificial intelligence (AI) - Overview of computational approaches for AI systems

<https://www.iso.org/standard/78508.html>

This document provides an overview of the state of the art of computational approaches for AI systems, by describing a) main computational characteristics of AI systems; b) main algorithms and approaches used in AI systems, referencing use cases contained in ISO IEC TR 24030.

◇ CATEGORY Algorithms ML, TransferLearning, Reinforcement and Deep Learning

📅 PUBLISHED WIP

ISO/IEC JTC 1/SC 42 DIS 23053 Framework for Artificial Intelligence (AI) Systems Using Machine Learning (ML)

<https://www.iso.org/standard/74438.html>

This document establishes an Artificial Intelligence (AI) and Machine Learning (ML) framework for describing a generic AI system using ML technology. The framework describes the system components and their functions in the AI ecosystem. This document is applicable to all types and sizes of organizations, including public and private companies, government entities, and not-for-profit organizations, that are implementing or using AI systems.

◇ CATEGORY Algorithms ML, TransferLearning, Reinforcement and Deep Learning

📅 PUBLISHED WIP

ISO/IEC TR 20547-1:2020 Information technology - Big data reference architecture - Part 1: Framework and application process

<https://www.iso.org/standard/71275.html>

The big data paradigm is a rapidly changing field with rapidly changing technologies. This dynamic situation creates two significant issues for potential implementers of the technology. First, there is a lack of standard definitions for terms including the core concept of big data. The second issue is that there is no consistent approach to describe a big data architecture and implementation. The first issue is addressed by ISO IEC 20546. The ISO IEC 20547 series is targeted to the second issue and provides a framework and reference architecture which organizations can apply to their problem domain to effectively and consistently describe their architecture and its implementations with respect to the roles actors and their concerns as well as the underlying technology. This document describes the reference architecture framework and provides a process for mapping a specific problem set use case to the architecture and evaluating that mapping.

◇ CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED 2020

🔖 KEYWORDS data

ISO/IEC TR 20547-2:2018 Information technology - Big data reference architecture - Part 2: Use cases and derived requirements

<https://www.iso.org/standard/71276.html>

This document is focuses on forming a community of interest from industry, academia, and government, with the goal of developing a consensus list of big data technical considerations across all stakeholders. This included gathering and understanding various examples of use cases from diversified areas (i.e., application domains). To achieve this goal, the following tasks were done (a)

gathered input from all stakeholders regarding big data technical considerations; (b) analyzed and prioritized a list of challenging use case specific technical considerations that may delay or prevent adoption of big data deployment; (c) developed a comprehensive list of generalized big data technical considerations for ISO IEC 20547-3, Information technology - Big data reference architecture - Part 3 Reference architecture; and (d) documented the findings in this document.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED 2020

🔍 KEYWORDS data

ISO/IEC TR 20547-5:2018 Information technology - Big data reference architecture - Part 5: Standards roadmap

🔗 <https://www.iso.org/standard/72826.html>

There is broad agreement among commercial, academic, and government leaders about the remarkable potential of big data to spark innovation, fuel commerce, and drive progress. big data is the common term used to describe the deluge of data in today's networked, digitized, sensor-laden, and information-driven world. The availability of vast data resources carries the potential to answer questions previously out of reach, including the following (a) How can a potential pandemic reliably be detected early enough to intervene?; (b) Can new materials with advanced properties be predicted before these materials have ever been synthesized?; (c) How can the current advantage of the attacker over the defender in guarding against cyber-security threats be reversed? There is also broad agreement on the ability of big data to overwhelm traditional approaches. The growth rates for data volumes, speeds, and complexity are outpacing scientific and technological advances in data analytics, management, transport, and data user spheres. Despite widespread agreement on the inherent opportunities and current limitations of big data, a lack of consensus on some important, fundamental questions continues to confuse potential users and stymie progress. These questions include the following

(1) What attributes define big data solutions?; (2) How is big data different from traditional data environments and related applications?; (3) What are the essential characteristics of big data environments?; (4) How do these environments integrate with currently deployed architectures?; (5) What standards are in place to support big data and how does big data affect existing standards?; (6) What are the central scientific, technological, and standardisation challenges that need to be addressed to accelerate the deployment of robust big data solutions? This document is focused on providing at least some portion of the answers to the last two questions.

🔗 CATEGORY Citizen Application-dependent Societal impact, Goals, Big picture, Citizen View, Financial impact

📅 PUBLISHED 2020

🔍 KEYWORDS data logic network

ISO/IEC TR 24028 - Information technology - Artificial Intelligence (AI) - Overview of trustworthiness in Artificial Intelligence

🔗 <https://www.iso.org/standard/77608.html>

This document surveys topics related to trustworthiness in AI systems, including the following (1) approaches to establish trust in AI systems through transparency, explainability, controllability, etc.; (2) engineering pitfalls and typical associated threats and risks to AI systems, along with possible mitigation techniques and methods; and (3) approaches to assess and achieve availability, resiliency, reliability, accuracy, safety, security and privacy of AI systems. The specification of levels of trustworthiness for AI systems is out of the scope of this document.

🔗 CATEGORY Ethics Trustworthiness, Explainability, Transparency, Bias, Accountability

📅 PUBLISHED DTR

🔍 KEYWORDS engineering techniques

ISO/IEC TR 24028:2020 Information technology - Artificial intelligence - Overview of trustworthiness in artificial intelligence

<https://www.iso.org/standard/77608.html>

The goal of this document is to analyse the factors that can impact the trustworthiness of systems providing or using AI, called hereafter artificial intelligence (AI) systems. The document briefly surveys the existing approaches that can support or improve trustworthiness in technical systems and discusses their potential application to AI systems. The document discusses possible approaches to mitigating AI system vulnerabilities that relate to trustworthiness. The document also discusses approaches to improving the trustworthiness of AI systems. This document surveys topics related to trustworthiness in AI systems, including the following approaches to establish trust in AI systems through transparency, explainability, controllability, etc.; engineering pitfalls and typical associated threats and risks to AI systems, along with possible mitigation techniques and methods; and approaches to assess and achieve availability, resiliency, reliability, accuracy, safety, security and privacy of AI systems. The specification of levels of trustworthiness for AI systems is out of the scope of this document.

🔗 CATEGORY Security CyberSec, Privacy, Anonymization, Authentication, Access, Risk Analysis

📅 PUBLISHED WIP

🔑 KEYWORDS artificial intelligence engineering intelligence techniques

ISO/IEC TR 24029-1:2021 Artificial Intelligence (AI) - Assessment of the robustness of neural networks - Part 1: Overview

<https://www.iso.org/standard/77609.html>

When designing an AI system, several properties are often considered desirable, such as robustness, resiliency, reliability, accuracy, safety, security, privacy. A definition of robustness is provided in 3.6. Robustness is a crucial property that poses new challenges in the context of AI systems. For example, in AI systems there are some risks specifically tied to the robustness of AI systems. Understanding these risks is essential for the adoption of AI in many contexts. This document aims at providing an overview of the approaches available to assess these risks, with a particular focus on neural networks, which are heavily used in industry, government and academia. In many organizations, software validation is an essential part of putting software into production. The objective is to ensure various properties including safety and performance of the software used in all parts of the system. In some domains, the software validation and verification process is also an important part of system certification. For example, in the automotive or aeronautic fields, existing standards, such as ISO 26262 or Reference [2], require some specific actions to justify the design, the implementation and the testing of any piece of embedded software. The techniques used in AI systems are also subject to validation. However, common techniques used in AI systems pose new challenges that require specific approaches in order to ensure adequate testing and validation. AI technologies are designed to fulfil various tasks, including interpolation regression, classification and other tasks. While many methods exist for validating non-AI systems, they are not always directly applicable to AI systems, and neural networks in particular. Neural network systems represent a specific challenge as they are both hard to explain and sometimes have unexpected behaviour due to their non-linear nature. As a result, alternative approaches are needed. Methods are categorized into three groups statistical methods, formal methods and empirical methods. This document provides background on these methods to assess the robustness of neural networks. It is noted that characterizing the robustness of neural networks is an open area of research, and there are limitations to both testing and validation approaches.

🔗 CATEGORY Algorithms ML, TransferLearning, Reinforcement and Deep Learning

📅 PUBLISHED WIP

🔑 KEYWORDS classification network neural search techniques

ISO/IEC TR 24030 Information technology - Artificial intelligence (AI) - Use cases

 <https://www.iso.org/standard/77610.html>

This document provides a collection of use cases of Artificial Intelligence (AI) applications in a variety of domains. The current document reflects contributions and discussions by ISO IEC JTC 1 SC 42 WG 4 (Use cases and applications) experts and liaison organizations, and JTC 1 SC 42 national mirror committees. In total 132 AI use cases were submitted between July 2018 and the end of November 2019. Experts from the following national committees and liaison organizations contributed use cases on AI Austria, Canada, China, France, Germany, India, Ireland, Italy, Japan, Korea, Russian Federation, Singapore, United Kingdom, JTC 1 SC 36, and JTC 1 SC 38. In this document, the term use cases means collection of submitted use cases.

 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

 PUBLISHED WIP

ISO/IEC WD 5339 Information Technology - Artificial Intelligence - Guidelines for AI applications

 <https://www.iso.org/standard/81120.html>

Provide a set of guidelines for identifying the context, opportunities, and processes for developing and applying AI Applications. It can be used by ISO, IEC, and JTC1 Technical Committees and Sub-Committees to build on this work in developing standards for AI Applications in their areas of interest. The guidelines provide a macro level view of the AI Application context, the stakeholders and their roles, relationship to the life cycle of the system, and common AI application characteristics. The guidelines will reference but not duplicate or overlap other AI-related standards to build details.

 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

 PUBLISHED WIP

ISO/IEC WD 5392 Information technology - Artificial intelligence - Reference architecture of knowledge engineering

 <https://www.iso.org/standard/81228.html>

This document defines a reference architecture of Knowledge Engineering (KE) in Artificial Intelligence (AI). The reference architecture describes KE roles, activities, constructional layers, components and their relationships among themselves and other systems from systemic user and functional views. This document also provides a common KE vocabulary by defining KE terms.

 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

 PUBLISHED WIP

ISO/IEC WD TS 4213 Information technology - Artificial Intelligence - Assessment of machine learning classification performance

 <https://www.iso.org/standard/79799.html>

This document specifies methodologies for measuring classification performance of machine learning models, systems, and algorithms.

 CATEGORY Data Quality, Usage, Provenance, Checking, Ontologies

 PUBLISHED WIP

F.AI-SCS - Use cases and requirements for speech interaction of intelligent customer service

http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=16381

Under study

📁 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

F.Supp-OCAIB - Overview of convergence of artificial intelligence and blockchain

http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=16631

Under study

📁 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

HSTP.Med-AI-CCTA - Guidelines on development and application of artificial intelligence in coronary computed tomography angiography

http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=16378

Under Study

📁 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

ITU-R 144/6 - Use of Artificial Intelligence (AI) for broadcasting

https://www.itu.int/en/ITU-R/seminars/wrs/2020/Plenary%20Sessions%20%20Presentations/04.%20Study%20Group%20Activities%20-%204%20Dec%202020/P6.%20WRS-20_SG6.pdf

The ITU Radiocommunication Assembly, decides that the following Questions should be studied 1. What are the applications, requirements, and impacts of AI technologies for programme production and how can the effectiveness be increased? 2 What are the applications, requirements, and impacts of AI technologies for quality evaluation and how can the effectiveness be increased? 3 What are the applications, requirements, and impacts of AI technologies for programme assembling and access and how can the effectiveness be increased? 4 What are the applications, requirements, and impacts of AI technologies for broadcast emission and how can the effectiveness be increased? and further decides, 1 that the results of the above studies should be included in Recommendation(s) and Reports; 2 that the above studies should be completed by 2023.


📁 CATEGORY Governance Policy, Regulations, Liability

📅 PUBLISHED 19050711

ITU-T E.475 (ex E.FINAD) - Guidelines for Intelligent Network Analytics and Diagnostics

 <https://www.itu.int/itu-t/aap/AAPRecDetails.aspx?AAPSeqNo=8648>

This Recommendation specifies guidelines for intelligent network analytics and diagnostics for managing and troubleshooting networks. The Intelligent Network Analytics and Diagnostics (INAD) function is responsible for aggregating network data and setting up automatic tasks for network maintenance, providing the assurance of appropriate network performance, locating the service degradation area and service channels with poor performance, finding root causes of the detected network faults, probing network status, and predicting the possible network performance degradation at an early stage. Specifically, this Recommendation describes the design considerations, functional architecture, network anomaly analysis models for network analytics and diagnostics. The network anomaly analysis model can be used to assess network anomaly degree, network performance, risk degree, to analyze the location and time of the network impairment and further to determine the root causes of the network impairments and to allow increased network visibility and network fault management automation.

 CATEGORY Algorithms ML, TransferLearning, Reinforcement and Deep Learning

 PUBLISHED 4Q2019

 KEYWORDS data network

ITU-T E.475 (ex E.FINAD) - Guidelines for Intelligent Network Analytics and Diagnostics

 https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=14037

With the increased number of connected devices and the proliferation of web and multimedia services, cloud services and IoT applications, networks are subject to various network incidents and unregulated network changes which may be measured by network alerts and logs received from the underlying networks. Therefore, it is important for the networks to be aware of the services and applications they transport to optimize the operation and ensure that service quality meets user expectations. The absence of network alerts or network logs is generally interpreted as an indication of good network health, however this is not necessarily the case. Service quality problems may not be the result of network device failures, but instead due to issues that are not detected by traditional network monitoring tools such as configuration errors, insufficient network capacity, wireless access point issues (e.g., insufficient coverage, interference or overlapping channel), or third party network issues. Typically, the manual network reconfiguration is time consuming and often error prone. In addition, service quality assessment methodologies need to further distinguish between network impairments and other causes of the performance degradation by considering application-specific factors (e.g., encoding decoding, interaction between an application and a network) because the traditional assessment tools cannot provide accurate fault diagnosis, fault prediction, and root cause analysis. Furthermore, the reaction time of traditional assessment tools tends to be slow, responding after the service disruption occurs. In addition, the network performance metrics may contribute to QoS/QoE assessment, but many of existing network performance metrics may reflect only limited aspects of the network quality. When the objectively-measured results indicate an unsatisfactory level of network performance or anomaly degree, it is desirable that the system performs necessary corrective actions automatically to resolve the identified quality problems. This Recommendation specifies guidelines for intelligent network analytics and diagnostics for managing and troubleshooting networks. The Intelligent Network Analytics and Diagnostics (INAD) function is responsible for aggregating network data and setting up automatic tasks for network maintenance, providing the assurance of appropriate network performance, locating the service degradation area and service channels with poor performance, finding root causes of the detected network faults, probing network status, and predicting the possible network performance degradation at an early stage. Specifically, this Recommendation describes the design considerations, functional architecture, network anomaly analysis models for network analytics and diagnostics. The network anomaly analysis model can be used to assess network anomaly degree, network performance, risk degree, to analyze the location and time of the network impairment and further to determine the root causes of the network impairments and to allow increased network visibility and network

fault management automation. This Recommendation also presents the concept of Network Health Indicator (NHI) which provides a numerical indication of the network anomaly degree based on Big Data Analytics. The NHI is not focused on specific multimedia application rating (e.g., rating of specific audio application, video conferencing application) and application layer monitoring. Instead, it aims at network monitoring and evaluation of specific networks (e.g., LAN, WAN, Storage Network, Data Centre Network) and further triggers Network Diagnosis using Big Data based fault diagnosis algorithms and determine the root causes of the network anomaly events.

📁 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED 19050712

📖 KEYWORDS data network

ITU-T F.746.11 (ex F.IQAS-INT) - Interfaces for intelligent question answering system

🔗 http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=15015

This Recommendation describes interfaces for Intelligent Question Answering Service Framework [ITU-T F.746.3]. This recommendation defines the interfaces among functional modules to support the intelligent Question Answering service, which provides advanced functions to generate answers for the user's question in a natural language. The scope of this Recommendation is focused on describing interfaces and functional features for natural language processing function, question analysis function, candidate answer generation function, and answer inference generation function of intelligent question answering system.

📁 CATEGORY Protocols interoperability of information exchange and control signalling

📅 PUBLISHED 2020-07

ITU-T F.748.11 (ex F.AI-DLPB) - Metrics and evaluation methods for deep neural network processor benchmark

🔗 http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=15295

This Recommendation provides the benchmarking framework, evaluation metrics and methods, and a guideline of technical testing for deep learning processor while doing training and inference task. The edge computing market, where AI computation is done on the device, is expected to represent more than three-quarters of the total market opportunity, with the balance being in cloud data center environments. Mobile phones will be a major driver of the edge market, and other prominent edge categories include automotive, smart cameras, robots, and drones.

📁 CATEGORY Governance Policy, Regulations, Liability

📅 PUBLISHED 2020-07

📖 KEYWORDS data deep learning

ITU-T F.AI-DLFE - Deep Learning Software Framework Evaluation Methodology

🔗 http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=15296

With great desire in AI applications, Deep Learning Framework provide an easy and fast way for manufacturers to develop their own applications. However, different frameworks show different performance under different scenarios. It is a necessity to formulate a recommendation to evaluate the performance of Deep Learning Frameworks in order to help manufacturers take full advantages of certain framework and avoid disadvantages of others.

📁 CATEGORY Governance Policy, Regulations, Liability

ITU-T F.AI-DMPC - Technical framework for Deep Neural Network model partition and collaborative execution

http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=16634

Under study

🔗 CATEGORY Governance Policy, Regulations, Liability

ITU-T F.AI-FASD - Framework for audio structuralizing based on deep neural network

http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=16636

Under study

🔗 CATEGORY Governance Policy, Regulations, Liability

ITU-T F.AI-ILICSS - Technical Requirements and Evaluation Methods of Intelligent Levels of Intelligent Customer Service System

http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=16639

Under study

🔗 CATEGORY Governance Policy, Regulations, Liability

ITU-T F.AI-MLTF - Technical framework for shared machine learning system

https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=15262

This Recommendation provides the architecture framework, technical requirements and application guidelines for Shared Machine Learning system.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

ITU-T F.AI-RMCDP - Requirements of multimedia composite data preprocessing

http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=16637

Under study

🔗 CATEGORY Governance Policy, Regulations, Liability

ITU-T F.CDN-AINW - Requirements and reference model for CDN services over AI network

https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=16358

Under study

🔗 CATEGORY Governance Policy, Regulations, Liability

ITU-T F.EMO-NN - Emotion enabled multimodal user interface based on artificial neural network

https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=15026

Under study

🔗 CATEGORY Protocols interoperability of information exchange and control signalling

ITU-T F.EMO-NN - Emotion enabled multimodal user interface based on artificial neural network

https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=15026

This Draft Recommendation provides UI functional entities and architecture for emotion enabled multimodal user interface based on artificial neural network. As Emotion technology can give big improvement in HCI (Human Computer Interaction), many companies and researchers have been studying emotion technology. Various applications using multimodality and emotion analysis begin to be introduced these days with artificial intelligence technology. However, current many systems still did not infer human emotion properly yet, because some systems are too dependent to certain source, or too weak for real circumstances. Therefore, the proposed system architecture is for multimodal UI based on emotion analysis with some properties and illustrations data with artificial neural network. The multimedia data is composed of text, speech, and image. And, for the unimodal emotion analysis, these data are pre-processed in each. For example, the text data can be pre-processed by data augmentation, person attributes recognition, topic cluster recognition, document summarization, named entity recognition, sentence splitter, keyword cluster, sentence to graph.

🔗 CATEGORY Governance Policy, Regulations, Liability

📖 KEYWORDS artificial intelligence cluster data intelligence network neural search

ITU-T F.IMCS - Requirements for smart speaker based Intelligent Multimedia Communication System

http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=16633

Under study

🔗 CATEGORY Governance Policy, Regulations, Liability

ITU-T F.SCAI - Requirements for smart class based on artificial intelligence

https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=15294

Under study

📁 CATEGORY Governance Policy, Regulations, Liability

ITU-T F.SCAI - Requirements for smart class based on artificial intelligence

https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=15294

Smart class is designed to improve lecture preparation, enhance interaction between teachers and students and promote teaching quality via educational data analytics and advanced teaching equipment. This document describes application scenarios and requirements for smart class based on artificial intelligence.

📁 CATEGORY Governance Policy, Regulations, Liability

🔍 KEYWORDS artificial intelligence data intelligence

ITU-T F.VS-AIMC - Use cases and requirements for multimedia communication enabled vehicle systems using artificial intelligence

https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=14767

This recommendation specifies use cases and requirements of artificial intelligence for ICT-enabled autonomous vehicle systems. This draft Recommendation covers the followings 1- Use cases to identify the use cases of artificial intelligence applied to the ICT-based autonomous vehicle systems, e.g. situational awareness, route planning, driving behavior decision and human-computer interaction; 2- Requirements to identify the service and network requirements, functional requirements and non-functional requirements of the ICT-based autonomous vehicle systems .

📁 CATEGORY Governance Policy, Regulations, Liability

🔍 KEYWORDS artificial intelligence behavior intelligence network

ITU-T FSTP-ACC-AI - Guideline on the use of AI for ICT accessibility

https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=15037

This technical paper describes the use of AI for ICT accessibility. AI technologies such as automatic speech recognition for captioning are described, with their pros and cons. It also describes some parameters and criteria for objective, quantitative assessment and measurement the quality of service using these technologies.

📁 CATEGORY Governance Policy, Regulations, Liability

ITU-T FSTP-ACC-AI -Technical Paper - Guidelines on the use of AI for ICT accessibility

https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=15037

This document contains the updated draft of FSTP-ACC-AI Guidelines on the use of AI for ICT accessibility as agreed at Q26 16 meeting at Geneva, 19-29 Mar. 2019.

📁 CATEGORY Governance Policy, Regulations, Liability

ITU-T H.841 (04/2017) - Conformance of ITU-T H.810 personal health system: Personal Health Devices interface Part 1: Optimized Exchange Protocol: Personal Health Device

<http://handle.itu.int/11.1002/roadmap/2.1000.13215>

Recommendation ITU-T H.841 provides a test suite structure (TSS) and the test purposes (TP) for personal health devices using the IEEE 11073-20601 optimized exchange protocol in the Personal Health Devices (PHD) interface, based on the requirements defined in the Recommendations of the ITU-T H.810 sub-series, of which Recommendation ITU-T H.810 (2016) is the base Recommendation. The objective of this test specification is to provide a high probability of interoperability at this interface. Recommendation ITU-T H.841 is a transposition of Continua Test Tool DG2016, Test Suite Structure and Test Purposes, Personal Health Devices Interface; Part 1 Optimized Exchange Protocol. Personal Health Device (Version 1.11, 2017-03-14), that was developed by the Personal Connected Health Alliance. A number of versions of this specification existed before transposition. This Recommendation includes an electronic attachment with the protocol implementation conformance statements (PICS) and the protocol implementation extra information for testing (PIXIT) required for the implementation of Annex A.

🔗 CATEGORY Governance Policy, Regulations, Liability

📅 PUBLISHED published

ITU-T H.AI-SaMD-Req - Requirements for artificial intelligence/machine learning (AI/ML)-based software as a medical device (SaMD)

http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=16376

Under study

🔗 CATEGORY Governance Policy, Regulations, Liability

ITU-T H.CUAV-AIF - Framework and requirements for civilian unmanned aerial vehicle flight control using artificial intelligence

https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=14760

This recommendation provides framework and requirements for civilian unmanned aerial vehicle (CUAV) flight control using artificial intelligence. Currently, the CUAV has been widely used in industry and consumption areas, there are also problems in the development of CUAVs. In addition to the policy and legal supervision, the other problem is how CUAVs avoid obstacles during the flight, and how the CUAVs applied in a specific industry can automatically navigate, track or fly along a specific area according to the mission requirements. This draft Recommendation provides a framework of civilian unmanned aerial vehicle flight control using Artificial Intelligence, including the flight navigation control of a CUAV itself (including avoiding obstacles, normal take-off and landing) and the specific flight control (including automatic navigation, tracking, or along a regular direction or specific area) based on the specific industry application requirements. This framework is not a specific implementation case, but it provides a framework and capability requirements for each specific implementation, and the product and system integrators can design and produce specific products and systems according to this framework.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📖 KEYWORDS artificial intelligence intelligence

ITU-T J.1600 - Premium cable network platform - Framework

<https://www.itu.int/itu-t/aap/AAPRecDetails.aspx?AAPSeqNo=8469>

This Recommendation specifies the framework of the Premium Cable Network Platform (PCNP) for the cable TV and broadband network that exploit the cloud based artificial intelligence and network data to optimize the network and TV services, thus enable the high satisfaction of user's experience of perceptual aspects of services.

📁 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED In force

🔍 KEYWORDS artificial intelligence data intelligence network

ITU-T J.1600 - Premium cable network platform Framework

<https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=13977>

Recommendation ITU-T J.1600 specifies the framework of the premium cable network platform (PCNP) for cable TV and broadband network that exploit cloud based artificial intelligence (AI) and network data to optimize network and TV services, thus enabling the high satisfaction of user's experience of perceptual aspects of services.

📁 CATEGORY Governance Policy, Regulations, Liability

📅 PUBLISHED In force

🔍 KEYWORDS artificial intelligence data intelligence network

ITU-T J.pcnp-char - E2E network characteristics requirement for video services

https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=16556

In the big era of information explosion, video is the main carrier of information, and video demand is a global, universal demand. Nowadays, various of videos are now emerging, like 4K, and 8K, augmented reality (AR), virtual reality (VR) and other developments. However, video demand is still far from being satisfied. The satisfaction of video transmission depends highly on the network technology and deployment. Different networks have different network performance or quality. Quality of Service defines the network quality in terms of quantitative network performance parameters named Key performance indicators (KPI). On the other hand, the aim of network operators is to offer a satisfactory Quality of Experience (QoE) level to the end users during the service delivery. Quality of Experience (QoE) defines the quality perceived subjectively by the end users, and to be evaluated by the quantitative parameters named Key Quality Indicators (KQI). Therefore, to provide the guidance for high quality and satisfaction video transmission, it worth studying the KPI and KQI of the network from end to end video service delivery perspective. By such, it can help the market to provide the good quality network thus having the capability to deliver the high quality and immersive experience video service. Besides, those KPI and KQI being the characteristic data of the video transmission network, can be further analysed by the premium cable network platform (PCNP) for a better OAM and network optimization.

📁 CATEGORY Governance Policy, Regulations, Liability

🔍 KEYWORDS data network

ITU-T J.pcnp-smgw - Functional requirements for Smart Home Gateway

<https://www.itu.int/md/T17-SG09-C-0119/en>

In a smart home solution, a smart home gateway is incorporated to connect various smart home

appliances. In addition, an IoT-based connection management platform is required to enable various applications. These applicable solutions include home health, entertainment, security, and home automation, which promotes a safer, happier, and more comfortable and convenient lifestyle. This Recommendation aims to define the functional requirements for a smart home gateway from both hardware and software point of view to ensure secure interoperability among consumers, businesses and industries by delivering a standardised communications platform and allowing devices to communicate cross operating system, service provider, transport technology or ecosystem.

🔗 CATEGORY Governance Policy, Regulations, Liability

ITU-T J.pcnp-smgw - Functional requirements for Smart Home Gateway

🔗 https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=14926

In a Smart Home solution, a smart home gateway is incorporated to connect various smart home appliances, and an IoT connection management platform is required to enable various applications. These applicable solutions include home health, entertainment, security, and home automation, which promotes a safer, happier, and more comfortable and convenient lifestyle. The proposal aims to define the functional requirement and specification for a smart home gateway, from both hardware and software point of views, ensuring secure interoperability for consumers, businesses and industries by delivering a standardised communications platform to allowing devices to communicate cross operating system, service provider, transport technology or ecosystem.

🔗 CATEGORY Governance Policy, Regulations, Liability

ITU-T L.1305 - Data centre infrastructure management system based on big data and artificial intelligence technology

🔗 <https://www.itu.int/itu-t/aap/AAPRecDetails.aspx?AAPSeqNo=8571>

Recommendation ITU-T L.1305 contains technical specifications of data centre infrastructure management (DCIM) system, with the following aspects being covered principles, management objects, management system schemes, data collection function requirements, operational function requirements, energysaving management, capacity management for information and communication technology (ICT) and facilities, other operational function requirements and intelligent controlling on systems to maximize green energy use. Other items such as maintenance function requirements, early alarm and protection based on big data analysis and intelligent controlling on systems to decrease the cost for maintenance are also considered.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED Consented 2019-09

📄 KEYWORDS data

ITU-T L.1305 - Data centre infrastructure management system based on big data and artificial intelligence technology

🔗 https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=14873

This Recommendation contains technical specifications of data centre infrastructure management system (DCIM), following aspects are covered - Principles - management objects - Management system scheme - data collection function requirements - operational function requirements -- Energy saving management -- Capacity management for ICT and facilities -- Other operational Function requirements -- Intelligent controlling on system to maximize the green energy uses. Other items -- maintenance function requirements -- Early Alarm and protection based on the big data analysis -- Intelligent controlling on system to decrease the cost for maintenance are also considered.

📁 CATEGORY Governance Policy, Regulations, Liability

📅 PUBLISHED Consented 2019-09

📄 KEYWORDS data

ITU-T L.5G_sav (under study) - Energy saving technologies and best practices for 5G RAN equipment

🔗 <http://handle.itu.int/11.1002/roadmap/2.1.15123>

Under Study

📁 CATEGORY Governance Policy, Regulations, Liability

ITU-T M.AI-TOM - Framework of AI enhanced Telecom Operation and Management (AITOM)

🔗 <http://handle.itu.int/11.1002/roadmap/2.3.11229>

Recommendation ITU-T M.3080 provides a framework of Artificial Intelligence (AI) enhanced Telecom Operation and Management (AITOM). It describes the functional framework of AITOM to support telecom operation management for efficiency improvement, quality assurance, cost management, and security assurance. It also describes AI pipelines that combines some components to enable AI based applications. This Recommendation also describes the relationship of functional framework of AITOM with smart operations, management and maintenance (SOMM) in M.3041. In the end, general requirements of security are described

📁 CATEGORY Governance Policy, Regulations, Liability

ITU-T M.resm-AI - Requirements for energy saving management of 5G RAN system with AI

🔗 https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=16435

Early draft

📁 CATEGORY Governance Policy, Regulations, Liability

ITU-T P.1130 (06/2015) - Subsystem requirements for automotive speech services

🔗 <http://handle.itu.int/11.1002/roadmap/2.1000.12518>

Recommendation ITU-T P.1130 defines test methodologies for and standard behaviour of subsystems used in automotive speakerphone terminals. The purpose of this Recommendation is to provide guidance on the design and optimization of such subsystems, as well as the diagnostic capabilities needed to give a consistent and high quality of service of the overall speakerphone terminal to the users of such devices. This specification is intended to give guidance to all parties involved in the design and integration of speakerphone terminals. This Recommendation covers both narrowband and wideband systems.

📁 CATEGORY Protocols interoperability of information exchange and control signalling

📅 PUBLISHED published

ITU-T P.565 (ex P.VSQMTF) - Framework for creation and performance testing of machine learning based models for the assessment of transmission network impact on speech quality for mobile packet-switched voice services

<https://www.itu.int/itu-t/aap/AAPRecDetails.aspx?AAPSeqNo=8647>

The output of the framework is a machine learning based speech quality prediction model, which predicts the impact on the speech quality from the IP transport and underlying transport, as well as the jitter buffer in the end client; thus providing a network centric view on the speech quality service delivered on mobile packet switched networks. This is expressed in terms of a MOS-LQO under the assumption of an otherwise clean transmission, without background noise, automatic gain control, voice enhancement devices, transcoding, bridging, frequency response, clock drift or any other impairment not caused by the IP transport and underlying transport. The models according to this framework use information on the temporal structure of the reference signal to identify the importance of individual sections of the bitstream with regard to speech quality. These models do not perform any perceptual analysis of the recorded speech signal. The framework specifies three modules required for the development of these kinds of metrics the databases generator module, the machine learning module, and the validation module for the trained model. In addition, database content and the features used by the machine learning algorithm are described. The framework also provides a large set of test vectors, in the form of error (jitter and packet loss) patterns files for learning and validation. The recommendation specifies minimum required performance, as well as conditions and requirements for an independent additional validation for models developed based on the framework. The recommendation also specifies implementation requirements. The models developed based on the framework enable the assessment of transmission network impact on speech quality for mobile packet-switched voice services, and therefore benefit operators and regulators alike with a fast and easy speech quality trend monitoring benchmarking and troubleshooting. In addition, if predictors according to this framework are used together with perceptual speech quality metrics like P.863, it is possible to identify if the source of problems resides inside or outside the transport network observed by the predictor according to this framework and thus a more detailed analysis of the situation can be achieved and consequently troubleshooting of less obvious degradations such as the ones occurring outside of the transport network (e.g. emerged from automatic gain control, voice enhancement devices, transcoding or analog processing) is enabled.

📁 CATEGORY Governance Policy, Regulations, Liability

📅 PUBLISHED 4Q2019

🔑 KEYWORDS data learning machine network processing

ITU-T P.565 (ex P.VSQMTF) - Framework for creation and performance testing of machine learning based models for the assessment of transmission network impact on speech quality for mobile packet-switched voice services

https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=14353

The output of the framework is a machine learning based speech quality prediction model, which predicts the impact on the speech quality from the IP transport and underlying transport, as well as the jitter buffer in the end client; thus providing a network centric view on the speech quality service delivered on mobile packet switched networks. This is expressed in terms of a MOS-LQO under the assumption of an otherwise clean transmission, without background noise, automatic gain control, voice enhancement devices, transcoding, bridging, frequency response, clock drift or any other impairment not caused by the IP transport and underlying transport. The models according to this framework use information on the temporal structure of the reference signal to identify the importance of individual sections of the bitstream with regard to speech quality. These models do not perform any perceptual analysis of the recorded speech signal. The framework specifies three modules required for the development of these kinds of metrics the databases generator module, the machine learning module, and the validation module for the trained model. In addition, database content and the features used by the machine learning algorithm are described. The framework also provides a large set of test vectors, in the form of error (jitter and packet loss) patterns files for learning and validation. The recommendation specifies minimum

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📁 CATEGORY Governance Policy, Regulations, Liability

📅 PUBLISHED 19050712

🔍 KEYWORDS data learning machine network processing

ITU-T P.MLGuide - Guide for Development of Machine Learning Based Solutions

🌐 https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=15114

The ML topic's imminence grew significantly in the telecom industry lately and mainly due to the fact that 5G networks must heavily rely on machine learning; from the intelligently adaptive RAN to real time network slicing adaptation to seamless context aware QoE service delivery and expected transformation of human's demands and perception. It is becoming impetuous for network operators to use machine learning to cost efficiently operate, control and manage their networks. Therefore, in order to remain relevant to the evolving telecom industry, SG 12 needs to adapt to and adopt case by case basis ML based approaches. ML approaches are to some extent use case specific, and these regard the conditions and assumptions within which ML techniques are applied, such as real time with continuous adaptive learning tuning for non-supervised suited applications (e.g. network quality diagnosis, control and management) or off -line learning for supervised suited applications (e.g. QoE prediction). Regardless of the use case, the following aspects related to topics such as, but not limited to, are addressed in this recommendation guide training learning databases integrity and validity (data cleansing); training and validation data bases split process; machine learning features selection; ML algorithm's accuracy and consequently its suitability for a specific application; ML overfitting underfitting test.

📁 CATEGORY Governance Policy, Regulations, Liability

📅 PUBLISHED 2Q 2020

🔍 KEYWORDS data learning machine network perception supervised techniques

ITU-T P.MLGuide for Development of Machine Learning Based Solutions

🌐 https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=15114

The ML topic's imminence grew significantly in the telecom industry lately and mainly due to the fact that 5G networks must heavily rely on machine learning; from the intelligently adaptive RAN to real time network slicing adaptation to seamless context aware QoE service delivery and expected transformation of human's demands and perception. It is becoming impetuous for network operators to use machine learning to cost efficiently operate, control and manage their networks. Therefore, in order to remain relevant to the evolving telecom industry, SG 12 needs to adapt to and adopt case by case basis ML based approaches. ML approaches are to some extent use case specific, and these regard the conditions and assumptions within which ML techniques are applied, such as real time with continuous adaptive learning tuning for non-supervised suited applications (e.g. network quality diagnosis, control and management) or off -line learning for supervised suited applications (e.g. QoE prediction). Regardless of the use case, the following aspects related to topics such as, but not limited

to, are addressed in this recommendation guide training learning databases integrity and validity (data cleansing); training and validation data bases split process; machine learning features selection; ML algorithm's accuracy and consequently its suitability for a specific application; ML overfitting or underfitting test.

🔗 CATEGORY Algorithms ML, TransferLearning, Reinforcement and Deep Learning

📅 KEYWORDS data learning machine network perception supervised techniques

ITU-T Q.5001 - Signalling requirements and architecture of intelligent edge computing

🔗 <https://www.itu.int/rec/T-REC-Q.5001-201810-I/en>

A large volume of data have been generated from the use of various types of smart things. The related smart services have been working based on cloud systems. However, various issues has occurred as a result of the network bottleneck between terminals and a cloud system (e.g., data loss, network delay, etc.). An edge computing technology between the user equipment and a cloud server system is envisaged to solve these problems. In addition, applying the intelligent data processing functions by providing artificial intelligence (AI) technologies will provide enhanced networking capabilities for new emerging services and applications. Regarding these emerging environments, Recommendation ITU-T Q.5001 defines the intelligent edge computing (IEC). It is applicable to collect, store, and process data reliably in the intelligent edge computing, especially to support mission critical services. Thus, the main functionality of intelligent edge computing is collecting, processing, analysing the data and providing the values based on

intelligent data processing. This Recommendation specifies use cases, signalling requirements and an architecture of intelligent edge computing

🔗 CATEGORY Protocols interoperability of information exchange and control signalling

📅 PUBLISHED Published 2018

📅 KEYWORDS artificial intelligence data network processing

ITU-T Q.5001 - Signalling requirements and architecture of intelligent edge computing

🔗 https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=14276

A large volume of data have been generated from the use of various types of smart things. The related smart services have been working based on cloud systems. However, various issues have occurred as a result of the network bottleneck between terminals and a cloud system (e.g., data loss, network delay, etc.). An edge computing technology between the user equipment and a cloud server system is envisaged to solve these problems. In addition, applying the intelligent data processing functions by providing artificial intelligence (AI) technologies will provide enhanced networking capabilities for new emerging services and applications. Regarding these emerging environments, Recommendation ITU-T Q.5001 defines the intelligent edge computing (IEC). It is applicable to collect, store, and process data reliably in the intelligent edge computing, especially to support mission critical services. Thus, the main functionality of intelligent edge computing is collecting, processing, analysing the data and providing the values based on intelligent data processing. This Recommendation specifies use cases, signalling requirements and an architecture of intelligent edge computing.

🔗 CATEGORY Governance Policy, Regulations, Liability

📅 PUBLISHED Published 2018

📅 KEYWORDS artificial intelligence data intelligence network processing

ITU-T Q.IEC-PRO (under study) - Protocols for microservices based intelligent edge computing

<http://handle.itu.int/11.1002/roadmap/2.1.15048>

Under Study

🔗 CATEGORY Governance Policy, Regulations, Liability

ITU-T Q.IEC-REQ (under study) - Signalling requirement of intelligent edge computing

<http://handle.itu.int/11.1002/roadmap/2.1.14276>

A huge volume of data has been generated from the various smart things. Currently lots of smart services have been working based on cloud systems and services. However, the network bottleneck between terminal and cloud system has incurred various issues such as data lost, network delay, etc. Edge computing technology for the efficient data processing in the network, especially in edge side of network, are recently attracted by network providers to solve these problems. Also, applying the intelligent data processing functions supported by AI technologies in edge network between user equipment and cloud server system will provide enhanced network capabilities for the new emerging services and applications. To support machine type communication services, it will be useful to collect and store data reliably in the cloud, which can be used by emerging services and applications. The main functionality of intelligent edge computing is collecting, processing, analysing the data and providing the values based on intelligent data processing. This Recommendation will specify use cases, signalling requirements and architecture of intelligent edge computing.

🔗 CATEGORY Governance Policy, Regulations, Liability

📄 KEYWORDS data machine network processing

ITU-T Q.IMT2020-PIAS - Protocol for providing intelligent analysis services in IMT-2020 network

<https://www.itu.int/md/T17-SG11-200722-TD-GEN-1402>

This Recommendation specifies architecture for supporting intelligent analysis services in IMT-2020 network, and intelligent analysis services offered by Data Analysis Function (DAF) including load balancing, network functions fault location and advance warning, device on off analysis, mobility analysis ,etc. It includes signalling flows for network functions (NFs) event exposure to DAF and DAF analytics exposure to NFs, message format, and security considerations.

🔗 CATEGORY Protocols interoperability of information exchange and control signalling

ITU-T Q.IMT2020-PIAS - Protocol for providing intelligent analysis services in IMT-2020 network

https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=16387

This recommendation specifies architecture for supporting intelligent analysis services in IMT-2020 network, and intelligent analysis services offered by Data Analysis Function (DAF) including load balancing, network functions fault location and advance warning, device on off analysis, mobility analysis ,etc. It includes signalling flows for network functions (NFs) event exposure to DAF and DAF analytics exposure to NFs, message format, and security considerations. Data analysis function (DAF) is defined in ITU-T Q.INS-PM, and DAF introduced in IMT-2020 network [ITU-T Y.3104] can provide intelligent analysis services. Intelligent analysis services offered by DAF include load balancing, NF fault location and warning, device on off analysis, mobility analysis, energy saving, etc. It is necessary to enable network automation and intelligence.

🔗 CATEGORY Governance Policy, Regulations, Liability

📖 KEYWORDS intelligence network

[ITU-T Q.INS-PM - Protocol for managing Intelligent Network Slicing with AI-assisted analysis in IMT-2020 network](#)

🔗 <http://handle.itu.int/11.1002/roadmap/2.1.15152>

The Draft Recommendation describes APIs, API management, message format and procedures related of intelligent network slice with AI-assisted in IMT-2020 networks.

🔗 CATEGORY Protocols interoperability of information exchange and control signalling

📖 KEYWORDS network

[ITU-T Q.INS-PM - Protocol for managing Intelligent Network Slicing with AI-assisted analysis in IMT-2020 network](#)

🔗 https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=15152

This recommendation specifies APIs, API management, message format and procedures related of intelligent network slice with AI-assisted in IMT-2020 networks. Intelligent network slicing with AI-assisted functions is capable of allocating limited resources to meet the SLA of slicing users in real time dynamically. It is necessary to develop an intelligent network slicing API framework which makes the IMT-2020 network more efficient and flexible. The framework includes common aspects and some functional APIs which provide AI-assisted functions.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📖 KEYWORDS network

[ITU-T Q.VoLTE-SAO-FP - Framework and protocols for signalling network analyses and optimization in VoLTE](#)

🔗 https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=16385

This draft Recommendation defines the framework of signalling network analyses and optimization for VoLTE network, specifies the interfaces and protocols between signalling network analyses and optimization system and VoLTE network, specifies the service procedures of signalling network analyses and optimization, and specifies the AI-assisted functions and security issues of the proposed system. The proposed signalling network analyses and optimization system is a network management system with the characteristics of high efficiency, real time reaction, reliability and intelligence, designed for VoLTE network.

🔗 CATEGORY Protocols interoperability of information exchange and control signalling

KEYWORDS intelligence network

[ITU-T SG9 Recommendation J.1302 \(ex J.CBCMS.part2\) v2 Specification of cloud-based converged media service to support Internet protocol and broadcast cable television](#)

🔗 <https://www.itu.int/itu-t/j.1302>

In a high level architecture of the Cloud-Based Converged Media Service to support IP and Broadcast Cable TV, we define an ability layer which include AI Applications. The data driven application and AI Capability provides support for the intelligitization of the broadcast and converged media service

cloud, including streaming AI applications and Batch AI Applications. Streaming AI Applications include Real time AI applications based on real time algorithms using tools such as Spark Streaming, Flint of Storm, which are used mainly for operational management, such as video quality monitoring, data log analysis and fault alarming. Batch AI Applications include Non-real time Batch Application based on non-real time AI algorithms using tools such as Spark. Mainly used for personalized applications, service security, business analysis and so on. For example, data-driven advertising, program recommendation, UI personalization, anti-piracy, business analysis, video content analysis, user behavior analysis, and so on.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 KEYWORDS behavior data

ITU-T TR.cs-ml - Technical Report: Countering spam based on machine learning

🔗 https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=15246

The purpose of this work item is to define a technical framework for countering spam based on machine learning. It may help some relevant persons and companies in spam management, reduce the benefit loss of users and providers, improve user experience and promote the healthy development of telecommunication business. This technical report provides some general scenarios, characteristics of spam, and define general technical framework, work flows, to help some companies and users to counter spam.

🔗 CATEGORY Governance Policy, Regulations, Liability

📅 PUBLISHED 3Q 2020

📅 KEYWORDS learning machine

ITU-T TR-ML - Technical Report on Machine Learning

🔗 https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=14675

Discontinued

🔗 CATEGORY Governance Policy, Regulations, Liability

📅 PUBLISHED 2Q 2020

ITU-T X.1525 (04/2015) - Common weakness scoring system

🔗 <http://handle.itu.int/11.1002/roadmap/2.1000.12357>

Recommendation ITU-T X.1525 on the common weakness scoring system (CWSS) provides an open framework for communicating the characteristics and impact of information and communication technologies (ICT) weaknesses during development of software capabilities. The goal of this Recommendation is to enable ICT software developers, managers, testers, security vendors and service suppliers, buyers, application vendors and researchers to speak from a common language of scoring ICT weaknesses that could manifest as vulnerabilities when the software is used.

🔗 CATEGORY Security CyberSec, Privacy, Anonymization, Authentication, Access, Risk Analysis

📅 PUBLISHED published

📅 KEYWORDS language search

ITU-T Y.2701 (04/2007) - Security requirements for NGN release 1

<http://handle.itu.int/11.1002/roadmap/2.1000.8899>

ITU-T Recommendation Y.2701 provides security requirements for next generation networks (NGNs) and its interfaces (e.g., UNIs, NNIs and ANIs) by applying ITU-T Rec. X.805, Security architecture for systems providing end-to-end communications to ITU-T Recs Y.2201, NGN release 1 requirements and Y.2012, Functional requirements and architecture of the NGN release 1. The requirements are to provide network-based security of end user communications across multiple-network administrative domains. Security of customer assets and information in the customer domain (e.g., user network), and the use of peer-to-peer application capabilities on customer equipment are not within the scope of this Recommendation. This Recommendation uses trust model based on network elements (physical boxes). NGN providers will be deploying network elements that support the functional entities defined in ITU-T Rec. Y.2012. The bundling of these functional entities to a given network element will vary, depending on the vendor. Therefore, this Recommendation will not attempt to show a strict and fixed bundling between logical functional entities and physical network elements. The requirements in this Recommendation should be treated as a minimum set of security requirements, and NGN providers are encouraged to take additional measures beyond those specified in Recommendations for NGN security.

🔗 CATEGORY Security CyberSec, Privacy, Anonymization, Authentication, Access, Risk Analysis

📅 PUBLISHED published

🔖 KEYWORDS logic network

ITU-T Y.2702 (09/2008) - Authentication and authorization requirements for NGN release 1

<http://handle.itu.int/11.1002/roadmap/2.1000.9359>

Recommendation ITU-T Y.2702 specifies authentication and authorization requirements for next generation networks (NGNs).

🔗 CATEGORY Governance Policy, Regulations, Liability

📅 PUBLISHED published

🔖 KEYWORDS network

ITU-T Y.3170 - Requirements for machine learning-based quality of service assurance for the IMT-2020 network

https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=14278

This recommendation specifies requirements of machine learning based QoS assurance for the international mobile telecommunications 2020 (IMT-2020) network. This recommendation provides an overview of machine learning based QoS assurance for IMT-2020 network. It describes capabilities for QoS anomaly detection and prediction using machine learning. In addition, recommendation describes a functional model of machine learning based QoS assurance which includes functional components such as QoS data collection, data pre-processing, data storage, modelling and training, QoS anomaly detection and prediction, QoS policy decision making, enforcement and reporting. Based on the capabilities and functionalities described in the functional model, this recommendation specifies the high-level requirements and functional requirements of machine learning based QoS assurance for IMT-2020 network.

🔗 CATEGORY Governance Policy, Regulations, Liability

📅 PUBLISHED 19050710

🔖 KEYWORDS data learning machine network processing

ITU-T Y.3172 - Architectural framework for machine learning in future networks including IMT-2020

https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=15020

This document specifies an architectural framework for machine learning (ML) in future networks including IMT-2020. A set of architectural requirements and specific architectural components needed to satisfy these requirements are presented. These components include, but are not limited to, ML pipeline and ML management and orchestration functionalities. The integration of such components into future networks including IMT-2020 and guidelines for applying this architectural framework in a variety of technology-specific underlying networks are also described.

🔗 CATEGORY Governance Policy, Regulations, Liability

📅 PUBLISHED 20190601

🔍 KEYWORDS learning machine network

ITU-T Y.bDDN-MLMec - Mechanisms of machine learning for big data driven networking

https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=15183

This Recommendation specifies the mechanisms of machine learning for big data driven networking, its scope includes the following aspects o studying the procedures of machine learning applied in bDDN; o studying the general machine learning approach for bDDN; o studying the interfaces related to machine learning for bDDN; o studying the learning and control path based on machine learning for bDDN; o studying other aspects related to machine learning for bDDN.

🔗 CATEGORY Governance Policy, Regulations, Liability

🔍 KEYWORDS data learning machine network

ITU-T Y.IMT2020-NSAA-reqts - Requirements for network slicing with AI-assisted analysis in IMT-2020 networks

https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=15061

Based on the future operation and maintenance management of network slicing and the purpose of satisfying users SLA requirements, the objective of this document is to describe the requirements, architecture and function design of network slicing based on intelligent network analysis.

🔗 CATEGORY Governance Policy, Regulations, Liability

📅 PUBLISHED 2020-7

🔍 KEYWORDS network

ITU-T Y.MecTa-ML - Mechanism of traffic awareness for application-descriptor-agnostic traffic based on machine learning

https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=14619

Application-descriptor-agnostic traffic is the traffic which cannot be identified by an application descriptor. On the one hand, traditional traffic awareness technologies such as deep packet inspection are not highly effective when they are applied to application-descriptor-agnostic traffic. On the other hand, with development of the artificial intelligence, many related technologies are emerging and applied in various areas. Compared to traditional traffic methods, traffic awareness method combining with machine learning based technologies will be more effective when it is used to process other application-descriptor-agnostic. Therefore, it is time to study mechanism and methods to implement application-descriptor-

agnostic traffic awareness functions based on machine learning. This Recommendation specifies the mechanism of traffic awareness for application-descriptor-agnostic traffic based on machine learning.

🔗 CATEGORY Governance Policy, Regulations, Liability

📅 KEYWORDS artificial intelligence deep learning machine

ITU-T Y.MLaaS-reqts - Cloud computing- functional requirements for machine learning as a service

🔗 https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=14484

This Recommendation provides cloud computing requirements for machine learning as a service, which addresses requirements from use cases. Machine learning as a service (MLaaS) is a cloud service category to support the development and applications of machine learning in the cloud computing environments. On the perspective of cloud computing service provisioning, this Recommendation defines the functional requirements for MLaaS to identify functionalities such as data gathering, machine learning modelling and computing resources, etc. Also, this draft Recommendation aligned with the cloud computing reference architecture of ITU-T Y.3502. Developments of machine learning algorithms and methodology are out of the scope on this Recommendation.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED 19050712

📅 KEYWORDS data learning machine

ITU-T Y.ML-IMT2020-Data-Handling - Mechanism of traffic awareness for application-descriptor-agnostic traffic based on machine learning

🔗 https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=15177

A framework of data handling to enable machine learning in future networks including IMT 2020 is described in this document. The requirements for ML data collection and ML processing mechanisms in various usage scenarios for ML in future networks are identified along with the requirements of corresponding targets for ML output in the network. Based on this, a generic framework of data handling and examples of its realisation on specific underlying networks are described.

🔗 CATEGORY Governance Policy, Regulations, Liability

📅 PUBLISHED 4Q 2019

📅 KEYWORDS data learning machine network processing

ITU-T Y.qos-ml-arc - Architecture of machine learning based QoS assurance for IMT-2020 network

🔗 <https://www.itu.int/md/T17-SG13-181102-TD-WP1-0276/en>

This recommendation specifies architecture of machine learning based QoS assurance for the international mobile telecommunications 2020 (IMT-2020) network. It provides an overview of unified architecture for ML in 5G and future networks. In addition, it describes the architecture of machine learning based QoS assurance. Based on the architecture, this recommendation specifies the procedures of machine learning based QoS assurance for IMT-2020 network.

🔗 CATEGORY Governance Policy, Regulations, Liability

📅 PUBLISHED 4Q 2019

📅 KEYWORDS learning machine network

ITU-T Y.SSC-AISE-arc - Reference architecture of artificial intelligence service exposure for smart sustainable cities

<https://www.itu.int/md/T17-SG20-200706-TD-GEN-1779>

This Recommendation introduces artificial intelligence service exposure (AISE) for smart sustainable cities (SSC), and provides the common characteristics and high-level requirements, reference architecture and relevant common capabilities of AISE. AISE is one of the basic supporting functional entities for smart sustainable cities, with which SSC services can use uniform reference points (exposed by AISE) to integrate and access the AI capabilities of AI services (e.g., machine learning services for image recognition, natural language processing services, traffic prediction services etc.). In addition, AISE can collect and open SSC data, and it supports AI services to train and perform AI capabilities in AISE in SSCs.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED 4Q 2019

ITU-T Y.SSC-AISE-arc - Reference architecture of artificial intelligence service exposure for smart sustainable cities

https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=14503

This recommendation introduces the artificial intelligence service exposure (AISE) for smart sustainable cities (SSC), analyses common characteristics and high-level requirements of AISE, brings a reference architecture of AISE and relevant common capabilities. The AISE is one of the bases, supporting functional entities for smart sustainable cities, with which the SSC services can use the uniform interfaces (exposed by the AISE) to integrate and access the AI capabilities (functionalities) of AI services (e.g., machine learning services for video audio picture recognition, natural language processing services, traffic prediction services etc.). The AISE can leverage the AI capabilities developed and exposed by AI service providers for SSC services, and can support the SSC service providers to integrate and access the exposed AI capabilities. The AISE can provide security and privacy mechanism on the SSC data. The AISE can support the AI service providers to design and train AI capabilities with local SSC data on AISE in SSCs, and can support the SSC services to integrate and access AI capabilities.

🔗 CATEGORY Protocols interoperability of information exchange and control signalling

📅 PUBLISHED 4Q 2019

🔑 KEYWORDS artificial intelligence data intelligence language learning machine natural processing

ITU-T Y.Sup.AI4IoT - Unlocking Internet of things with artificial intelligence

<https://www.itu.int/md/T17-SG20-C-0760>

The present Supplement examines how artificial intelligence could step in to as the saviour and bolster the intent of urban stakeholders to deploy IoT technologies and eventually transition to smart cities.

The main elements examined in this Supplement are (a) The various technological implementations of AI which may facilitate smart city transformations; (b) The role played by AI in managing the data generated within the IoT realm and urban spaces; (c) The main benefits of adopting AI and delving into how this technology could be leveraged to attain the Sustainable Development Goals (SDGs).

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED 4Q 2019

ITU-T Y.Sup.AI4IoT - Unlocking Internet of things with artificial intelligence

https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=14103

As the IoT system seeks to spread within the urban realm in keeping with smart and sustainable city aspirations, the need to manage the burgeoning big data and establishing a self-sustaining urban ecosystem is at the fore-front. Accordingly, this Technical Report examines how artificial intelligence could step in as the saviour and bolster the intent of urban stakeholders to deploy IoT technologies and eventually transition to smart cities. This Technical Report includes 1- The various technologies from AI which will help cater to urbanization and facilitate smart city transformations; 2- The role played by AI in managing the data generated within the IoT realm; 3- The main benefits of adopting AI and delving into how this technology could be leveraged to attain the targets stipulated in the recently established Sustainable Development Goals (SDGs).

📁 CATEGORY Protocols interoperability of information exchange and control signalling

📅 PUBLISHED 4Q 2019

🔍 KEYWORDS artificial intelligence data intelligence

ITU-T Y.Suppl to Y.317X series - Machine learning in future networks including IMT-2020: use cases

https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=15175

This Supplement describes the use cases of Machine Learning in future networks including IMT-2020. For each use case description, along with the benefits of the use case, the most relevant possible requirements related to the use case are provided. Classification of the use cases into categories is also provided.

📁 CATEGORY Governance Policy, Regulations, Liability

📅 PUBLISHED 4Q 2019

🔍 KEYWORDS network

M.AI-TOM - Framework of AI enhanced Telecom Operation and Management (AITOM)

https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=16432

This Recommendation provides framework of Artificial Intelligence (AI) enhanced Telecom Operation and Management (AITOM). It describes functional architecture of AITOM to support telecom operation management for efficiency improvement, quality assurance, cost management, and security assurance. It also describes AI pipeline and information model on how to enable AITOM using AI technology.

📁 CATEGORY Governance Policy, Regulations, Liability

📅 PUBLISHED 19050712

M.resm-AI - Requirements for energy saving management of 5G RAN system with AI

https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=16435

This draft Recommendation provides requirements for energy saving management of 5G RAN system with AI. This draft targets for proving requirement of energy saving management for communication units and virtualized hardware resources of base station via OMC and open interfaces provided

by vendors, from OSS perspective. As a necessary technology, AI is applied to the energy saving management of 5G RAN system across vendors and communication systems, such as 4G and 5G. In addition, this draft Recommendation includes sending intelligent energy saving strategies from OSS to OMC and then to wireless equipment.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

Report ITU-R BT.2447 - Artificial intelligence systems for programme production and exchange

🔗 https://www.itu.int/dms_pub/itu-r/opb/rep/R-REP-BT.2447-2019-PDF-E.pdf

New broadcasting technologies driven by artificial intelligence (AI) are being introduced to the broadcasting workflow. These technologies intend to increase productivity, efficiency and creative opportunities during programme production, and to convey information to viewers quickly, accurately and automatically. This Report discusses current applications and efforts underway and evaluated that are relevant to the nearterm broadcast programme and production pathway. Relevant applications and efforts are categorized into the following topical descriptions for areas of technological benefit Workflow Optimization, Bandwidth Optimization, Automated Content Creation, Content Creation from Legacy Archives, Content Selection for Targeting Audience Demographics, Optimization of Asset Selection - Metadata Creation, Dynamic Product Placement and Advertising for Broadcast and Content Personalization.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED 19050711

🔑 KEYWORDS artificial intelligence data intelligence logic

Y.IMT2020-AIICDN-arch - AI integrated cross-domain network architecture for future networks including IMT-2020

🔗 https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=16347

This Recommendation specifies the design principles and architecture of AI (including machine learning) integrated cross-domain network for future networks including IMT-2020.

🔗 CATEGORY Protocols interoperability of information exchange and control signalling

🔑 KEYWORDS learning machine network

Y.ML-IMT2020-MP - ML marketplace integration in future networks including IMT-2020

🔗 https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=16345

This Recommendation provides the architecture for integration of ML marketplace in future networks including IMT-2020. The scope of this Recommendation includes (a) Challenges and motivations for ML marketplace integration, (b) High level requirements of ML marketplace integration, (c) Architecture for integration of ML marketplace in networks.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED 2Q 2020

🔑 KEYWORDS network

Y.ML-IMT2020-NA-RAFR - Architecture framework of AI-based network automation for resource adaptation and failure recovery for future networks including IMT-2020

https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=16343

This draft Recommendation specifies an architecture framework of artificial intelligence (AI)-based network automation for resource adaptation, failure detection and recovery for the purpose of improving network efficiency and maintaining QoS by continuously monitoring the network and promptly deciding about appropriate actions for resource adaptation and failure recovery with the help of AI including machine learning.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED 2020-Q2

🔖 KEYWORDS artificial intelligence intelligence learning machine network

■ WEF

WEF Whitepaper on Responsible Limits on Facial Recognition Use Case: Flow Management. Part II Pilot phase: Self assessment, the audit management system and certification

http://www3.weforum.org/docs/WEF_Responsible_Limits_on_Facial_Recognition_2020.pdf

In April 2019, the World Economic Forum Centre for the Fourth Industrial Revolution launched the Responsible Limits on Facial Recognition project. It seeks to address the need for a set of concrete guidelines to ensure the trustworthy and safe use of this technology through the design of a robust governance framework. To achieve this goal, the Forum is spearheading a multistakeholder, evidence-based policy project with France and Japan, which have recently joined the initiative, as anchor partners. After careful consideration, the working group members decided to focus on flow management (using facial features as a means to access a service) primarily because this use case is likely to develop in


the coming years. For instance, the organizers of the Tokyo Olympic Games announced the use of facial recognition to manage athlete and staff access to stadia and Olympic facilities. Also, airports and airline companies have started using this technology.

🔗 CATEGORY LifeCycle Management Certification, Deployment, Operations, Testing and KPIs, Quality Management


📅 PUBLISHED 12 2020

🔖 KEYWORDS biometrics


W3C WML Web Neural Network API

 <https://webmachinelearning.github.io/webnn/>

This document describes a dedicated low-level API for neural network inference hardware acceleration. This specification was published by the Web Machine Learning Community Group. It is not a W3C Standard nor is it on the W3C Standards Track. Please note that under the W3C Community Contributor License Agreement (CLA) there is a limited opt-out and other conditions apply.

 CATEGORY Protocols: interoperability of information exchange and control signalling

 PUBLISHED Draft 13.05.2021


 KEYWORDS neural network machine learning

EC COM(2021) 205 Coordinated Plan on Artificial Intelligence - April 2021

 <https://digital-strategy.ec.europa.eu/en/library/coordinated-plan-artificial-intelligence-2021-review>

This document is a Review of the 2018 Coordinated Plan on AI and represents a joint commitment by the European Commission and Member States to work together to maximise Europe's potential to compete globally. It lays the ground for cooperation, defined areas for investments and encourages Member States to develop national strategic visions on AI. The processes and the public debates, in Member States, the EU and globally, triggered by the 2018 Coordinated Plan, indicate that it was an essential first step to define a common direction and objectives for a European policy on AI.

 CATEGORY Citizen: Application-dependent Societal impact, Goals, Big picture, Citizen View, Financial impact

 PUBLISHED April 2021

 KEYWORDS policy planning

■ 5.4 Country Specific Contributions

■ China

Proprietary

[Framework of China AI Standards and AI Standards List of China.](#)

Reports of SESEC, sent only by email to ETSI stakeholders on 10.08.2020 10:19

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

[Translation: Excerpts from China's White Paper on Artificial Intelligence Standardisation. Published online 24th January 2018.](#)

🔗 <https://www.newamerica.org/cybersecurity-initiative/digichina/blog/translation-excerpts-chinas-white-paper-artificial-intelligence-standardisation/>

This translation by Jeffrey Ding, edited by Paul Triolo, covers some of the most interesting parts of the Standards Administration of China's 2018 White Paper on Artificial Intelligence Standardisation, a joint effort by more than 30 academic and industry organizations overseen by the Chinese Electronics Standards Institute. Ding, Triolo, and Samm Sacks describe the importance of this white paper and other Chinese government efforts to influence global AI development and policy formulation in their companion piece, Chinese Interests Take a Big Seat at the AI Governance Table. -Ed.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED 20180124

■ Germany

DIN/DKE

[German Standardisation Roadmap AI, November 2020](#)

🔗 <https://www.dke.de/resource/blob/2008048/14ebd34ae33117f1b6a35a5c03a2aa9e/nr-ki-english---download-data.pdf>

This is an ongoing document that needs to be regularly updated to reflect the enormously dynamic development of AI technologies and their rapidly expanding fields of application. Although all previously published standards and specifications in the field of AI are documented and the numerous ongoing standardisation activities are shown in the Roadmap, many white spots on the AI standardisation map have been identified which need to be filled in the next version. The Roadmap was drawn up in seven working groups which developed important questions and recommendations for action on ethics, quality conformity assessment certification and IT security as horizontal topics,

in addition to the basic principles and the three AI application fields of particular importance for Germany - industrial automation, mobility logistics and medicine.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

■ Japan

AIST

[AIST ML quality management guidelines \(Japanese only\)](#)

🔗 <https://www.cpsec.aist.go.jp/achievements/aiqm/>

CPSEC and the Artificial Intelligence Research Center (AIRC) will jointly publish the Machine Learning Quality Management Guidelines that systematically summarizes quality management in the design and development of AI systems.

This guideline deals with quality management throughout the life cycle of AI systems using machine learning, and systematically summarizes the necessary efforts and inspection items to meet the quality requirements required for service provision of AI systems. .. In particular, by setting standards and achievement goals regarding the quality of software components (machine learning elements) implemented by machine learning included in the system, the quality of the system using AI built by the company can be measured and improved. The purpose is to help reduce accidents and economic losses caused by misjudgment of AI.

🔗 CATEGORY Governance Policy, Regulations, Liability

📄 KEYWORDS learning machine search

IMI

[Guides to improve data interoperability v.2 March 2021 \(Japanese only\)](#)

🔗 <https://www.ipa.go.jp/files/000089479.zip>

Improving data interoperability is essential for data, a social asset, to be safely and timely available to more people, systems, and devices - that is, searchable, locationable, and accessible. This guide is related to procedures and data representation, such as data asset maintenance methods, data linkage mechanisms, and how to incorporate technical standards when performing data linkage, with data interoperability as the starting point. Introducing technical standards international standards. In addition, we will introduce examples of ideas for eliminating data recognition discrepancies that occur in advancing data linkage and points of success. Many examples of efforts to improve data interoperability in Japan and overseas are also included in a separate volume.

🔗 CATEGORY Data Quality, Usage, Provenance, Checking, Ontologies

📅 PUBLISHED 20200327

METI

METI Contract Guidelines on Utilization of AI and Data

<https://www.meti.go.jp/press/2019/04/20190404001/20190404001-1.pdf>

Data contracts have not been broadly executed in general and contractual practices have not been accumulated enough yet. Therefore, data contracts are likely to cause various problems when they are executed in the future. These Guidelines (Data Section) aim to, with respect to data contracts which have such characteristics as above and for which there is no standard form established, reduce transaction costs and diffuse data contracts in order to consequently promote the effective use of data by presenting major issues and questions for each type of contract and by providing examples of contractual terms that are easily accessible to the public and factors to be considered when preparing such terms.

📁 CATEGORY Governance Policy, Regulations, Liability

📄 KEYWORDS data

NEDO

Artificial Intelligence Technology Strategy. Report of Strategic Council for AI Technology, Japan. Published 31st March 2017.

<https://web.archive.org/web/20190209172241/https://www.nedo.go.jp/content/100865202.pdf>

As a result of promotion of machine learning, starting with deep learning, advancement of accumulation of enormous amounts of data on the Internet, acceleration of communication speed due to broadband, and the popularization of compact, high-performance computers such as smartphones, research and development of artificial intelligence (AI) technology has progressed. Domains in which AI can be used and applied have also expanded, and a social change known as the “Fourth Industrial Revolution” is beginning. The AI technology that is currently progressing is specialized AI technology for carrying out specialized tasks, and is used only to supplement human capabilities. Based on the progression of AI technology, various inferences have become possible from past data, image recognition, language recognition, etc. By using and applying AI technology as a service based on data, the capabilities of human beings are drawn out to the fullest extent, human society has become abundant, including sustainability of society and approaches to social issues such as environmental problems, and economic and industrial benefits are yielded.

📁 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED 20170331

United Kingdom

Artificial Intelligence and Public Standards: report, Committee on Standards in Public Life, Chair, Lord Evans of Weardale KCB DL (10 February 2020).

https://papers.ssrn.com/sol3/Data_Integrity_Notice.cfm?abid=3544871

The Committee on Standards in Public Life has recently published (February 2020) a review on Artificial Intelligence and Public Standards. Chaired by Lord Evans of Weardale KCB DL, the report takes a thorough look at the use of AI in public service through the framework of the Nolan Principles (Selflessness, Integrity, Objectivity, Accountability, Openness, Honesty, and Leadership). This position paper briefly comments upon and analyses selections from the publication by surveying the recommendations.

🔗 CATEGORY Citizen Application-dependent Societal impact, Goals, Big picture, Citizen View, Financial impact

📅 PUBLISHED 20200211

USA

Proprietary

American Artificial Intelligence Initiative G46 year one annual report, Published 25th February 2020.

https://iapp.org/media/pdf/resource_center/US_AI_Initiative_year_one_annual_report_white_house.pdf

The American AI Initiative focuses the resources of the Federal Government to support AI innovation that will increase prosperity, enhance national security, and improve quality of life for the American people. Since the signing of the Executive Order, the United States has made significant progress on achieving the objectives of this national strategy. This document provides both a summary of progress and a continued long-term vision for the American AI Initiative.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED 20200225

USA February 2019 Executive Order on Maintaining American Leadership on Artificial Intelligence (EO 13859).

<https://www.whitehouse.gov/presidential-actions/executive-order-maintaining-american-leadership-artificial-intelligence/>

On February 11, 2019, President Donald J. Trump launched the American Artificial Intelligence Initiative, the Nation's strategy for promoting American leadership in AI, by signing Executive Order 13859. The American AI Initiative focuses the resources of the Federal Government to support AI innovation that will increase prosperity, enhance national security, and improve quality of life for the American people. Since the signing of the Executive Order, the United States has made significant progress on achieving the objectives of this national strategy. This document provides both a summary of progress and a continued long-term vision for the American AI Initiative.

DoD

AI Principles: Recommendations on the Ethical Use of Artificial Intelligence by the Department of Defense. Published October 2019.

🔗 https://media.defense.gov/2019/Oct/31/2002204458/-1/-1/0/DIB_AI_PRINCIPLES_PRIMARY_DOCUMENT.PDF

The leadership of the Department of Defense (DoD) tasked the Defense Innovation Board (DIB) with proposing Artificial Intelligence (AI) Ethics Principles for DoD for the design, development, and deployment of AI for both combat and non-combat purposes. Building upon the foundation of DoD's existing ethical, legal, and policy frameworks and responsive to the complexities of the rapidly evolving field of AI, the Board sought to develop principles consistent with the Department's mission to deter war and ensure the country's security. This document summarizes the DIB's project and includes a brief background; an outline of enduring DoD ethics principles that transcend AI; a set of proposed AI Ethics Principles; and a set of recommendations to facilitate the Department's adoption of these principles and advance the wider aim of promoting AI safety, security, and robustness. The DIB's complete report includes detailed explanations and addresses the wider historical, policy, and theoretical context for these recommendations. It is available at innovation.defense.gov ai

🔗 CATEGORY Ethics Trustworthiness, Explainability, Transparency, Bias, Accountability

📅 PUBLISHED 20191001

NIST

Comments Received for RFI about Federal Engagement in Artificial Intelligence Standards

🔗 <https://www.nist.gov/topics/artificial-intelligence/comments-received-rfi-about-federal-engagement-artificial>

Comments Received in Response To Request for Information about Federal Engagement in Artificial Intelligence Standards

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

NIST Resource Page on AI

🔗 <https://www.nist.gov/topics/artificial-intelligence/ai-standards>

NIST has released a plan for prioritizing federal agency engagement in the development of standards for artificial intelligence (AI) per the February 2019 Executive Order on Maintaining American Leadership on Artificial Intelligence (EO 13859). The plan recommends the federal government commit to deeper, consistent, long-term engagement in AI standards development activities to help the United States to speed the pace of reliable, robust, and trustworthy AI technology development.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📄 KEYWORDS artificial intelligence deep intelligence

5.5 Relevant Contributions From Other Organisations

■ Big Data Value Association (BDVA)

Strategic Research, Innovation and Deployment Agenda for an AI PPP: A focal point for collaboration on Artificial Intelligence, Data and Robotics. Second Consultation Release

 <https://www.bdva.eu/sites/default/files/AI%20PPP%20SRIDA-Second%20Consultation%20Release-September%202019%20-%20Online%20version.pdf>

AI will only be successful for us if there is a specific market for its solutions. And there will only be such a market if we create AI

applications that benefit customers and society. Only then will customers be willing to pay for the benefits provided by AI, and only then will society embrace AI. This is something we can achieve by following - and fulfilling - the recommendations made by the HLEG to cultivate trust in AI and make it easily explainable, the latter being essential for the former. Furthermore, AI-related activities should be measurable to ensure that AI performance is related to the objectives pursued by businesses and customers. Our mission must therefore be to increase and demonstrate the value of AI to customers and society in Europe and around the world. Europe, with its industry knowledge in specialized fields, has an important competitive advantage that must now be exploited in the market.

 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

 PUBLISHED 20190916

 KEYWORDS knowledge

■ G20

G20 Ministerial Statement on Trade and Digital Economy

 <https://www.mofa.go.jp/files/000486596.pdf>

This Meeting, which gathered both Trade Ministers and Digital Economy Ministers together for the first time, presented an opportunity to deepen our understanding of the interface between trade and the digital economy. We discussed how we can work together toward the realization of a sustainable and innovative global society, by making full use of digital technologies, together with trade and investment, and harnessing the benefits of technological transformation and globalization, taking into consideration national needs, priorities and circumstances.

 CATEGORY Citizen Application-dependent Societal impact, Goals, Big picture, Citizen View, Financial impact

 PUBLISHED 20190609

 KEYWORDS deep logic

■ Khronos

[NNEF 1.0 - Neural Network Exchange Format \(NNEF\)](https://www.khronos.org/nnef#:~:text=NNEF%20reduces%20machine%20learning%20deployment,range%20of%20devices%20and%20platforms)

<https://www.khronos.org/nnef#:~:text=NNEF%20reduces%20machine%20learning%20deployment,range%20of%20devices%20and%20platforms>

NNEF is a data format for exchanging information about (trained) neural networks. Exchanging such information in a standardised format has become inevitable with the spreading of deep learning, as neural networks found their way from academic research to real-world industrial applications. With the proliferation of open-source deep learning frameworks and hardware support emerging for the acceleration of neural networks, the field faces the problem of fragmentation, as different accelerators are compatible with different frameworks. The goal of NNEF is to provide a standard platform for connecting accelerated neural network execution engines and available deep learning tools. Ideally, neural networks trained in deep learning frameworks would be exported to NNEF, and neural network accelerator libraries could consume it without worrying about compatibility with all deep learning frameworks.

🔗 CATEGORY Algorithms ML, TransferLearning, Reinforcement and Deep Learning

📅 PUBLISHED Published 2018-08

🔍 KEYWORDS data deep learning network neural search

■ The Organisation for Economic Co-operation and Development (OECD)

[Identifying and measuring developments in artificial intelligence: Making the impossible possible. OECD Whitepaper](https://www.oecd-ilibrary.org/docserver/5f65ff7e-en.pdf)

<https://www.oecd-ilibrary.org/docserver/5f65ff7e-en.pdf>

This paper identifies and measures developments in science, algorithms and technologies related to artificial intelligence (AI). Using information from scientific publications, open source software (OSS) and patents, it finds a marked increase in AI-related developments over recent years. Since 2015, AI-related publications have increased by 23 per year; from 2014 to 2018, AI-related OSS contributions grew at a rate three times greater than other OSS contributions; and AI-related inventions comprised, on average, more than 2.3 of IP5 patent families in 2017. China's growing role in the AI space also emerges. The analysis relies on a three-pronged approach based on established bibliometric and patent-based methods, and machine learning (ML) implemented on purposely collected OSS data

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED 20200430

🔍 KEYWORDS artificial intelligence data intelligence learning machine science

[OECD Recommendation of the Council on Artificial Intelligence](https://legalinstruments.oecd.org/api/print?id=648&lang=en#:~:text=The%20Recommendation%20aims%20to%20foster,human%20rights%20and%20democratic%20values.&text=In%20June%202019%2C%20at%20the,drawn%20from%20the%20OECD%20Recommendation)

<https://legalinstruments.oecd.org/api/print?id=648&lang=en#:~:text=The%20Recommendation%20aims%20to%20foster,human%20rights%20and%20democratic%20values.&text=In%20June%202019%2C%20at%20the,drawn%20from%20the%20OECD%20Recommendation>

The Recommendation identifies five complementary values-based principles for the responsible stewardship of trustworthy AI and calls on AI actors to promote and implement them (a) inclusive

growth, sustainable development and well-being; (b) human-centred values and fairness; (c) transparency and explainability; (d) robustness, security and safety; (e) and accountability. In addition to and consistent with these value-based principles, the Recommendation also provides five recommendations to policy-makers pertaining to national policies and international co-operation for trustworthy AI, namely (a) investing in AI research and development; (b) fostering a digital ecosystem for AI; (c) shaping an enabling policy environment for AI; (d) building human capacity and preparing for labour market transformation; (e) and international co-operation for trustworthy AI.

🔗 CATEGORY Governance Policy, Regulations, Liability

📅 PUBLISHED 20190522

OECD report on Artificial intelligence patents by top RnD companies, by headquarters' location, 2012-14. Published 22nd November 2017.

🔗 https://www.oecd-ilibrary.org/science-and-technology/oecd-science-technology-and-industry-scoreboard-2017/artificial-intelligence-patents-by-top-r-and-d-companies-by-headquarters-location-2012-14_sti_scoreboard-2017-graph25-en

With some 200 indicators, the 2017 edition of the OECD Science, Technology and Industry (STI) Scoreboard shows how the digital transformation affects science, innovation, the economy, and the way people work and live. It aims to help governments design more effective science, innovation and industry policies in the fast-changing digital era. The charts and underlying data in this publication are available for download and over half the indicators contain additional data expanding the time and or country coverage of the print edition

🔗 CATEGORY Citizen Application-dependent Societal impact, Goals, Big picture, Citizen View, Financial impact

📅 PUBLISHED 20171122

🔑 KEYWORDS data science

OECD report on Private Equity Investment in Artificial Intelligence. Published 22nd January 2019.

🔗 <http://www.oecd.org/going-digital/ai/private-equity-investment-in-artificial-intelligence.pdf>

After five years of steady increases, private equity investment in AI has accelerated since 2016, with the amount of private equity invested doubling from 2016 to 2017 (Figure 1). In total, it is estimated that more than USD 50 billion was invested in AI start-ups during the period 2011 through to mid-2018. The surge in private investment suggests that investors are increasingly aware of the potential of AI, and are crafting their investment strategies accordingly.

🔗 CATEGORY Citizen Application-dependent Societal impact, Goals, Big picture, Citizen View, Financial impact

📅 PUBLISHED 20190122

SAE International

EUROCAE WG114 / SAE G34 Artificial Intelligence in Aviation - AIR6987 - Artificial Intelligence in Aeronautical Systems: Taxonomy

<https://www.sae.org/servlets/works/documentHome.do?docID=AIR6987&inputPage=wlpSdOcDeTails&comtID=TEAG34>

Establish a comprehensive taxonomy of Artificial Intelligence in aviation

CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

EUROCAE WG114 / SAE G34 Artificial Intelligence in Aviation - AIR6994 - Use Case AIR

<https://www.sae.org/servlets/works/documentHome.do?docID=AIR6994&inputPage=wlpSdOcDeTails&comtID=TEAG34>

Document possible AI technologies, architecture, validation approach, and safety concerns for each use case.

CATEGORY Governance Policy, Regulations, Liability

EUROCAE WG114 / SAE G34 Artificial Intelligence in Aviation - AS6983 - Process Standard for Development and Certification/ Approval of Aeronautical Safety-Related Products Implementing AI

<https://www.sae.org/servlets/works/documentHome.do?docID=AS6983&inputPage=wlpSdOcDeTails&comtID=TEAG34>

This document discusses guidelines for the development of Aircraft Systems leveraging AI capabilities, taking into account the overall aircraft operating environment and functions. This includes validation of requirements and verification of the design implementation for certification and product assurance and guidelines with the assessment of safety. It provides practices for showing compliance with the regulations and serves to assist a company in developing and meeting its own internal standards by considering the guidelines herein.

CATEGORY Data Quality, Usage, Provenance, Checking, Ontologies

EUROCAE WG114 / SAE G34 Artificial Intelligence in Aviation- AIR6988 - Artificial Intelligence in Aeronautical Systems: Statement of Concerns

<https://www.sae.org/servlets/works/documentHome.do?docID=AIR6988&inputPage=wlpSdOcDeTails&comtID=TEAG34>

Establish a comprehensive statement of concerns versus the demonstration of conformity of AI-based products to the regulation requirements and clarify the future scope of the standard applicability.

CATEGORY Citizen Application-dependent Societal impact, Goals, Big picture, Citizen View, Financial impact

■ Proprietary

Stix, Charlotte. A survey of the European Union's artificial intelligence ecosystem, Published March 2019. Leverhulme Centre for the Future of Intelligence, University of Cambridge, UK


 http://lcfi.ac.uk/media/uploads/files/Stix_Europe_AI_Final.pdf

Narratives in international media, and increasingly within governments, place great importance on nations achieving leadership in artificial intelligence (AI). The EU is rarely considered the leading player in these discussions. This report investigates this assumption and outlines existing building blocks that could form the basis for EU leadership in AI. The research is based primarily around EU legislation, policy and strategy documents, publicly available databases of ongoing projects, and funding decisions. In aggregating this information, the report aims to provide an introductory overview of the EU's AI ecosystem.

 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures


 KEYWORDS artificial intelligence data intelligence search

Blackman, Reid. A Practical Guide to Building Ethical AI. Harvard Business Review

 <https://hbr.org/2020/10/a-practical-guide-to-building-ethical-ai>

Companies are quickly learning that AI doesn't just scale solutions - it also scales risk. In this environment, data and AI ethics are business necessities, not academic curiosities. Companies need a clear plan to deal with the ethical quandaries this new tech is introducing. To operationalize data and AI ethics, they should

- 1) Identify existing infrastructure that a data and AI ethics program can leverage;
- 2) Create a data and AI ethical risk framework that is tailored to your industry;
- 3) Change how you think about ethics by taking cues from the successes in health care;
- 4) Optimize guidance and tools for product managers;
- 5) Build organizational awareness;
- 6) Formally and informally incentivize employees to play a role in identifying AI ethical risks; and
- 7) Monitor impacts and engage stakeholders.

 CATEGORY Ethics Trustworthiness, Explainability, Transparency, Bias, Accountability

 PUBLISHED 20201020

 KEYWORDS data learning

Chelvachandran, Nishan, Sonja Trifuljesko, Karolina Drobotowicz, Stefan Kendzierskyj, Hamid Jahankhani, and Yelda Shah. Considerations for the Governance of AI and Government Legislative Frameworks. In *Cyber Defence in the Age of AI, Smart Societies and Augmented Humanity*, pp. 57-69. Springer, Cham, 2020.

 https://link.springer.com/chapter/10.1007/978-3-030-35746-7_4

The speed and proliferation of AI and algorithmic technology has far outpaced that of the development of the legislative frameworks to which to govern them, to ensure their appropriate, safe and permissive use. It is not suggested that the development of these technologies and integrations are thwarted or inhibited,

but more that there is a holistic review and understanding of the complex integrations between the moral, ethical, technological and legal concepts that their use brings. Multiple approaches must be made, utilising top down legislative mechanisms, bottom up consumer and citizen led engagement approaches, and cross sector and industry led standardisation and frame working. Such a cyclical process would ensure that the continual development and evolution of the appropriate instruments keep in pace with technological development. And with such synergic pace, will bring allow such considerations to be made at the design phase technological solutions, rather than taking a reactionary and sometimes unknown approach. A full understanding of new and emerging technologies is needed, how they interact and are interconnected, as well as their vulnerabilities, and causal effects, both direct and indirect, of the use of algorithmic and automated technology.

🔗 CATEGORY Governance Policy, Regulations, Liability

📅 KEYWORDS logic

Dutton, Tim. An Overview of National AI Strategies. Published online 28th June 2018.

🔗 <https://medium.com/politics-ai/an-overview-of-national-ai-strategies-2a70ec6edfd>

The race to become the global leader in artificial intelligence (AI) has officially begun. In the past fifteen months, Canada, China, Denmark, the EU Commission, Finland, France, India, Italy, Japan, Mexico, the Nordic-Baltic region, Singapore, South Korea, Sweden, Taiwan, the UAE, and the UK have all released strategies to promote the use and development of AI. No two strategies are alike, with each focusing on different aspects of AI policy scientific research, talent development, skills and education, public and private sector adoption, ethics and inclusion, standards and regulations, and data and digital infrastructure. This article summarizes the key policies and goals of each strategy, as well as related policies and initiatives that have announced since the release of the initial strategies. It also includes countries that have announced their intention to develop a strategy or have related AI policies in place.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED 20180628

📅 KEYWORDS artificial intelligence data intelligence search

General information on ISO 25000 series of standards and 25012

🔗 <http://www.iso25000.it/styled-19/>

The standard describes a structured data quality model that categorizes quality attributes into 15 characteristics inherent and system dependent.

🔗 CATEGORY Data Quality, Usage, Provenance, Checking, Ontologies

📅 KEYWORDS data

Herpig, Sven. Securing Artificial Intelligence. Part 1: The attack surface of machine learning and its implications. (Stiftung Neue Verantwortung)

🔗 https://www.stiftung-nv.de/sites/default/files/securing_artificial_intelligence.pdf

In the past, both the Internet infrastructure and technology was built on it has not necessarily been secure by design. This offered militaries, intelligence agencies and criminal groups new avenues to pursue their respective goals. We should not repeat the same mistakes with machine learning. A key requirement is accurate threat modeling for machine learning applications designated to be deployed in high-stakes decisions domains (military, critical infrastructure, public safety) and implement security-by-design as well as resilience mechanisms and safeguards.

🔗 CATEGORY Security CyberSec, Privacy, Anonymization, Authentication, Access, Risk Analysis

📅 PUBLISHED 20191016

📖 KEYWORDS intelligence learning machine

Kuleshov, Andrey. Formalizing AI system parameters in standardisation of AI. In 2018 International Conference on Artificial Intelligence Applications and Innovations (IC-AIAI), pp. 51-54. IEEE, 2018.

🔗 <https://ieeexplore.ieee.org/abstract/document/8674446>

The author discusses how a formal framework can be applied to structure the definitions required for the development of standards of functions correspondence, safety, reliability, accuracy and trustworthiness of AI systems. Some definitions are put forward to permit the formalization AI systems properties within an overall approach known as intellometry of AI systems. The author discusses the need for strict contextualization of the measurements of the parameters of AI systems (intellometrics) corresponding to the specific features of tasks to be solved with the use of AI systems.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED 20181217

Parsons, G. The Standardisation of Artificial Intelligence, in IEEE Communications Standards Magazine, vol. 3, no. 1, pp. 2-2, March 2019, doi: 10.1109/MCOMSTD.2019.8771307.

🔗 <https://ieeexplore.ieee.org/document/8771307>

Presents the introductory editorial for this issue of the publication.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED 20190722

The AI techno-economic complex System: Worldwide landscape, thematic subdomains and technological collaborations Riccardo Righi, Sofia Samoli, Montserrat Lopez Cobo, Miguel Vazquez-Prada Baillet, Melisande Cardona, Giuditta De Prato

🔗 <https://reader.elsevier.com/reader/sd/pii/S0308596120300355?token=2E039188F3DE8929C4F2817E672B9130B97325A75AE995EBAD00A04E9D90D937D38BFE6EECB7CBC751FC98DE1DAC7FD9>

Artificial intelligence (AI) is playing a major role in the new paradigm shift occurring across the technological landscape. After a series of alternate seasons starting in the 60s, AI is now experiencing a new spring. Nevertheless, although it is spreading throughout our economies and societies in multiple ways, the absence of standardised classifications prevents us from obtaining a measure of its pervasiveness. In addition, AI cannot be identified as part of a specific sector, but rather as a transversal technology because the fields in which it is applied do not have precise boundaries. In this work, we address the need for a deeper understanding of this complex phenomenon by investigating economic agents involvement in industrial activities aimed to supply AI-related goods and services, and AI-related RnD processes in the form of patents and publications. In order to conduct this extensive analysis, we use a complex systems approach through the agent-artifact space model, which identifies the core dimensions that should be considered. Therefore, by considering the geographic location of the involved agents and their organisation types (i.e., firms, governmental institutions, and research institutes), we (i) provide an overview of the worldwide presence of agents,

(ii) investigate the patterns in which AI technological subdomains subsist and scatter in different parts of the system, and (iii) reveal the size, composition, and topology of the AI RnD collaboration network. Based on a unique data collection of multiple micro-based data sources and supported by a methodological framework for the analysis of techno-economic segments (TES), we capture the state of AI in the worldwide landscape in the period 2009-2018. As expected, we find that major roles are played by the US, China, and the EU28. Nevertheless, by measuring the system, we unveil elements that provide new, crucial information to support more conscious discussions in the process of policy design and implementation.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📄 KEYWORDS classification data deep intelligence logic network search

Trenta, Andrea, and Domenico Natale. Examples of Practical Use of ISO/IEC 25000 (short paper). In IWESQ@ APSEC, pp. 9-10. 2019.

🔗 <http://ceur-ws.org/Vol-2545/paper-02.pdf>

In recent years the ISO IEC 25000 series of standards seems to have reached their completeness and maturity expanding their definition from software to systems, data and IT service products. The ISO IEC 25000 application in industry is on a voluntary basis, but it is also supported by public regulatory context. Some actions are also undertaken to apply these standards when new quality measures are defined.

🔗 CATEGORY Data Quality, Usage, Provenance, Checking, Ontologies

📄 KEYWORDS data

Ziegler, Wolfgang. A Landscape Analysis of Standardisation in the Field of Artificial Intelligence. Journal of ICT Standardisation (2020): 151-184.

🔗 <https://journals.riverpublishers.com/index.php/JICTS/article/download/2647/1745>

While projects, developments and applications addressing and using artificial intelligence (AI) are rather multifaceted and their number is constantly increasing, the standardisation activities in the field of artificial intelligence are limited, their number is significantly lower and does not increase at the same pace. The European funded project StandICT.eu aims at supporting European experts presence in and contributions to international standardisation activities in ICT. The focus of the project is on the 5 priority domains identified by the European Commission (Cloud Computing, IoT, Big Data, Cyber Security, 5G) and on Artificial Intelligence while being open for other relevant topics defined in the annual European Rolling Plan for ICT Standardisation. As part of the effort for the Standards Watch the projects has prepared a comprehensive analysis of the international standardisation landscape in the AI field, that comprises a description of the ICT standards and ongoing work at international level in the field of AI across the standardisation organisations already active in the field.

🔗 CATEGORY Fundamental - Definitions, Use Cases, Reference Architectures

📅 PUBLISHED 20200413

📄 KEYWORDS artificial intelligence intelligence

■ 6 Table of Standards by Categories

Algorithms: ML, Transfer Learning, Reinforcement and Deep Learning	
ETSI Whitepaper Nr.4 - ETSI GANA Multi-Layer Autonomics and their AI Algorithms for Closed-Loop Network Automation.	https://intwiki.etsi.org/images/ETSI_5G_PoC_White_Paper_No_4_v3.1.pdf
IEEE P2830 - Standard for Technical Framework and Requirements of Shared Machine Learning	https://standards.ieee.org/project/2830.html
IEEE P2841 - Framework and Process for Deep Learning Evaluation	https://standards.ieee.org/project/2841.html
IEEE P3333.1.3 - Standard for the Deep Learning Based Assessment of Visual Experience Based on Human Factors	https://standards.ieee.org/project/3333_1_3.html
IEEE P3652.1 - Guide for Architectural Framework and Application of Federated Machine Learning	https://standards.ieee.org/standard/3652_1-2020.html
ISO/IEC AWI 24029-2 Artificial intelligence (AI) - Assessment of the robustness of neural networks - Part 2: Methodology for the use of formal methods	https://www.iso.org/standard/79804.html
ISO/IEC DTR 24027 Information technology - Artificial Intelligence (AI) - Bias in AI systems and AI aided decision making	https://www.iso.org/standard/77607.html
ISO/IEC DTR 24372 Information technology - Artificial intelligence (AI) - Overview of computational approaches for AI systems	https://www.iso.org/standard/78508.html
ISO/IEC JTC 1/SC 42 DIS 23053 Framework for Artificial Intelligence (AI) Systems Using Machine Learning (ML)	https://www.iso.org/standard/74438.html
ISO/IEC TR 24029-1:2021 Artificial Intelligence (AI) - Assessment of the robustness of neural networks - Part 1: Overview	https://www.iso.org/standard/77609.html
ITU-T E.475 (ex E.FINAD) - Guidelines for Intelligent Network Analytics and Diagnostics	https://www.itu.int/itu-t/aap/AAPRecDetails.aspx?AAPSeqNo=8648
ITU-T P.MLGuide for Development of Machine Learning Based Solutions	https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=15114
NNEF 1.0 - Neural Network Exchange Format (NNEF)	https://www.khronos.org/nnef#:~:text=NNEF%20reduces%20machine%20learning%20deployment,range%20of%20devices%20and%20platforms

Citizen: Application-dependent Societal impact, Goals, Big picture, Citizen View, Financial impact

Coordinated Plan on Artificial Intelligence. Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. COM(2018) 795 final. Published 07.12.2018.	https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=56018
Digital Europe Programm	http://europa.eu/rapid/press-release_IP-18-4043_en.htm
EC Rolling Plan for ICT Standardisation, Published annually.	https://joinup.ec.europa.eu/collection/rolling-plan-ict-standardisation/rolling-plan-2021
EC. Artificial Intelligence for Europe. COM(2018) 237 final. Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. Published 25th April 2018.	https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=51625
WHITE PAPER On Artificial Intelligence - A European approach to excellence and trust. COM(2020) 65 final. Published 19th February 2020.	https://ec.europa.eu/info/files/white-paper-artificial-intelligence-european-approach-excellence-and-trust_en
G20 Ministerial Statement on Trade and Digital Economy. Published 9th June 2019.	https://www.mofa.go.jp/files/000486596.pdf
IEEE 7010-2020 - IEEE Recommended Practice for Assessing the Impact of Autonomous and Intelligent Systems on Human Well-being	https://standards.ieee.org/content/ieee-standards/en/standard/7010-2020.html
IEEE P2089 - Standard for Age Appropriate Digital Services Framework - Based on the 5Rights Principles for Children	https://standards.ieee.org/project/2089.html
IEEE P7011 - Standard for the Process of Identifying and Rating the Trustworthiness of News Sources	https://standards.ieee.org/project/7011.html
ISO/TR 22100-5 - Safety of machinery - Relationship with ISO 12100 - Part 5: Implications of embedded artificial intelligence machine learning	https://www.iso.org/standard/80778.html
ISO/IEC TR 20547-5:2018 Information technology - Big data reference architecture - Part 5: Standards roadmap	https://www.iso.org/standard/72826.html
OECD report on Artificial intelligence patents by top RnD companies, by headquarters' location, 2012-14. Published 22nd November 2017.	https://www.oecd-ilibrary.org/science-and-technology/oecd-science-technology-and-industry-scoreboard-2017/artificial-intelligence-patents-by-top-r-and-d-companies-by-headquarters-location-2012-14_sti_scoreboard-2017-graph25-en

OECD report on Private Equity Investment in Artificial Intelligence. Published 22nd January 2019.	http://www.oecd.org/going-digital/ai/private-equity-investment-in-artificial-intelligence.pdf
EUROCAE WG114 / SAE G34 Artificial Intelligence in Aviation-AIR6988 - Artificial Intelligence in Aeronautical Systems: Statement of Concerns	https://www.sae.org/servlets/works/documentHome.do?docID=AI6988&inputPage=wlpSdOcDeTails&comtID=TEAG34
Artificial Intelligence and Public Standards: report, Committee on Standards in Public Life, Chair, Lord Evans of Weardale KCB DL (10 February 2020).	https://papers.ssrn.com/sol3/Data_Integrity_Notice.cfm?abid=3544871

Data: Quality, Usage, Provenance, Checking, Ontologies

General information on ISO 25000 series of standards and 25012	http://www.iso25000.it/styled-19/
Trenta, Andrea, and Domenico Natale. Examples of Practical Use of ISO/IEC 25000 (short paper). In IWESQ@ APSEC, pp. 9-10. 2019.	http://ceur-ws.org/Vol-2545/paper-02.pdf
The Economic Impact of Open Data - Opportunities for value creation in Europe	https://www.europeandataportal.eu/sites/default/files/the-economic-impact-of-open-data.pdf
ETSI DES/eHEALTH-008 (ES 203 668) eHEALTH Data recording requirements for eHealth	https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=56908
IEEE P1872.2 - Standard for Autonomous Robotics (AuR) Ontology	https://standards.ieee.org/project/1872_2.html
IEEE P2247.3 - Recommended Practices for Evaluation of Adaptive Instructional Systems	https://standards.ieee.org/project/2247_3.html
IEEE P2671 - Standard for General Requirements of Online Detection Based on Machine Vision in Intelligent Manufacturing	https://standards.ieee.org/project/2671.html
IEEE P2807.1 - Standard for Technical Requirements and Evaluation of Knowledge Graphs	https://standards.ieee.org/project/2807_1.html
IEEE P2817 - Guide for Verification of Autonomous Systems	https://standards.ieee.org/project/2817.html
IEEE P2846 - Assumptions for Models in Safety-Related Automated Vehicle Behavior	https://standards.ieee.org/project/2846.html
IEEE P7007 - Ontological Standard for Ethically Driven Robotics and Automation Systems	https://standards.ieee.org/project/7007.html
IEEE P7012 - Standard for Machine Readable Personal Privacy Terms	https://standards.ieee.org/project/7012.html

Guides to improve data interoperability v.2 March 2021 (Japanese only)	https://www.ipa.go.jp/files/000089479.zip
ISO/IEC 25024:2015. Systems and software engineering - Systems and software Quality Requirements and Evaluation (SQuaRE) - Measurement of data quality. Published by ISO/IEC JTC 1/SC 7 Software and systems engineering.	https://www.iso.org/standard/35749.html
ISO/IEC AWI 25059 Software engineering - Systems and software Quality Requirements and Evaluation (SQuaRE) - Quality model for AI-based systems	https://www.iso.org/standard/80655.html
ISO/IEC AWI 5259-2 Data quality for analytics and ML - Part 2: Part 2: Data quality measures	https://www.iso.org/standard/81860.html
ISO/IEC AWI 5259-3 Data quality for analytics and ML - Part 3: Data quality management requirements and guidelines	https://www.iso.org/standard/81092.html
ISO/IEC AWI 5259-4 Data quality for analytics and ML - Part 4: Data quality process framework	https://www.iso.org/standard/81093.html
ISO/IEC WD TS 4213 Information technology - Artificial Intelligence - Assessment of machine learning classification performance	https://www.iso.org/standard/79799.html
EUROCAE WG114 / SAE G34 Artificial Intelligence in Aviation - AS6983 - Process Standard for Development and Certification/Approval of Aeronautical Safety-Related Products Implementing AI	https://www.sae.org/servlets/works/documentHome.do?docID=AS6983&inputPage=wlpSdOcDeTails&comtID=TEAG34
Ethics: Trustworthiness, Explainability, Transparency, Bias, Accountability	
Blackman, Reid. A Practical Guide to Building Ethical AI. Harvard Business Review	https://hbr.org/2020/10/a-practical-guide-to-building-ethical-ai
AI Principles: Recommendations on the Ethical Use of Artificial Intelligence by the Department of Defense. Published October 2019.	https://media.defense.gov/2019/Oct/31/2002204458/-1/-1/0/DIB_AI_PRINCIPLES_PRIMARY_DOCUMENT.PDF
Commission Report on safety and liability implications of AI, the Internet of Things and Robotics	https://eur-lex.europa.eu/legal-content/EN/TXT/DOC/?uri=CELEX:52020DC0064&from=en
Liability for Artificial Intelligence and other emerging digital technologies. Expert Group on Liability and New Technologies. Published 18th November 2019.	https://ec.europa.eu/transparency/regexpert/index.cfm?do=groupDetail.groupMeetingDoc&docid=36608
EU guidelines on ethics in artificial intelligence: Context and implementation. Published 19th September 2019.	http://www.europarl.europa.eu/RegData/etudes/BRIE/2019/640163/EPRS_BRI(2019)640163_EN.pdf

Ethics Guidelines for Trustworthy AI . High-Level Expert Group on AI. Published 8th April 2019.	https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai
Policy and investment recommendations for trustworthy Artificial Intelligence	https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=60343
IEEE IC16-002 - Ethically Aligned Design	https://ethicsinaction.ieee.org/
IEEE IC18-004 - IC18-004 - Ethics Certification Program for Autonomous and Intelligent Systems (ECPAIS)	https://standards.ieee.org/industry-connections/ecpais.html
IEEE IC20-008 - The IEEE Trusted Data and Artificial Intelligence Systems (AIS) Playbook for Finance Initiative	https://standards.ieee.org/industry-connections/ais-finance-playbook.html
IEEE P2840 - Standard for Responsible AI Licensing	https://standards.ieee.org/project/2840.html
IEEE P2842 - Recommended Practice for Secure Multi-party Computation	https://standards.ieee.org/project/2842.html
IEEE P2863 - Recommended Practice for Organizational Governance of Artificial Intelligence	https://standards.ieee.org/project/2863.html
IEEE P7000 - Standard for Model Process for Addressing Ethical Concerns During System Design	https://standards.ieee.org/project/7000.html
IEEE P7001 - Standards for Transparency of Autonomous Systems	https://standards.ieee.org/project/7001.html
IEEE P7003 - Standard for Algorithmic Bias Considerations	https://standards.ieee.org/project/7003.html
IEEE P7006 - Standard for Personal Data Artificial Intelligence (AI) Agent	https://standards.ieee.org/project/7006.html
IEEE P7008 - Standard for Ethically Driven Nudging for Robotic, Intelligent and Autonomous Systems	https://standards.ieee.org/project/7008.html
IEEE P7014 - Standard for Ethical considerations in Emulated Empathy in Autonomous and Intelligent Systems	https://standards.ieee.org/project/7014.html
ISO/IEC 23894 - Information Technology - Artificial Intelligence - Risk Management	https://www.iso.org/standard/77304.html
ISO/IEC TR 24028 - Information technology - Artificial Intelligence (AI) - Overview of trustworthiness in Artificial Intelligence	https://www.iso.org/standard/77608.html
0042	Fundamental - Definitions, Use Cases, Reference Architectures,
American Artificial Intelligence Initiative G46 year one annual report, Published 25th February 2020.	https://iapp.org/media/pdf/resource_center/US_AI_Initiative_year_one_annual_report_white_house.pdf

Dutton, Tim. An Overview of National AI Strategies. Published online 28th June 2018.	https://medium.com/politics-ai/an-overview-of-national-ai-strategies-2a70ec6edfd
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The AI techno-economic complex System: Worldwide landscape, thematic subdomains and technological collaborations Riccardo Righi, Sofia Samoili, Montserrat Lopez Cobo, Miguel Vazquez-Prada Baillet, Melisande Cardona, Giuditta De Prato	https://reader.elsevier.com/reader/sd/pii/S0308596120300355?token=2E039188F3DE8929C4F2817E672B9130B97325A75AE995EBAD00A04E9D90D937D38BFE6EECB7CBC751FC98DE1DAC7FD9
Translation: Excerpts from China's White Paper on Artificial Intelligence Standardisation. Published online 24th January 2018.	https://www.newamerica.org/cybersecurity-initiative/digichina/blog/translation-excerpts-chinas-white-paper-artificial-intelligence-standardisation/
USA February 2019 Executive Order on Maintaining American Leadership on Artificial Intelligence (EO 13859).	https://www.whitehouse.gov/presidential-actions/executive-order-maintaining-american-leadership-artificial-intelligence/
Ziegler, Wolfgang. A Landscape Analysis of Standardisation in the Field of Artificial Intelligence. Journal of ICT Standardisation (2020): 151-184.	https://journals.riverpublishers.com/index.php/JICTS/article/download/2647/1745
Strategic Research, Innovation and Deployment Agenda for an AI PPP: A focal point for collaboration on Artificial Intelligence, Data and Robotics. Second Consultation Release, September 2019.	https://www.bdva.eu/sites/default/files/AI%20PPP%20SRIDA-Second%20Consultation%20Release-September%202019%20-%20Online%20version.pdf
CEN-CENELEC Roadmap for AI Standardisation. Submitted 24th January 2019.	ftp://ftp.cencenelec.eu/EN/News/SectorNews/2019/AI-Focus-Group/CEN-CLC_AI_FG_N004_Roadmap.pdf

German Standardisation Roadmap AI, November 2020	https://www.dke.de/resource/blob/2008048/14ebd34ae33117f1b6a35a5c03a2aa9e/nr-ki-english---download-data.pdf
Artificial Intelligence and future directions for ETSI. 1st edition - June 2020	https://www.etsi.org/images/files/ETSIWhitePapers/etsi_wp34_Artificial_Intelligence_and_future_directions_for_ETSI.pdf
Augmented Reality Framework (ARF); AR framework architecture	https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=54070
ETSI ENI GR 0011 Experiential Networked Intelligence (ENI); Definition of Categories for AI Application to Networks	https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=56393
ETSI GR ARF 001 V1.1.1 (2019-04): Augmented Reality Framework (ARF); AR standards landscape,	https://www.etsi.org/deliver/etsi_gr/ARF/001_099/001/01.01.01_60/gr_ARF001v010101p.pdf
ETSI GS CIM 009 V1.2.1 (2020-02): Context Information Management (CIM); NGS-LD API; NGS-LD v1.2.1,	https://www.etsi.org/deliver/etsi_gs/CIM/001_099/009/01.02.01_60/gc_CIM009v010201p.pdf
ETSI GS ENI 001 v2.1.1 (2019-09): Experiential Networked Intelligence (ENI); ENI use cases ,	https://www.etsi.org/deliver/etsi_gs/ENI/001_099/001/02.01.01_60/gc_ENI001v020101p.pdf
ETSI GS ENI 005 v1.1.1 (2019-09): Experiential Networked Intelligence (ENI); System Architecture,	https://www.etsi.org/deliver/etsi_gs/ENI/001_099/005/01.01.01_60/gc_ENI005v010101p.pdf
ETSI GS ZSM 002, (2019-08): Zero-touch network and Service Management (ZSM); Reference Architecture ,	https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=54295
ETSI presentation on AI to the GSC-22. Contributed 26th March 2019.	https://www.itu.int/en/ITU-T/gsc/22/Documents/GSC-22-S05-002.pdf
ETSI Summit on Artificial Intelligence. Published 4th April 2017.	https://www.etsi.org/events/1474-etsi-summit-on-artificial-intelligence#pane-2
ETSI TR 103 674 (in draft): SmartM2M; Artificial Intelligence and the oneM2M architecture	https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=57866
ETSI TR 103 675 (in draft): SmartM2M AI for IoT: A Proof of Concept; PoC AI4IoT	https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=57867
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SAREF Smart Applications Reference Ontology	https://saref.etsi.org
SmartM2M; Artificial Intelligence and the oneM2M architecture	https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=57866
IEEE P2247.1 - Standard for the Classification of Adaptive Instructional Systems	https://standards.ieee.org/project/2247_1.html
IEEE P2660.1 - Recommended Practices on Industrial Agents: Integration of Software Agents and Low Level Automation Functions	https://standards.ieee.org/standard/2660_1-2020.html
IEEE P2672 - Guide for General Requirements of Mass Customization	https://standards.ieee.org/project/2672.html
IEEE P2802 - Standard for the Performance and Safety Evaluation of Artificial Intelligence Based Medical Device: Terminology	https://standards.ieee.org/project/2802.html
IEEE P2805.3 - Cloud-Edge Collaboration Protocols for Machine Learning	https://standards.ieee.org/project/2805_3.html
IEEE P2894 - Guide for an Architectural Framework for Explainable Artificial Intelligence	https://standards.ieee.org/project/2894.html
IEEE P7005 - Standard for Transparent Employer Data Governance	https://standards.ieee.org/project/7005.html
ISO/TR 9241-810 - Ergonomics of human-system interaction - Part 810: Robotic, intelligent and autonomous systems	https://www.iso.org/standard/76577.html
ISO/IEC 20546:2019 Information technology - Big data - Overview and vocabulary	https://www.iso.org/standard/68305.html
ISO/IEC 20547-3:2020 Information technology - Big data reference architecture - Part 3: Reference architecture	https://www.iso.org/standard/71277.html
ISO/IEC 22989 Information technology - Artificial intelligence - Artificial intelligence concepts and terminology	https://www.iso.org/standard/74296.html
ISO/IEC AWI 42001 Information Technology - Artificial intelligence - Management system	https://www.iso.org/standard/81230.html

ISO/IEC AWI 5259-1 Data quality for analytics and ML - Part 1: Overview, terminology, and examples	https://www.iso.org/standard/81088.html
ISO/IEC AWI 5338 Information technology - Artificial intelligence - AI system life cycle processes	https://www.iso.org/standard/81118.html
ISO/IEC AWI TR 24368 - Information technology - Artificial intelligence - Overview of ethical and societal concerns	https://www.iso.org/standard/78507.html?browse=tc
ISO/IEC CD 24668 Information technology - Artificial intelligence -Process management framework for Big data analytics	https://www.iso.org/standard/78368.html
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ISO/IEC TR 24030 Information technology - Artificial intelligence (AI) - Use cases	https://www.iso.org/standard/77610.html
ISO/IEC WD 5339 Information Technology - Artificial Intelligence - Guidelines for AI applications	https://www.iso.org/standard/81120.html
ISO/IEC WD 5392 Information technology - Artificial intelligence - Reference architecture of knowledge engineering	https://www.iso.org/standard/81228.html
F.AI-SCS - Use cases and requirements for speech interaction of intelligent customer service	http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=16381
F.Supp-OCAIB - Overview of convergence of artificial intelligence and blockchain	http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=16631
HSTP.Med-AI-CCTA - Guidelines on development and application of artificial intelligence in coronary computed tomography angiography	http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=16378
ITU-T E.475 (ex E.FINAD) - Guidelines for Intelligent Network Analytics and Diagnostics	https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=14037
ITU-T F.AI-MLTF - Technical framework for shared machine learning system	https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=15262
ITU-T H.CUAV-AIF - Framework and requirements for civilian unmanned aerial vehicle flight control using artificial intelligence	https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=14760

ITU-T J.1600 - Premium cable network platform - Framework	https://www.itu.int/itu-t/aap/AAPRecDetails.aspx?AAPSeqNo=8469
ITU-T L.1305 - Data centre infrastructure management system based on big data and artificial intelligence technology	https://www.itu.int/itu-t/aap/AAPRecDetails.aspx?AAPSeqNo=8571
ITU-T Q.INS-PM - Protocol for managing Intelligent Network Slicing with AI-assisted analysis in IMT-2020 network	https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=15152
ITU-T SG9 Recommendation J.1302 (ex J.CBCMS.part2) v2 Specification of cloud-based converged media service to support Internet protocol and broadcast cable television	https://www.itu.int/itu-t/j.1302
ITU-T Y.MLaaS-reqts - Cloud computing-functional requirements for machine learning as a service	https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=14484
ITU-T Y.SSC-AISE-arc - Reference architecture of artificial intelligence service exposure for smart sustainable cities	https://www.itu.int/md/T17-SG20-200706-TD-GEN-1779
ITU-T Y.Sup.AI4IoT - Unlocking Internet of things with artificial intelligence	https://www.itu.int/md/T17-SG20-C-0760
M.resm-AI - Requirements for energy saving management of 5G RAN system with AI	https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=16435
Report ITU-R BT.2447 - Artificial intelligence systems for programme production and exchange	https://www.itu.int/dms_pub/itu-r/opb/rep/R-REP-BT.2447-2019-PDF-E.pdf
Y.ML-IMT2020-MP - ML marketplace integration in future networks including IMT-2020	https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=16345
Y.ML-IMT2020-NA-RAFR - Architecture framework of AI-based network automation for resource adaptation and failure recovery for future networks including IMT-2020	https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=16343
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NIST Resource Page on AI	https://www.nist.gov/topics/artificial-intelligence/ai-standards

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EUROCAE WG114 / SAE G34 Artificial Intelligence in Aviation - AIR6987 - Artificial Intelligence in Aeronautical Systems: Taxonomy	https://www.sae.org/servlets/works/documentHome.do?docID=AIR6987&inputPage=wlpSdOcDeTails&comtID=TEAG34
Governance: Policy, Regulations, Liability	
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IEEE P2801 - Recommended Practice for the Quality Management of Datasets for Medical Artificial Intelligence	https://standards.ieee.org/project/2801.html
IEEE P7009 - Standard for Fail-Safe Design of Autonomous and Semi-Autonomous Systems	https://standards.ieee.org/project/7009.html
P2755.2 - Recommended Practice for Implementation and Management Methodology for Software Based Intelligent Process Automation (SBIPA)	https://ieeexplore.ieee.org/abstract/document/9199584
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ISO/IEC DTR 24027 - Information technology - Artificial Intelligence (AI) - Bias in AI systems and AI aided decision making	https://www.iso.org/standard/77607.html?browse=tc
F.748.11 (ex F.AI-DLPB) - Metrics and evaluation methods for deep neural network processor benchmark	http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=15295
F.AI-DLFE - Deep Learning Software Framework Evaluation Methodology	http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=15296
F.AI-DMPC - Technical framework for Deep Neural Network model partition and collaborative execution	http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=16634
F.AI-FASD - Framework for audio structuralizing based on deep neural network	http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=16636
F.AI-ILICSS - Technical Requirements and Evaluation Methods of Intelligent Levels of Intelligent Customer Service System	http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=16639
F.AI-RMCDP - Requirements of multimedia composite data preprocessing	http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=16637
F.IMCS - Requirements for smart speaker based Intelligent Multimedia Communication System	http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=16633
FSTP-ACC-AI -Technical Paper - Guidelines on the use of AI for ICT accessibility	https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=15037

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ITU-T F.CDN-AINW - Requirements and reference model for CDN services over AI network	https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=16358
ITU-T F.EMO-NN - Emotion enabled multimodal user interface based on artificial neural network	https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=15026
ITU-T F.SCAI - Requirements for smart class based on artificial intelligence	https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=15294
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ITU-T F.VS-AIMC - Use cases and requirements for multimedia communication enabled vehicle systems using artificial intelligence	https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=14767
ITU-T FSTP-ACC-AI - Guideline on the use of AI for ICT accessibility	https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=15037
ITU-T H.841 (04/2017) - Conformance of ITU-T H.810 personal health system: Personal Health Devices interface Part 1: Optimized Exchange Protocol: Personal Health Device	http://handle.itu.int/11.1002/roadmap/2.1000.13215
ITU-T J.1600 - Premium cable network platform Framework	https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=13977
ITU-T J.pcnp-char - E2E network characteristics requirement for video services	https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=16556
ITU-T J.pcnp-smgw - Functional requirements for Smart Home Gateway	https://www.itu.int/md/T17-SG09-C-0119/en
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ITU-T L.1305 - Data centre infrastructure management system based on big data and artificial intelligence technology	https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=14873
ITU-T L.5G_sav (under study) - Energy saving technologies and best practices for 5G RAN equipment	http://handle.itu.int/11.1002/roadmap/2.1.15123
ITU-T M.AI-TOM - Framework of AI enhanced Telecom Operation and Management (AITOM)	http://handle.itu.int/11.1002/roadmap/2.3.11229

ITU-T P.565 (ex P.VSQMTF) - Framework for creation and performance testing of machine learning based models for the assessment of transmission network impact on speech quality for mobile packet-switched voice services	https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=14353
ITU-T P.565 (ex P.VSQMTF) - Framework for creation and performance testing of machine learning based models for the assessment of transmission network impact on speech quality for mobile packet-switched voice services	https://www.itu.int/itu-t/aap/AAPRecDetails.aspx?AAPSeqNo=8647
ITU-T P.MLGuide - Guide for Development of Machine Learning Based Solutions	https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=15114
ITU-T Q.5001 - Signalling requirements and architecture of intelligent edge computing	https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=14276
ITU-T Q.IEC-PRO (under study) - Protocols for microservices based intelligent edge computing	http://handle.itu.int/11.1002/roadmap/2.1.15048
ITU-T Q.IEC-REQ (under study) - Signalling requirement of intelligent edge computing	http://handle.itu.int/11.1002/roadmap/2.1.14276
ITU-T Q.IMT2020-PIAS - Protocol for providing intelligent analysis services in IMT-2020 network	https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=16387
ITU-T TR.cs-ml - Technical Report: Countering spam based on machine learning	https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=15246
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ITU-T Y.3170 - Requirements for machine learning-based quality of service assurance for the IMT-2020 network	https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=14278
ITU-T Y.3172 - Architectural framework for machine learning in future networks including IMT-2020	https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=15020
ITU-T Y.bDDN-MLMec - Mechanisms of machine learning for big data driven networking	https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=15183
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ITU-T Y.MecTa-ML - Mechanism of traffic awareness for application-descriptor-agnostic traffic based on machine learning	https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=14619

ITU-T Y.ML-IMT2020-Data-Handling - Mechanism of traffic awareness for application-descriptor-agnostic traffic based on machine learning	https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=15177
ITU-T Y.qos-ml-arc - Architecture of machine learning based QoS assurance for IMT-2020 network	https://www.itu.int/md/T17-SG13-181102-TD-WP1-0276/en
ITU-T Y.Suppl to Y.317X series - Machine learning in future networks including IMT-2020: use cases	https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=15175
M.AI-TOM - Framework of AI enhanced Telecom Operation and Management (AITOM)	https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=16432
M.resm-AI - Requirements for energy saving management of 5G RAN system with AI	https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=16435
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EUROCAE WG114 / SAE G34 Artificial Intelligence in Aviation - AIR6994 - Use Case AIR	https://www.sae.org/servlets/works/documentHome.do?docID=AIR6994&inputPage=wlpSdOcDeTails&comtID=TEAG34
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IEC 62243:2012 - Artificial Intelligence Exchange and Service Tie to All Test Environments (AI-ESTATE)	https://webstore.iec.ch/publication/6631
IEEE P2247.2 - Interoperability Standards for Adaptive Instructional Systems (AISs)	https://standards.ieee.org/project/2247_2.html
IEEE P2751 - 3D Map Data Representation for Robotics and Automation	https://standards.ieee.org/project/2751.html

IEEE P2807 - Framework of Knowledge Graphs	https://standards.ieee.org/project/2807.html
F.746.11 (ex F.IQAS-INT) - Interfaces for intelligent question answering system	http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=15015
ITU-T F.EMO-NN - Emotion enabled multimodal user interface based on artificial neural network	https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=15026
ITU-T P.1130 (06/2015) - Subsystem requirements for automotive speech services	http://handle.itu.int/11.1002/roadmap/2.1000.12518
ITU-T Q.5001 - Signalling requirements and architecture of intelligent edge computing	https://www.itu.int/rec/T-REC-Q.5001-201810-l/en
ITU-T Q.IMT2020-PIAS - Protocol for providing intelligent analysis services in IMT-2020 network	https://www.itu.int/md/T17-SG11-200722-TD-GEN-1402
ITU-T Q.INS-PM - Protocol for managing Intelligent Network Slicing with AI-assisted analysis in IMT-2020 network	http://handle.itu.int/11.1002/roadmap/2.1.15152
ITU-T Q.VoLTE-SAO-FP - Framework and protocols for signalling network analyses and optimization in VoLTE	https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=16385
ITU-T Y.SSC-AISE-arc - Reference architecture of artificial intelligence service exposure for smart sustainable cities	https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=14503
ITU-T Y.Sup.AI4IoT - Unlocking Internet of things with artificial intelligence	https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=14103
Y.IMT2020-AIICDN-arch - AI integrated cross-domain network architecture for future networks including IMT-2020	https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=16347

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IEEE IC20-006 - The IEEE Applied AIS Risk and Impact Framework Initiative	https://standards.ieee.org/industry-connections/ais-risk-impact-framework.html
IEEE P7002 - Standard for Data Privacy Process	https://standards.ieee.org/project/7002.html
IEEE P7013 - Inclusion and Application Standards for Automated Facial Analysis Technology	https://spectrum.ieee.org/the-institute/ieee-products-services/standards-working-group-takes-on-facial-recognition
ISO/IEC 20547-4:2020 - Information technology - Big data reference architecture - Part 4: Security and privacy	https://www.iso.org/standard/71278.html
ISO/IEC AWI TR 5469 Artificial intelligence - Functional safety and AI systems	https://www.iso.org/standard/81283.html
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ITU-T Y.2701 (04/2007) - Security requirements for NGN release 1	http://handle.itu.int/11.1002/roadmap/2.1000.8899

7 Contributing Organisations

We would like to acknowledge the following, non-exhaustive list of organisations who have contributed with their documentation or are active in the field of AI related activities.

3IA: Interdisciplinary Artificial Intelligence Institutes

<https://www.gouvernement.fr/en/ai-research-institutes-established-in-grenoble-nice-paris-and-toulouse>

France established in April 2019 four interdisciplinary artificial intelligence institutes (3IA) to develop France's potential in the field of artificial intelligence (AI).

🔗 CATEGORY InformationProcessing_Computing

AI Watch: AI Watch

<https://ec.europa.eu/knowledge4policy/ai-watch>

AI watch is funded by the EC to monitor the development, uptake and impact of Artificial Intelligence for Europe

🔗 CATEGORY InformationProcessing_Computing

AI4CITIES: AI for Cities

<https://ai4cities.eu/about/project>

AI4Cities is a three-year EU-funded project bringing together leading European cities looking for artificial intelligence (AI) solutions to accelerate carbon neutrality. HELSINKI (Finland), AMSTERDAM (Netherlands), COPENHAGEN (Denmark), PARIS REGION (France), STAVANGER (Norway) and TALLINN (Estonia) are the six European cities and regions that want to ask suppliers to provide with AI solutions for mobility and energy challenges, that will ultimately contribute to reduce CO2 emissions and meet their climate commitments.

🔗 CATEGORY SmartCity

AI4DI: Artificial Intelligence for Digitizing Industry

<https://cordis.europa.eu/project/id/826060>

The EU-funded AI4DI project aims to transfer machine learning (ML) and AI from the cloud to the digitising industry. It will use a seven-key-target approach to evaluate and improve its relevance within the industry. The project plans to connect factories, processes and devices within the digitised industry by utilising ML and AI. It will then collect data on their performance.

🔗 CATEGORY InformationProcessing_Computing

AI4EU: AI4EU

<http://ai4eu.org/>

AI4EU is the European Union's landmark Artificial Intelligence project, which seeks to develop a European AI ecosystem, bringing together the knowledge, algorithms, tools and resources available and making it a compelling solution for users. Involving 80 partners, covering 21 countries, the Euro20M project kicked off in January 2019 and will run for three years. AI4EU will unify Europe's Artificial Intelligence community. It will facilitate collective work in AI research, innovation and business in Europe.

🔗 CATEGORY InformationProcessing_Computing

AIDA: Special Committee of the European Parliament on Artificial Intelligence in a Digital Age (AIDA)

<https://www.europarl.europa.eu/committees/en/aida/about>

The 12-month mandate of AIDA, from June 2020-21, is to take a horizontal approach on AI, analysing its future impact on the EU economy, focusing on skills, employment, education, health, transport, environment, industry, e-government, and third-country approaches to AI. To achieve its objectives, the Committee's Members will organise hearings and workshops with key stakeholders, including experts, policy-makers, and the business community. Meeting minutes are archived at <https://www.europarl.europa.eu/committees/en/archives/aida> and at the end of our mandate, we will submit a report with our findings and recommendations.

🔗 CATEGORY InformationProcessin

AIST: AIST national institute of advanced industrial science and technology, Japan

https://www.aist.go.jp/index_en.html

The National Institute of Advanced Industrial Science and Technology (AIST), one of the largest public research organizations in Japan, focuses on the creation and practical realization of technologies useful to Japanese industry and society, and on bridging the gap between innovative technological seeds and commercialization. For this, AIST is organized into 5 departments and 2 centers that bring together core technologies to exert its comprehensive strength. AIST, as a core and pioneering existence of the national innovation system, has about 2300 researchers doing research and development at 11 research bases across the country, based on the national strategies formulated bearing in mind the changing environment regarding innovation.

🔗 CATEGORY Organization

ALOHA: Aloha software framework for runtime-Adaptive and secure deep Learning On Heterogeneous Architectures

<https://www.aloha-h2020.eu/>

The main goal of ALOHA is to facilitate implementation of Deep Learning on heterogeneous low-energy computing platforms. To this aim, the project will develop a software development tool flow, automating (a) algorithm design and analysis; (b) porting of the inference tasks to heterogeneous embedded architectures, with optimized mapping and scheduling; (c) implementation of middleware and primitives controlling the target platform, to optimize power and energy savings.

🔗 CATEGORY InformationProcessing_Computing

ART-AI: University of Bath, UKRI Centre for Doctoral Training in Accountable, Responsible and Transparent AI

<https://cdt-art-ai.ac.uk/>

ART-AI exists to educate interdisciplinary professional experts to make the best, and safest, use of artificial intelligence (AI) and to explore the opportunities, challenges and constraints presented by the diverse range of contexts for AI.

🔗 CATEGORY Education

ARTICONF: smART social media eCOsytstem in a blockchain Federated environment

<https://articonf.eu/>

ARTICONF addresses issues of trust, time-criticality and democratisation for a new generation of federated infrastructure, to fulfil the privacy, robustness, and autonomy related promises that proprietary social media platforms have failed to deliver so far. The mission includes simplified creation, integration and federation of agile decentralised social media platforms by creating a novel permissioned blockchain with anonymised identities.

🔗 CATEGORY InformationProcessing_CyberSecurityPrivacy

BDVA: Big Data Value Association

<http://www.bdva.eu>

The mission of the BDVA is to develop the Innovation Ecosystem that will enable the data and AI-driven digital transformation in Europe delivering maximum economic and societal benefit, and, achieving and sustaining Europe's leadership on Big Data Value creation and Artificial Intelligence.

🔗 CATEGORY InformationProcessing_Computing

CAHA: Council of Europe Ad hoc Committee on Artificial Intelligence

<https://www.coe.int/en/web/artificial-intelligence/cahai>

The Committee will examine the feasibility and potential elements on the basis of broad multi-stakeholder consultations, of a legal framework for the development, design and application of artificial intelligence, based on Council of Europe's standards on human rights, democracy and the rule of law.

🔗 CATEGORY Organizatio

CEN/CLC FG on AI: CEN-CENELEC Focus Group on Artificial Intelligence

https://www.cencenelec.eu/news/brief_news/Pages/TN-2019-018.aspx

CEN-CENELEC Focus Group on Artificial Intelligence (AI) was established in December 2018 by the CEN and CENELEC Technical Boards (BT). The decision to establish the Focus Group followed the Stakeholders engagement workshop Trustworthy Artificial Intelligence - building a framework with standardisation organized by CEN and CENELEC in September 2018, with the aim to launch a high-level discussion on standardisation in the field of AI and agree on a roadmap for AI standardisation by 2020.

🔗 CATEGORY InformationProcessing_Computing

CEN: European Committee for Standardisation (CEN)

<https://standards.cen.eu/dyn/www/f?p=CENWEB:6::NO::>

European Committee for Standardisation (CEN)
CATEGORY Connectivity

DIN/DKE: German Institute for Standardisation

<https://www.din.de/en>

German Institute for Standardisation
CATEGORY Connectivity

DoD USA: Department of Defense of USA

<https://www.defense.gov>

The Department of Defense provides the military forces needed to deter war and ensure the USA's security.
CATEGORY Organization

EC AC SUM: EC Action Cluster Sustainable Urban Mobility

<https://eu-smartcities.eu/clusters/11/description>

EC Action Cluster Sustainable Urban Mobility
CATEGORY Organization

EC: European Commission

https://ec.europa.eu/commission/index_en

European Commission
CATEGORY Organization

EDP: European Data Portal

<https://www.europeandataportal.eu>

The European Data Portal provides access to open data from international, EU, national, regional, local and geo data portals. It replaces the EU Open Data Portal and the European Data Portal. The portal addresses the whole data value chain, from data publishing to data reuse. Going beyond collecting metadata (data about data), the strategic objective of the portal is to improve accessibility and increase the value of open data.

CATEGORY InformationProcessing

EIT-Health: European Institute of Innovation and Technology (EIT) - Health

<https://eit.europa.eu/our-communities/eit-health>

EIT Health is a Knowledge and Innovation Community supported by the European Institute of Innovation and Technology (EIT), an EU body created to find solutions to pressing global challenges. EIT is an integral part of the European Union's Framework Programme for Research and Innovation. EIT Health brings together experts from business, research and education to form dynamic cross-border collaborations, helping create an optimal environment for healthcare innovation to flourish.

🔗 CATEGORY InformationProcessing_Computing

ETSI ISG ARF: ETSI ISG ARF Augmented Reality

<https://portal.etsi.org/tb.aspx?tbid=858&SubTB=858>

ETSI ISG ARF Augmented Reality

🔗 CATEGORY InformationProcessing_Computing

ETSI ISG CIM: ETSI ISG CIM Context Information Management

<https://portal.etsi.org/tb.aspx?tbid=854&SubTB=854>

ETSI ISG CIM Context Information Management

🔗 CATEGORY InformationProcessing_Computing

ETSI ISG ENI: ETSI ISG ENI Experiential Network Intelligence

<http://portal.etsi.org/tb.aspx?TBID=857&subTB=857>

ENI focuses on improving the operator experience by adding closed-loop Artificial Intelligence (AI) mechanisms based on context-aware, metadata-driven policies to more quickly recognize and incorporate new and changed knowledge, and hence, make actionable decisions about network services.

🔗 CATEGORY Connectivity_Fixed

ETSI ISG SAI: ETSI ISG Secured Artificial Intelligence

<https://portal.etsi.org/tb.aspx?tbid=877&SubTB=877>

The Securing Artificial Intelligence Industry Specification Group (ISG SAI) develops technical specifications that mitigate against threats arising from the deployment of AI, and threats to AI systems, from both other AIs, and from conventional sources. ISG SAI is intended to frame the security concerns arising from AI and to build the foundation of a longer term response to the threats to AI in sponsoring the future development of normative technical specifications.

🔗 CATEGORY InformationProcessing_CyberSecurityPrivacy

ETSI ISG ZSM: ETSI ISG Zero touch network and Service Management (ISG ZSM)

<https://portal.etsi.org/tb.aspx?tbid=862&SubTB=862,863#/>

ETSI ISG Zero touch network and Service Management (ISG ZSM) is working on the definition of a new, future-proof, horizontal and vertical end-to-end operable framework and solutions to enable agile, efficient and qualitative management and automation of emerging and future networks and services. Horizontal end-to-end refers to cross-domain, cross-technology aspects. Vertical end-to-end refers to cross-layer aspects, from the resource-oriented up to the customer-oriented layers. The goal is to have all operational processes and tasks (e.g., delivery, deployment, configuration, assurance, and optimization) executed automatically, ideally with 100 automation.

 CATEGORY Connectivity

ETSI TC NTECH: ETSI TC NTECH

<https://portal.etsi.org/tb.aspx?tbid=785&SubTB=785,808>

ETSI TC NTECH is the ETSI competence centre on network technologies, including interconnection to other networks, providing architecture and protocol specifications applicable to access and core networks and defining Future Networks technologies.

 CATEGORY Connectivity_Fixed

ETSI TC SmartBAN: ETSI TC SmartBAN Body Area Networks

<https://portal.etsi.org/tb.aspx?tbid=804&SubTB=804#/>

ETSI TC SmartBAN Body Area Networks is a vertical technical committee and has primarily responsibilities for development and maintenance of ETSI Standards, Specifications, Reports, Guides and other deliverables to support the development and implementation of Smart Body Area Network technologies (Wireless BAN, Personal BAN, Personal Networks etc.) in health, wellness, leisure, sport and other relevant domains. TC SmartBAN's scope includes communication media, and associated physical layer, network layer, security, QoS and lawful intercept, and also provision of generic applications and services (e.g. web) for standardisation in the area of Body Network Area technologies.

 CATEGORY Connectivity_Wireless

ETSI TC SmartM2M: ETSI TC SmartM2M

<https://portal.etsi.org/smartm2m>

ETSI TC SmartM2M

 CATEGORY InformationProcessing_IoT

ETSI: European Telecommunications Standards Institute

<http://www.etsi.org/>

European Telecommunications Standards Institute is an association of mainly European vendors and telecom operators which produces globally applicable standards for ICT-enabled systems, applications and services deployed across all sectors of industry and society

 CATEGORY Connectivity

EU AI Alliance: European AI Alliance

<https://ec.europa.eu/futurium/en/eu-ai-alliance>

European AI Alliance is a forum engaged in a broad and open discussion of all aspects of Artificial Intelligence development and its impacts

🔗 CATEGORY InformationProcessing_Computing

European Parliament: European Parliament

www.europarl.europa.eu

European Parliament

🔗 CATEGORY Organization

FBDAIA: Fraunhofer Big Data and Artificial Intelligence Alliance

<https://www.bigdata.fraunhofer.de/en.html>

The Fraunhofer Big Data and Artificial Intelligence Alliance consists of 30 institutes bundling their cross-sector competencies. Their expertise ranges from market-oriented big data solutions for individual problems to the professional education of data scientists and big data specialists.

🔗 CATEGORY InformationProcessing_Computing

FG-AI4EE: Focus Group on Environmental Efficiency for Artificial Intelligence and other Emerging Technologies

<https://www.itu.int/go/fgai4ee>

ITU-T Focus Group on Environmental Efficiency for Artificial Intelligence and other Emerging Technologies (FG-AI4EE) was established by ITU-T Study Group 5 at its meeting in Geneva on 22 May 2019. The Focus Group identifies the standardisation needs to develop a sustainable approach to AI and other emerging technologies including automation, augmented reality, virtual reality, extended reality, smart manufacturing, industry 5.0, cloud edge computing, nanotechnology, 5G, among others.

🔗 CATEGORY InformationProcessing_Computing

FGAI4H: Focus Group on Artificial Intelligence for Health

<https://www.itu.int/go/fgai4h>

The ITU WHO Focus Group on artificial intelligence for health (FG-AI4H) works in partnership with the World Health Organization (WHO) to establish a standardised assessment framework for the evaluation of AI-based methods for health, diagnosis, triage or treatment decisions. Participation in the FG-AI4H is free of charge and open to all. The group was established by ITU-T Study Group 16 at its meeting in Ljubljana, Slovenia, 9-20 July 2018.

🔗 CATEGORY InformationProcessing_Computing

G20: Group of Twenty

<https://g20.org/en/Pages/home.aspx>

The Group of Twenty, or the G20, is the premier forum for international economic cooperation. The G20 brings together the leaders of both developed and developing countries from every continent. Collectively, G20 members represent around 80 percent of the world economic output, two-thirds of global population and three-quarters of international trade. Throughout the year, representatives from G20 countries gather to discuss financial and socioeconomic issues.

🔗 CATEGORY Organization

GPAI: Global Partnership on AI (GPAI)

<https://oecd.ai/wonk/oecd-and-g7-artificial-intelligence-initiatives-side-by-side-for-responsible-ai>

The founding members will support the responsible and human-centric development and use of AI in a manner consistent with human rights, fundamental freedoms, and our shared democratic values, as elaborated in the OECD Recommendation on AI.

🔗 CATEGORY InformationProcessing

HLEG-AI: EU High Level Expert Group on AI

<https://ec.europa.eu/digital-single-market/en/high-level-expert-group-artificial-intelligence>

The EC appointed 52 experts in June 2018 to a High-Level Expert Group on Artificial Intelligence, with the objective to support the European Strategy on Artificial Intelligence. This includes the elaboration of recommendations on future-related policy development and on ethical, legal and societal issues related to AI, including socio-economic challenges.

🔗 CATEGORY Organization_Governance

Humane-AI: HUMAN-CENTERED ARTIFICIAL INTELLIGENCE

<https://www.humane-ai.eu/>

HUMAN-CENTERED ARTIFICIAL INTELLIGENCE is a H2020 EC Project to design the principles for a new science that will make artificial intelligence based on European values and closer to Europeans. This new approach works toward AI systems that augment and empower all Humans by understanding us, our society and the world around us.

🔗 CATEGORY InformationProcessing_Computing

IEC TC 65 WG24: IEC TC 65 WG24 Asset Administration Shell for Industrial Applications

https://www.iec.ch/dyn/www/f?p=103:14:239801078666:::FSP_ORG_ID:25623

Work on Asset Administration Shell in the scope of industrial applications and especially of Smart Manufacturing. Define how to represent an asset of the real world in the information world by the Asset Administration Shell containing structures, properties and services.

🔗 CATEGORY InformationProcessing_IoT

IEEE 7010-2020: IEEE 7010-2020 - IEEE Recommended Practice for Assessing the Impact of Autonomous and Intelligent Systems on Human Well-being

<https://standards.ieee.org/content/ieee-standards/en/standard/7010-2020.html>

This recommended practice establishes wellbeing metrics relating to human factors directly affected by intelligent and autonomous systems and establishes a baseline for the types of objective and subjective data these systems should analyze and include (in their programming and functioning) to proactively increase human wellbeing.

📁 CATEGORY SocialCohesion

IEEE A-IS: IEEE Global Initiative on Ethics of Autonomous and Intelligent Systems

<https://standards.ieee.org/industry-connections/ec/autonomous-systems.html>

The IEEE Global Initiative's mission is to ensure every stakeholder involved in the design and development of autonomous and intelligent systems is educated, trained, and empowered to prioritize ethical considerations so that these technologies are advanced for the benefit of humanity.

📁 CATEGORY InformationProcessing_Computing

IEEE ECPAIS: IEEE Ethics Certification Program for Autonomous and Intelligent Systems (ECPAIS)

<https://standards.ieee.org/industry-connections/ecpais.html>

The goal of The Ethics Certification Program for Autonomous and Intelligent Systems (ECPAIS) is to create specifications for certification and marking processes that advance transparency, accountability and reduction in algorithmic bias in Autonomous and Intelligent Systems (A IS).

📁 CATEGORY InformationProcessing_Computing

IEEE IoT and Smart Cities Open Standards Committee: IEEE IoT and Smart Cities Open Standards Committee

<https://cmte.ieee.org/comsoc-iotisc/>

IEEE IoT Initiative Smart Cities Working Group is sponsored through the IEEE Internet of Things Initiative, and administrated through the IEEE Communications Society. Our working group engages in the process of standards development and advancement of technical matters related to Smart Cities and applications within the Internet of Things.

📁 CATEGORY SmartCity

IEEE P1872.2: IEEE P1872.2 - Standard for Autonomous Robotics (AuR) Ontology

https://standards.ieee.org/project/1872_2.html

This standard is a logical extension to IEEE 1872-2015 Standard for Ontologies for Robotics and Automation. The standard extends the CORA ontology by defining additional ontologies appropriate for Autonomous Robotics (AuR) relating to 1) The core design patterns specific to AuR in common R and A sub-domains; 2) General ontological concepts and domain-specific axioms for AuR; and 3) General use cases and or case studies for AuR.

🔗 CATEGORY Manufacturing

IEEE P2089: IEEE P2089 - Standard for Age Appropriate Digital Services Framework - Based on the 5Rights Principles for Children

<https://standards.ieee.org/project/2089.html>

This standard is the first in a family of standards focused on the 5Rights principles, and establishes a framework for developing age appropriate digital services for situations where users are children. The framework centers around the following key areas a) recognition that the user is a child, b) has considered the capacity and upholds the rights of children, c) offers terms appropriate to children, d) presents information in an age appropriate way and e) thereby offers a level of validation for service design decisions. The standard provides a specific impact rating system and evaluation criteria, and sets out how vendors, public institutions and the educational sector can meet the criteria.

🔗 CATEGORY SocialCohesion

IEEE P2247.1: IEEE P2247.1 - Standard for the Classification of Adaptive Instructional Systems

https://standards.ieee.org/project/2247_1.html

This standard defines and classifies the components and functionality of adaptive instructional systems (AIS). This standard defines parameters used to describe AIS and establishes requirements and guidance for the use and measurement of these parameters.

🔗 CATEGORY InformationProcessing

IEEE P2247.2: IEEE P2247.2 - Interoperability Standards for Adaptive Instructional Systems (AISs)

https://standards.ieee.org/project/2247_2.html

This standard defines interactions and exchanges among the components of adaptive instructional systems (AISs). This standard defines the data and data structures used in these interactions and exchanges and parameters used to describe and measure them and establishes requirements and guidance for the use and measurement of the data, data structures, and parameters.

🔗 CATEGORY InformationProcessing

IEEE P2247.3: IEEE P2247.3 - Recommended Practices for Evaluation of Adaptive Instructional Systems

https://standards.ieee.org/project/2247_3.html

This recommended practice defines and classifies methods of evaluating adaptive instructional systems (AIS) and establishes guidance for the use of these methods. This best practice incorporates and promotes the principles of ethically aligned design for the use of artificial intelligence (AI) in AIS.

🔗 CATEGORY InformationProcessing

IEEE P2660.1: IEEE P2660.1 - Recommended Practices on Industrial Agents: Integration of Software Agents and Low Level Automation Functions

https://standards.ieee.org/standard/2660_1-2020.html

This recommended practice describes integrating and deploying the Multi-agent Systems (MAS) technology in industrial environments for use in building the intelligent decision-making layer on top of legacy industrial control platforms. The integration of software agents with the low-level real-time control systems, mainly based on the Programmable Logic Controllers (PLCs) running the IEC 61131-3 control programs (forming in this manner a new component known as industrial agents) are also identified. In addition, the integration of software agents with the control applications based on IEC 61499 standard or executed on embedded controllers is described. This recommended practice supports and helps the engineers leverage the best practices of developing industrial agents for specific automation control problems and given application fields. Therefore, corresponding rules, guidelines and design patterns are provided.

🔗 CATEGORY InformationProcessing

IEEE P2671: IEEE P2671 - Standard for General Requirements of Online Detection Based on Machine Vision in Intelligent Manufacturing

<https://standards.ieee.org/project/2671.html>

This standard specifies through the general requirements of online detection based on machine vision, including requirements for data format, data transmission processes, definition of application scenarios and performance metrics for evaluating the effect of online detection deployment.

🔗 CATEGORY InformationProcessing

IEEE P2672: IEEE P2672 - Guide for General Requirements of Mass Customization

<https://standards.ieee.org/project/2672.html>

This guide provides the definitions, terminologies, operation procedures, system architectures, key technological requirements, data requirements and applications of and related to user-oriented mass customization. This guide provides reference information to be used by manufacturing enterprises for designing and implementing business models of mass customization.

🔗 CATEGORY InformationProcessing

IEEE P2690: IEEE P2690 - Standard for Charging Network Management Protocol for Electric Vehicle Charging Systems

<https://standards.ieee.org/project/2690.html>

IEEE P2690 - Standard for Charging Network Management Protocol for Electric Vehicle Charging Systems defines communications between Electric Vehicle Charging Systems (EVSC) and a device, network, and services management system, which is typically based in the cloud but could also include interfaces to site-specific components or systems (e.g. building energy management systems). It defines patterns, messages and parameters for monitoring and controlling such functions as user vehicle authentication and authorization; charging session state; energy and service pricing, delivery and metering; managed and smart charging; EVSE device health; system fault detection and diagnosis; environmental sensing (vehicle proximity, position, presence); user-oriented communication; and support for other e-mobility and value added services.

🔗 CATEGORY Mobility

IEEE P2751: IEEE P2751 - 3D Map Data Representation for Robotics and Automation

<https://standards.ieee.org/project/2751.html>

This standard extends the IEEE 1873-2015 Standard for Robot Map Data Representation from two-dimensional (2D) maps to three-dimensional (3D) maps. The standard develops a common representation and encoding for 3D map data, to be used in applications requiring robot operation, like navigation and manipulation, in all domains (space, air, ground surface, underwater, and underground). The standard encoding is devoted to exchange map data between robot systems, while allowing robot systems to use their private internal representations for efficient map data processing. The standard places no constraints on where map data comes from nor on how maps are constructed.

🔗 CATEGORY InformationProcessing

IEEE P2755.2: IEEE Recommended Practice for Implementation and Management Methodology for Software Based Intelligent Process Automation (SBIPA)

<https://sagroups.ieee.org/2755/2755-2-2/>

This recommended practice describes implementation and management approaches and methods for enterprise implementation of Software Based Intelligent Process Automation (SBIPA) technologies. The recommended practice includes the exploration of technology capabilities, development of strategy, product evaluation, platform implementation, management and governance for service providers and end users.

🔗 CATEGORY InformationProcessing

IEEE P2801: IEEE P2801 - Recommended Practice for the Quality Management of Datasets for Medical Artificial Intelligence

<https://standards.ieee.org/project/2801.html>

P2801 - Recommended Practice for the Quality Management of Datasets for Medical Artificial Intelligence document identifies best practices for establishing a quality management system for datasets used for artificial intelligence medical device. The recommended practice covers a full cycle of dataset management, including items such as but not limited to data collection, transfer, utilization, storage, maintenance and update. The recommended practice recommends a list of critical factors that impact the quality of datasets, such as but not limited to data sources, data quality, annotation,

privacy protection, personnel qualification training evaluation, tools, equipment, environment, process control and documentation.

🔗 CATEGORY Health

IEEE P2802: IEEE P2802 - Standard for the Performance and Safety Evaluation of Artificial Intelligence Based Medical Device: Terminology

🔗 <https://standards.ieee.org/project/2802.html>

P2802 - Standard for the Performance and Safety Evaluation of Artificial Intelligence Based Medical Device Terminology standard establishes terminology used in artificial intelligence medical device, including definitions of fundamental concepts and methodology that describe the safety, effectiveness, risks and quality management of artificial intelligence medical device. The standard provides definitions using the following forms, such as but not limited to literal description, equations, tables, figures and legends. The standard also establishes a vocabulary for the development of future standards for artificial intelligence medical device.

🔗 CATEGORY Health

IEEE P2805.3: IEEE P2805.3 - Cloud-Edge Collaboration Protocols for Machine Learning

🔗 https://standards.ieee.org/project/2805_3.html

This standard specifies the collaboration protocols of enabling machine learning on the edge computing node with support from industrial clouds. This standard provides implementation reference of machine learning upon lower powered, cheaper, embedded devices, a specific hardware-based method of accepting the introduced machine learning models and then online optimization, i.e. comparing the models with incoming live data.

🔗 CATEGORY InformationProcessing

IEEE P2807.1: IEEE P2807.1 - Standard for Technical Requirements and Evaluation of Knowledge Graphs

🔗 https://standards.ieee.org/project/2807_1.html

IEEE P2807.1 - Standard for Technical Requirements and Evaluation of Knowledge Graphs

This standard defines technical requirements, performance metrics, evaluation criteria and test cases for knowledge graphs. The mandatory test cases include data input, metadata, data extraction, data fusion, data storage and retrieval, inference and analysis, and knowledge graph display.

🔗 CATEGORY Data Quality, Usage, Provenance, Checking, Ontologies

🔗 CATEGORY InformationProcessing

IEEE P2807: IEEE P2807 - Framework of Knowledge Graphs

🔗 <https://standards.ieee.org/project/2807.html>

P2807 - Framework of Knowledge Graphs standard defines the framework of knowledge graphs (KGs). The framework describes the input requirement of KG, construction process of KG, i.e., extraction, storage, fusion and understanding, performance metrics, applications of KG, verticals, KG related artificial intelligence (AI) technologies and other required digital infrastructure.

🔗 CATEGORY InformationProcessing

IEEE P2817: IEEE P2817 - Guide for Verification of Autonomous Systems

<https://standards.ieee.org/project/2817.html>

IEEE P2817 - Guide for Verification of Autonomous Systems

This Guide for Verification of Autonomous Systems enables the user to define a customized process for verification of their autonomous system based on their available resources. It documents best practices across all levels of abstraction within a given system. It describes a conceptual model that assists in the development of new verification processes for autonomous systems and provides both integration guidance for developing a verification process and techniques, methodologies, and tool types supporting verification process development.

➤ CATEGORY Data Quality, Usage, Provenance, Checking, Ontologies

➤ CATEGORY InformationProcessing

IEEE P2830: IEEE P2830 - Standard for Technical Framework and Requirements of Shared Machine Learning

<https://standards.ieee.org/project/2830.html>

IEEE P2830 - Standard for Technical Framework and Requirements of Shared Machine Learning

This standard defines a framework and architectures for machine learning in which a model is trained using encrypted data that has been aggregated from multiple sources and is processed by a third party trusted execution environment. A distinctive feature of this technique is the essential use of a third party trusted execution environment for computations. The standard specifies functional components, workflows, security requirements, technical requirements, and protocols.

➤ CATEGORY Algorithms ML, TransferLearning, Reinforcement and Deep Learning

➤ CATEGORY InformationProcessing

IEEE P2840: IEEE P2840 - Standard for Responsible AI Licensing

<https://standards.ieee.org/project/2840.html>

IEEE P2840 - Standard for Responsible AI Licensing - describes specifications for the factors that shall be considered in the development of a Responsible Artificial Intelligence (AI) license. Possible elements in the specification include (but are not limited to)

- (1) What a Responsible AI License means and what its aims are;
- (2) Standardised definitions for referring to components, features and other such elements of AI software, source code and services;
- (3) Standardised reference to geography specific AI Technology specific legislation and laws (such as the EU General Data Protection Regulation - GDPR) as well as identification of violation detection, penalties, and legal remedies;
- (4) The specification lists domain specific considerations that may be applied in developing a responsible AI license. The proposed standard shall not require the use of any specific legal text or clauses nor shall the proposed standard offer legal advice.

➤ CATEGORY Organization

IEEE P2841: IEEE P2841 - Framework and Process for Deep Learning Evaluation

<https://standards.ieee.org/project/2841.html>

IEEE P2841 - Framework and Process for Deep Learning Evaluation document defines best practices for developing and implementing deep learning algorithms and defines a framework and criteria for evaluating algorithm reliability and quality of the resulting software systems.

📁 CATEGORY InformationProcessing

IEEE P2842: IEEE P2842 - Recommended Practice for Secure Multi-party Computation

<https://standards.ieee.org/project/2842.html>

This standard provides a technical framework for Secure Multi-Party Computation, including specifying An overview of Secure Multi-Party Computation, A technical framework of Secure Multi-Party Computation, Security levels of Secure Multi-Party Computation, Use cases based on Secure Multi-Party Computation.

📁 CATEGORY InformationProcessing

IEEE P2846: IEEE P2846 - Assumptions for Models in Safety-Related Automated Vehicle Behavior

<https://standards.ieee.org/project/2846.html>

IEEE P2846 - Assumptions for Models in Safety-Related Automated Vehicle Behavior standard describes the minimum set of reasonable assumptions used in foreseeable scenarios to be considered for road vehicles in the development of safety-related models that are part of automated driving systems (ADS). The standard includes consideration of rules of the road and their regional and or temporal dependencies. This standard is not necessarily exhaustive to guarantee the safety of the ADS. In accordance with the IEEE SA Operations Manual Patent (6.3) and Structure (6.4) Sections, the Informative portion of the standard identifies attributes of suitable models including best practices for balancing ADS assumptions with rules of the road used in the context of the Dynamic Driving Task. The Informative portion also identifies methods that may be used to verify whether an implementation conforms to the minimum set of required reasonable assumptions used in foreseeable scenarios, and defines an example model conformant with the standard. Out of scope are the algorithms or technologies in an ADS that the assumptions and attributes defined in this standard impact.

📁 CATEGORY Safety

IEEE P2863: IEEE P2863 - Recommended Practice for Organizational Governance of Artificial Intelligence

<https://standards.ieee.org/project/2863.html>

This recommended practice specifies governance criteria such as safety, transparency, accountability, responsibility and minimizing bias, and process steps for effective implementation, performance auditing, training and compliance in the development or use of artificial intelligence within organizations.

📁 CATEGORY Organization

IEEE P2894: IEEE P2894 - Guide for an Architectural Framework for Explainable Artificial Intelligence

<https://standards.ieee.org/project/2894.html>

This guide specifies an architectural framework that facilitates the adoption of explainable artificial intelligence (XAI). This guide defines an architectural framework and application guidelines for XAI, including 1) description and definition of explainable AI, 2) the categorizes of explainable AI techniques; 3) the application scenarios for which explainable AI techniques are needed, 4) performance evaluations of XAI in real application systems.

🔗 CATEGORY InformationProcessing

IEEE P3030 3D Printing: IEEE P3030 - Standard for Consumer 3D Printing: Overview and Architecture

<https://standards.ieee.org/project/3030.html>

IEEE P3030 - Standard for Consumer 3D Printing Overview and Architecture

🔗 CATEGORY Manufacturing

IEEE P3333.1.3: IEEE P3333.1.3 - Standard for the Deep Learning Based Assessment of Visual Experience Based on Human Factors

https://standards.ieee.org/project/3333_1_3.html

This standard defines deep learning-based metrics of content analysis and quality of experience (QoE) assessment for visual contents, which is an extension of Standard for the Quality of Experience (QoE) and Visual-Comfort Assessments of Three-Dimensional (3D) Contents Based on Psychophysical Studies (IEEE STD 3333.1.1) and Standard for the Perceptual Quality Assessment of Three Dimensional (3D) and Ultra High Definition (UHD) Contents (IEEE 3333.1.2). The scope covers the following (a) Deep learning models for QoE assessment (multilayer perceptrons, convolutional neural networks, deep generative models); (b) Deep metrics of visual experience from High Definition (HD), UHD, 3D, High Dynamic Range (HDR), Virtual Reality (VR) and Mixed Reality (MR) contents; (c) Deep analysis of clinical (electroencephalogram (EEG), electrocardiogram (ECG), electrooculography (EOG), and so on) and psychophysical (subjective test and simulator sickness questionnaire (SSQ)) data for QoE assessment; (d) Deep personalized preference assessment of visual contents, (e) Building image and video databases for performance benchmarking purpose if necessary

🔗 CATEGORY InformationProcessing

IEEE P3652.1: IEEE P3652.1 - Guide for Architectural Framework and Application of Federated Machine Learning

https://standards.ieee.org/standard/3652_1-2020.html

Federated learning defines a machine learning framework that allows a collective model to be constructed from data that is distributed across data owners. This guide provides a blueprint for data usage and model building across organizations while meeting applicable privacy, security and regulatory requirements. It defines the architectural framework and application guidelines for federated machine learning, including 1) description and definition of federated learning, 2) the types of federated learning and the application scenarios to which each type applies, 3) performance evaluation of federated learning, and 4) associated regulatory requirements.

🔗 CATEGORY InformationProcessing

IEEE P7000: IEEE P7000 - Standard for Model Process for Addressing Ethical Concerns During System Design

<https://standards.ieee.org/project/7000.html>

The standard establishes a process model by which engineers and technologists can address ethical consideration throughout the various stages of system initiation, analysis and design. Expected process requirements include management and engineering view of new IT product development, computer ethics and IT system design, value-sensitive design, and, stakeholder involvement in ethical IT system design.

🔗 CATEGORY SocialCohesion

IEEE P7001: IEEE P7001 - Standards for Transparency of Autonomous Systems

<https://standards.ieee.org/project/7001.html>

This standard describes measurable, testable levels of transparency, so that autonomous systems can be objectively assessed and levels of compliance determined.

🔗 CATEGORY SocialCohesion

IEEE P7002: IEEE P7002 - Standard for Data Privacy Process

<https://standards.ieee.org/project/7002.html>

This standard defines requirements for a systems software engineering process for privacy oriented considerations regarding products, services, and systems utilizing employee, customer or other external user's personal data. It extends across the life cycle from policy through development, quality assurance, and value realization. It includes a use case and data model (including metadata). It applies to organizations and projects that are developing and deploying products, systems, processes, and applications that involve personal information. By providing specific procedures, diagrams, and checklists, users of this standard will be able to perform a conformity assessment on their specific privacy practices. Privacy impact assessments (PIAs) are described as a tool for both identifying where privacy controls and measures are needed and for confirming they are in place.

🔗 CATEGORY SocialCohesion

IEEE P7003: IEEE P7003 - Standard for Algorithmic Bias Considerations

<https://standards.ieee.org/project/7003.html>

This standard describes specific methodologies to help users certify how they worked to address and eliminate issues of negative bias in the creation of their algorithms, where negative bias infers the usage of overly subjective or uninformed data sets or information known to be inconsistent with legislation concerning certain protected characteristics (such as race, gender, sexuality, etc); or with instances of bias against groups not necessarily protected explicitly by legislation, but otherwise diminishing stakeholder or user well being and for which there are good reasons to be considered inappropriate. Possible elements include (but are not limited to) benchmarking procedures and criteria for the selection of validation data sets for bias quality control; guidelines on establishing and communicating the application boundaries for which the algorithm has been designed and validated to guard against unintended consequences arising from out-of-bound application of algorithms; suggestions for user expectation management to mitigate bias due to incorrect interpretation of systems outputs by users (e.g. correlation vs. causation).

🔗 CATEGORY SocialCohesion

IEEE P7004: IEEE P7004 - Standard for Child and Student Data Governance

<https://standards.ieee.org/project/7004.html>

This standard provides stakeholders with certifiable and responsible child and student data governance methodologies.

🔗 CATEGORY InformationProcessing_CyberSecurityPrivacy

IEEE P7006: IEEE P7006 - Standard for Personal Data Artificial Intelligence (AI) Agent

<https://standards.ieee.org/project/7006.html>

This standard describes the technical elements required to create and grant access to a personalized Artificial Intelligence (AI) that will comprise inputs, learning, ethics, rules and values controlled by individuals.

🔗 CATEGORY InformationProcessing

IEEE P7007: IEEE P7007 - Ontological Standard for Ethically Driven Robotics and Automation Systems

<https://standards.ieee.org/project/7007.html>

The standard establishes a set of ontologies with different abstraction levels that contain concepts, definitions and axioms which are necessary to establish ethically driven methodologies for the design of Robots and Automation Systems.

🔗 CATEGORY InformationProcessing

IEEE P7008: IEEE P7008 - Standard for Ethically Driven Nudging for Robotic, Intelligent and Autonomous Systems

<https://standards.ieee.org/project/7008.html>

Nudges as exhibited by robotic, intelligent or autonomous systems are defined as overt or hidden suggestions or manipulations designed to influence the behavior or emotions of a user. This standard establishes a delineation of typical nudges (currently in use or that could be created). It contains concepts, functions and benefits necessary to establish and ensure ethically driven methodologies for the design of the robotic, intelligent and autonomous systems that incorporate them.

🔗 CATEGORY SocialCohesion

IEEE P7009: IEEE P7009 - Standard for Fail-Safe Design of Autonomous and Semi-Autonomous Systems

<https://standards.ieee.org/project/7009.html>

This standard establishes a practical, technical baseline of specific methodologies and tools for the development, implementation, and use of effective fail-safe mechanisms in autonomous and semi-autonomous systems. The standard includes (but is not limited to) clear procedures for measuring, testing, and certifying a system's ability to fail safely on a scale from weak to strong, and instructions for improvement in the case of unsatisfactory performance. The standard serves as the basis for developers, as well as users and regulators, to design fail-safe mechanisms in a robust, transparent, and accountable manner.

🔗 CATEGORY Safety

IEEE P7011: IEEE P7011 - Standard for the Process of Identifying and Rating the Trustworthiness of News Sources

<https://standards.ieee.org/project/7011.html>

This standard provides semi-autonomous processes using standards to create and maintain news purveyor ratings for purposes of public awareness. It standardises processes to identify and rate the factual accuracy of news stories in order to produce a rating of online news purveyors and the online portion of multimedia news purveyors. This process will be used to produce truthfulness scorecards through multi-faceted and multi-sourced approaches. The standard defines an algorithm using open source software and a score card rating system as methodology for rating trustworthiness as a core tenant in an effort to establish trust and acceptance.

➤ CATEGORY SocialCohesion

IEEE P7012: IEEE P7012 - Standard for Machine Readable Personal Privacy Terms

<https://standards.ieee.org/project/7012.html>

The standard identifies addresses the manner in which personal privacy terms are proffered and how they can be read and agreed to by machines.

➤ CATEGORY InformationProcessing

IEEE P7013 Automated Facial Analysis: IEEE P7013 - Inclusion and Application Standards for Automated Facial Analysis Technology

<https://spectrum.ieee.org/the-institute/ieee-products-services/standards-working-group-takes-on-facial-recognition>

The team is investigating the scope of facial-recognition algorithms and associated metrics that could be standardised.

➤ CATEGORY InformationProcessing

IEEE P7014 Ethics in Emulated Empathy in AI: IEEE P7014 Standard for Ethical considerations in Emulated Empathy in Autonomous and Intelligent Systems

<https://standards.ieee.org/project/7014.html>

This standard defines a model for ethical considerations and practices in the design, creation and use of empathic technology, incorporating systems that have the capacity to identify, quantify, respond to, or simulate affective states, such as emotions and cognitive states. This includes coverage of affective computing, emotion Artificial Intelligence and related fields.

➤ CATEGORY InformationProcessing_CyberSecurityPrivacy

IEEE P7014: IEEE P7014 Standard for Ethical considerations in Emulated Empathy in Autonomous and Intelligent Systems

<https://standards.ieee.org/project/7014.html>

This standard defines a model for ethical considerations and practices in the design, creation and use of empathic technology, incorporating systems that have the capacity to identify, quantify, respond to, or simulate affective states, such as emotions and cognitive states. This includes coverage of affective computing, emotion Artificial Intelligence and related fields.

🔗 CATEGORY InformationProcessing_CyberSecurityPrivacy

IEEE: IEEE Institute of Electrical and Electronics Engineers

<https://www.ieee.org/>

IEEE and its members inspire a global community to innovate for a better tomorrow through highly cited publications, conferences, technology standards, and professional and educational activities. IEEE is the trusted voice for engineering, computing, and technology information around the globe.

🔗 CATEGORY Connectivity

IMI: IMI (Infrastructure for Multilayer Interoperability)

<https://imi.go.jp/>

IMI (Infrastructure for Multilayer Interoperability) is a part of an action plan for the development of an open use environment in the field of electronic administration, such that the terms used for data are shared to facilitate the sharing and utilization of information. We are working to improve the interoperability of administrative services by using a character information base and a common vocabulary base.

🔗 CATEGORY InformationProcessing_Computing

IRTF ICNRG : IRTF ICNRG Information-Centric Networking Research Group

<https://irtf.org/icnrg>

The main objective of the ICNRG is to couple ongoing ICN research in the above areas with solutions that are relevant for evolving the Internet at large.

🔗 CATEGORY Connectivity

IRTF NMRG: IRTF Network Management Research Group

<https://irtf.org/nmrg>

The Network Management Research Group (NMRG) provides a forum for researchers to explore new technologies for the management of the Internet. In particular, the NMRG will work on solutions for problems that are not yet considered well understood enough for engineering work within the IETF. The focus of the NMRG will be on management services that interface with the current Internet management framework. This includes communication services between management systems, which may belong to different management domains, as well as customer-oriented management services. The NMRG will prioritize investigation of three related topics (1) self-driving -managing networks, (2) intent-based networking and (3) artificial intelligence in network management.

🔗 CATEGORY Connectivity

ISO TC 159 SC 4: ISO TC 159 SC 4 Ergonomics of human-system interaction

<https://www.iso.org/committee/53372/x/catalogue/p/1/u/1/w/0/d/0>

Ergonomics standardisation of the interaction between systems (often computer based) and the people who use and operate them as well as those who develop, manufacture, evaluate, install and maintain them. Areas of standardisation include hardware ergonomics (including input, display and interactive devices and associated workplaces and environments), software ergonomics (including dialogue and interaction design) and human centred design processes and methods (including usability engineering and participative design methods) as well as accessibility.

🔗 CATEGORY Manufacturing

ISO TC 199: ISO TC 199 Machine Security

<https://www.iso.org/committee/54604.html>

ISO TC 199 Machine Security covers basic concepts and general principles for safety of machinery incorporating terminology, methodology, guards and safety devices within the framework of ISO IEC Guide 51 and in cooperation with other ISO and IEC technical committees.

🔗 CATEGORY InformationProcessing_CyberSecurityPrivacy

ISO/IEC JTC 1 AG 9: ISO/IEC JTC 1 AG 9 Data Usage

https://www.iec.ch/dyn/www/f?p=103:14:754409099798:::FSP_ORG_ID,FSP_LANG_ID:25021,25

Conduct a study of potential standards for Data Sharing Frameworks that would describe factors to consider when sharing data.

🔗 CATEGORY InformationProcessing_Computing

ISO/IEC JTC 1/SC 27: ISO/IEC JTC 1/SC 27 Information Security, cybersecurity and privacy protection

<https://www.iso.org/committee/45306.html>

Information Security, cybersecurity and privacy protection

🔗 CATEGORY InformationProcessing_CyberSecurityPrivacy

ISO/IEC JTC 1/SC 38/WG 5: ISO/IEC JTC 1/SC 38 WG 5 Data in cloud computing and related technologies

<https://www.iso.org/committee/601355.html>

Standardisation in the areas of Cloud Computing and Distributed Platforms including Foundational concepts and technologies; Operational issues; Interactions among Cloud Computing systems and with other distributed systems. SC 38 serves as the focus, proponent, and systems integration entity on Cloud Computing, Distributed Platforms, and the application of these technologies. SC 38 provides guidance to JTC 1, IEC, ISO and other entities developing standards in these areas.

🔗 CATEGORY InformationProcessing_Computing

ISO/IEC JTC 1/SC 42/JWG 1 - SC 40: ISO/IEC JTC 1/SC 42/JWG 1 on Governance Implications of AI

<https://isotc.iso.org/livelink/livelink?func=ll&objId=20079825&objAction=browse&sort=name&viewType=1>

ISO IEC JTC1 SC 42 is the Joint Working Group with ISO IEC JTC1 SC 40 on Governance implications of AI

🔗 CATEGORY InformationProcessing_Computing

ISO/IEC JTC 1/SC 42/WG 1: ISO/IEC JTC 1/SC 42/WG 1 Foundational standards for AI

<https://isotc.iso.org/livelink/livelink?func=ll&objId=19700267&objAction=browse&sort=name&viewType=1>

foundational standards for AI

🔗 CATEGORY InformationProcessing_Computing

ISO/IEC JTC 1/SC 42: ISO/IEC JTC 1/SC 42 Artificial Intelligence

<https://www.iso.org/committee/6794475.html>

ISO IEC JTC 1 SC 42 - Artificial Intelligence and big data - serves as the focus and proponent for JTC 1's standardisation program on Artificial Intelligence and provides guidance to JTC 1, IEC, and ISO committees developing Artificial Intelligence applications.

🔗 CATEGORY InformationProcessing_Computing

ISO/IEC JTC 1/SC 7: Software and systems engineering

<https://www.iso.org/committee/45086.html>

ISO IEC JTC 1 SC 7 - software and systems engineering delivers standards in the area of software and systems engineering that meet market and professional requirements. These standards covers the processes, supporting tools and supporting technologies for the engineering of software products and systems.

🔗 CATEGORY InformationProcessing

ITU FG-AI4H: ITU/WHO Focus Group AI for Health

<https://aiforgood.itu.int/ai4health/>

The ITU WHO Focus Group on artificial intelligence for health (FG-AI4H) works in partnership with the World Health Organization (WHO) to establish a standardised assessment framework for the evaluation of AI-based methods for health, diagnosis, triage or treatment decisions. Participation in the FG-AI4H is free of charge and open to all. The group was established by ITU-T Study Group 16 at its meeting in Ljubljana, Slovenia, 9-20 July 2018, for an initial term ?? of 2 years.

🔗 CATEGORY Health

ITU-R SG 6: ITU-R Study Group 6 - Broadcasting Service?

<https://www.itu.int/en/ITU-R/study-groups/rsg6/Pages/default.aspx>

ITU-R SG 6 considers radiocommunication broadcasting, including vision, sound, multimedia and data services principally intended for delivery to the general public. This includes issues such as Audio Definition Model renderer for advanced sound systems, artificial intelligence systems for programme production and exchange, advanced immersive sensory media systems, etc.

➤ CATEGORY Connectivity_Broadcast

ITU-T FG AI4H: ITU-T Focus Group AI for Health

<https://www.itu.int/en/ITU-T/focusgroups/ai4h>

The ITU WHO Focus Group on artificial intelligence for health (FG-AI4H) works in partnership with the World Health Organization (WHO) to establish a standardised assessment framework for the evaluation of AI-based methods for health, diagnosis, triage or treatment decisions. Participation in the FG-AI4H is free of charge and open to all. The group was established by ITU-T Study Group 16 at its meeting in Ljubljana, Slovenia, 9-20 July 2018, for an initial term of 2 years.

➤ CATEGORY InformationProcessing_Computing

ITU-T FG-AI4AD: ITU-T FG on AI for autonomous and assisted driving (FG-AI4AD)

<https://www.itu.int/en/ITU-T/focusgroups/ai4ad/Pages/default.aspx>

The FG-AI4AD supports standardisation activities for services and applications enabled by AI systems in autonomous and assisted driving. The FG-AI4AD will focus upon the behavioural evaluation of AI responsible for the dynamic driving task in accordance with the 1949 and 1968 Convention on Road Traffic of the UNECE Global Forum for Road Safety. To build public trust it is fundamental that the performance of AI on our road meets, or exceeds, the performance of a competent and careful human driver.

➤ CATEGORY Mobility

ITU-T SG 11: ITU-T Study Group 11 - Signalling requirements, protocols and test specifications

<https://www.itu.int/en/ITU-T/studygroups/2017-2020/11/Pages/default.aspx>

ITU-T Study Group 11 (SG11) is responsible for signalling, producing international standards (ITU-T Recommendations) that define how telephone calls and other calls (such as data calls) are handled in the network. SG11 is also responsible for the development of test specifications. This work focuses on global interoperability testing and covers technical means, services, quality of service (QoS) and testing parameters. Activities encompass establishing benchmark testing procedures and investigating the testing of next-generation networks (NGN), ubiquitous sensor networks (USN) and emerging technologies such as the internet of things (IoT), distributed service network (DSN), home networking (HN), etc. SG11 leads ITU's work on conformance and interoperability testing and is responsible for coordinating the programme. Conformance with international standards is one of the core principles underlying the global interoperability of ICT networks and devices. The conformance programme was initiated at the request of ITU membership in light of the challenges faced by developing countries in improving interoperability.

➤ CATEGORY Connectivity

ITU-T SG 12: ITU-T Study Group 12 - Performance, QoS and QoE

<https://www.itu.int/en/ITU-T/studygroups/2017-2020/12/Pages/default.aspx>

ITU-T Study Group 12 is the expert group responsible for the development of international standards (ITU-T Recommendations) on performance, quality of service (QoS) and quality of experience (QoE). This work spans the full spectrum of terminals, networks and services, ranging from speech over fixed circuit-switched networks to multimedia applications over mobile and packet-based networks. SG12 also leads work on services based on speech technology, voice aspects of car communications, hands-free communications in vehicles, and methods of minimizing technology-related driver distraction.

🔗 CATEGORY Connectivity

ITU-T SG 13 FG ML5G: ITU-T SG13 FG ML5G - Focus Group on Machine Learning for Future Networks including 5G

<https://www.itu.int/en/ITU-T/focusgroups/ml5g/Pages/default.aspx>

ITU-T SG13 FG ML5G - Focus Group on Machine Learning for Future Networks including 5G

🔗 CATEGORY Connectivity_Wireless

ITU-T SG 13: ITU-T Study Group 13 - Future networks, with focus on IMT-2020, cloud computing and trusted network infrastructure

<https://www.itu.int/en/ITU-T/studygroups/2017-2020/13/Pages/default.aspx>

SG13 focuses today on future networks (FNs networks of the future beyond NGN) expected to enjoy early realization sometime around 2020 in prototyping or phased deployments. The group is standardizing FNs with the objectives of service, data, environmental and socio-economic awareness. This study resulted in the completion of standardisation efforts to support network virtualization, energy saving for FNs, and an identification framework. Future plans are to develop different facets of the smart ubiquitous network, requirements of network virtualization for FNs, framework of telecom SDN (software-defined networking) and requirements of formal specification and verification methods for SDN.

🔗 CATEGORY Connectivity

ITU-T SG 16: ITU-T Study Group 16 - Multimedia coding, systems and applications

<https://www.itu.int/en/ITU-T/studygroups/2017-2020/16/Pages/default.aspx>

Study Group 16 is responsible for studies relating to ubiquitous multimedia applications, multimedia capabilities for services and applications for existing and future networks, including the coordination of related studies across the various ITU-T SGs. It is the lead study group on multimedia coding, systems and applications; ubiquitous multimedia applications; telecommunication ICT accessibility for persons with disabilities; human factors; intelligent transport system (ITS) communications; e-health; Internet Protocol television (IPTV) and digital signage; and e-services.

🔗 CATEGORY Connectivity

ITU-T SG 17: ITU-T SG17 Security

<https://www.itu.int/en/ITU-T/studygroups/2017-2020/17/Pages/default.aspx>

ITU-T Study Group 17 (SG17) coordinates security-related work across all ITU-T Study Groups. Often working in cooperation with other standards development organizations (SDOs) and various ICT industry consortia, SG17 deals with a broad range of standardisation issues.

🔗 CATEGORY InformationProcessing_CyberSecurityPrivacy

ITU-T SG 2: ITU-T Study Group 2 - Operational aspects of service provision and telecommunications management

<https://www.itu.int/en/ITU-T/studygroups/2017-2020/02/Pages/default.aspx>

Study Group 2 is home to Recommendation ITU-T E.164, the numbering standard which has played a central role in shaping the telecom networks of today. ITU-T E.164 provides the structure and functionality of telephone numbers, and without it we would not be able to communicate internationally. In recent years SG2 has worked on ENUM, an Internet Engineering Task Force (IETF) protocol for entering E.164 numbers into the Internet domain name system (DNS). Study Group 2 is also responsible for standards on the management of telecom services, networks and equipment. Standards focus on fault, configuration, accounting, performance and security management (FCAPS) interfaces. FCAPS interfaces sit between network elements and management systems and also between two management systems. An equally important product of SG2 is Recommendation ITU-T E.212 which describes a system to identify mobile devices as they move from network to network. International mobile subscriber identity (IMS) is a critical part of the modern mobile telecoms system, allowing the identification of a roaming mobile terminal in a foreign network and subsequently the querying of the home network for subscription and billing information.

🔗 CATEGORY Connectivity

ITU-T SG 20: ITU-T SG20 IoT and Smart City

<https://www.itu.int/en/ITU-T/studygroups/2017-2020/20/Pages/default.aspx>

ITU-T SG20 Internet of things (IoT) and smart cities and communities (SC and C) group includes studies relating to big data aspects of IoT and SC and C, e-services and smart services for SC and C.

🔗 CATEGORY SmartCity

ITU-T SG 5: ITU-T Study Group 5 - Environment and circular economy

<https://www.itu.int/en/ITU-T/studygroups/2017-2020/05/Pages/default.aspx>

ITU-T Study Group 5 (SG5) is responsible for studies on methodologies for evaluating ICT effects on climate change and publishing guidelines for using ICTs in an eco-friendly way. Under its environmental mandate SG5 is also responsible for studying design methodologies to reduce ICTs and e-waste adverse environmental effects, for example, through recycling of ICT facilities and equipment. In addition to its climate-focused activities, the ITU-T Recommendations, Handbooks and other publications produced by SG5 have four main objectives (1) to protect telecommunication equipment and installations against damage and malfunction due to electromagnetic disturbances, such as those from lightning; (2) to ensure safety of personnel and users of networks against current and voltages used in telecommunication networks; (3) to avoid health risks from electromagnetic fields (EMFs) produced by telecommunication devices and installations; (4) to guarantee a good quality of service (QoS) for high speed data services by providing requirements on characteristics of copper cables and on the coexistence of services delivered by different providers.

🔗 CATEGORY Sustainability

ITU-T SG 9: ITU-T Study Group 9 - Broadband cable and TV

<https://www.itu.int/en/ITU-T/studygroups/2017-2020/09/Pages/default.aspx>

ITU-T Study Group 9 (SG9) carries out studies on the use of telecommunication systems in the distribution of television and sound programs supporting advanced capabilities such as ultra-high definition and 3D TV. This work also covers the use of cable and hybrid networks - primarily designed for the distribution of television and sound programs to the home - as integrated broadband networks to provide interactive voice, video and data services, including Internet access. SG9 has developed ITU-T Recommendations on next-generation cable modems which act as universal integrated receivers or set-top boxes for home networking. The cable modems link all types of in-premises electronic devices for applications such as entertainment, telecommunication, information technology, home-automation systems and telemetry (remote control and monitoring systems). To stimulate the worldwide exchange of interactive TV services, SG9 has also developed a harmonized set of interactive content formats and common application programming interfaces (APIs).

➤ CATEGORY Connectivity_Broadcast

ITU-T SG5 FG-AI4EE: ITU-T SG5 Focus Group on Environmental Efficiency for Artificial Intelligence and other Emerging Technologies (FG-AI4EE)

<https://www.itu.int/en/ITU-T/focusgroups/ai4ee/Pages/default.aspx>

ITU-T SG5 Focus Group on Environmental Efficiency for Artificial Intelligence and other Emerging Technologies (FG-AI4EE) was established 22 May 2019 to identify the standardisation needs to develop a sustainable approach to AI and other emerging technologies including automation, augmented reality, virtual reality, extended reality, smart manufacturing, industry 5.0, cloud edge computing, nanotechnology, 5G, among others. The focus group will develop technical reports and technical specifications to address the environmental efficiency, as well as water and energy consumption of emerging technologies.

➤ CATEGORY Sustainability

JRC: Joint Research Centre

https://ec.europa.eu/info/departments/joint-research-centre_en

The Joint Research Centre is the European Commission's science and knowledge service. The JRC employs scientists to carry out research in order to provide independent scientific advice and support to EU policy.

➤ CATEGORY Organization

Khronos Group: Khronos Group

<https://www.khronos.org/>

The Khronos Group is an open, non-profit, member-driven consortium of over 150 industry-leading companies creating advanced, royalty-free interoperability standards for 3D graphics, augmented and virtual reality, parallel programming, vision acceleration and machine learning. The Khronos Board identifies which working groups are routinely sharing design contributions and organize them into IP (intellectual property) Zones in order to clearly manage a web of Working Group Exclusion Certificates.

➤ CATEGORY InformationProcessing

LOGISTAR: LOGISTAR

<https://logistar-project.eu/>

LOGISTAR project proposes the intensive use of Internet of Things, Open Data, Artificial Intelligence, Optimisation techniques and other ICT advances for effective planning and optimizing of transport in the logistics sector.

📁 CATEGORY Mobility

METI: Ministry of Economy, Trade and Industry (METI), Japan

<https://www.meti.go.jp/english/>

METI has the mission to develop Japan's economy and industry by focusing on promoting economic vitality in private companies and smoothly advancing external economic relationships, and to secure stable and efficient supply of energy and mineral resources.

📁 CATEGORY Organization

MUSKETEER: Machine Learning to augment shared knowledge in federated privacy preserving scenarios

<https://musketeer.eu/>

MUSKETEER aims to create a validated, federated, privacy-preserving machine learning platform tested on industrial data that is inter-operable, scalable and efficient enough to be deployed in real use cases. MUSKETEER aims to alleviate data sharing barriers by providing secure, scalable and privacy-preserving analytics over decentralized datasets using machine learning. Data can continue to be stored in different locations with different privacy constraints, but shared securely. The MUSKETEER cross-domain platform will validate progress in the two industrial scenarios SMART MANUFACTURING and HEALTH CARE. MUSKETEER strives to (1) Create machine learning models over a variety of privacy-preserving scenarios; (2) Ensure security and robustness against external and internal threats; (3) Provide a standardised and extendable architecture; (4) Demonstrate and validate in two different industrial scenarios; (5) Enhance data economy by boosting sharing across domains.

📁 CATEGORY InformationProcessing_CyberSecurityPrivacy

NEDO: National Research and Development Agency New Energy and Industrial Technology Development Organization, Japan

<https://www.nedo.go.jp/english/index.html>

Established in Japan in 1980, NEDO is a national research and development corporation that creates innovation by promoting the technological development necessary to realize a sustainable society. NEDO, as one of Japan's largest public technology development management institutions that plays a part in economic and industrial administration, has two missions solving energy and global environmental problems and strengthening industrial technology capabilities.

📁 CATEGORY Energy

NETRON: NETRON

<https://github.com/lutzroeder/netron>

Netron is a viewer for neural network, deep learning and machine learning models. Netron (Version 2) supports ONNX (.onnx, .pb, .pbtxt), Keras (.h5, .keras), Core ML (.mlmodel), Caffe (.caffemodel, .prototxt), Caffe2 (predict_net.pb), Darknet (.cfg), MXNet (.model, -symbol.json), Barracuda (.nn), ncnn (.param), Tengine (.tmfile), TNN (.tnnproto), UFF (.uff) and TensorFlow Lite (.tflite).

🔗 CATEGORY InformationProcessing_Computing

NNEF: Neural Network Exchange Format (NNEF)

<https://www.khronos.org/hnef>

NNEF reduces machine learning deployment fragmentation by enabling a rich mix of neural network training tools and inference engines to be used by applications across a diverse range of devices and platforms. The goal of NNEF is to enable data scientists and engineers to easily transfer trained networks from their chosen training framework into a wide variety of inference engines. A stable, flexible and extensible standard that equipment manufacturers can rely on is critical for the widespread deployment of neural networks onto edge devices, and so NNEF encapsulates a complete description of the structure, operations and parameters of a trained neural network, independent of the training tools used to produce it and the inference engine used to execute it. It was developed by the Khronos Group and a software implementation is available at <https://github.com/KhronosGroup/NNEF-Tools>

🔗 CATEGORY InformationProcessing_Computing

OCEANIS: Open Community for Ethics in Autonomous and Intelligent Systems (OCEANIS)

<https://ethicsstandards.org/>

OCEANIS is a global forum for discussion, debate and collaboration for organizations interested in the development and use of standards to further the development of autonomous and intelligent systems. It has a Global AI Standards Repository said to be the world's first centralized, transparent notification system that captures AI and Autonomous and Intelligent Systems standards and standards in progress.

🔗 CATEGORY InformationProcessing_Computing

OECD.ai: OECD.AI Policy Observatory

<https://www.oecd.org/going-digital/ai/>

The OECD.AI Policy Observatory is a unique source of real-time information, analysis and dialogue designed to shape and share AI policies across the globe. Its country dashboards allow you to browse and compare hundreds of AI policy initiatives in over 60 countries and territories.

🔗 CATEGORY Organization

OECD: Organisation for Economic Co-operation and Development

<https://www.oecd.org>

The Organisation for Economic Co-operation and Development (OECD) is an international organisation that works to build better policies for better lives. Our goal is to shape policies that foster prosperity, equality, opportunity and well-being for all. We draw on almost 60 years of experience and insights

to better prepare the world of tomorrow. Together with governments, policy makers and citizens, we work on establishing evidence-based international standards and finding solutions to a range of social, economic and environmental challenges. From improving economic performance and creating jobs to fostering strong education and fighting international tax evasion, we provide a unique forum and knowledge hub for data and analysis, exchange of experiences, best-practice sharing, and advice on public policies and international standard-setting.

🔗 CATEGORY Organization

ONNX: Open Neural Network Exchange

🔗 <https://onnx.ai/>

Open Neural Network Exchange (ONNX) is an open ecosystem that empowers AI developers to choose the right tools as their project evolves. ONNX provides an open source format for AI models, both deep learning and traditional ML. It defines an extensible computation graph model, as well as definitions of built-in operators and standard data types. Currently we focus on the capabilities needed for inferencing (scoring). Software is available at <https://github.com/onnx/onnx>

🔗 CATEGORY InformationProcessing_Computing

PartnershipOnAI: Partnership on AI

🔗 www.partnershiponai.org

Partnership on AI conducts research, organizes discussions, shares insights, provides thought leadership, consults with relevant third parties, responds to questions from the public and media, and creates educational material that advances the understanding of AI technologies including machine perception, learning, and automated reasoning.

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SAE Inat. G34: SAE International - G34 - Artificial Intelligence in Aviation

🔗 <https://www.sae.org/servlets/works/committeeResources.do?resourceID=831571>

SAE G-34 WG-114 focuses on implementation and certification related to AI technologies for the safer operation of aerospace systems and aerospace vehicles.

🔗 CATEGORY Mobility

StdsPublicLifeUK: UK Committee on Standards in Public Life

🔗 <https://www.gov.uk/government/organisations/the-committee-on-standards-in-public-life>

The Committee on Standards in Public Life is an independent public body which advises government on ethical standards across the whole of public life in the UK.

🔗 CATEGORY Organization

SYNERGY: Big Energy Data Value Creation within SYNergetic enERGY-as-a-service Applications through trusted multi-party data sharing over an AI big data analytics marketplac

<https://cordis.europa.eu/project/id/872734>

There are many different systems and connected energy networks today. Also, many factors play a role in effective power systems optimisation. Information and new technologies offer the key competencies for sustainable, intelligent energy supply. The integration of data and synergy add crucial value to all related activities and offer new viable solutions. The EU-funded SYNERGY project will develop a Big Energy Data Platform and AI Analytics Marketplace. It will offer a novel reference Big Data space where the information from various energy-related sources such as IoT statistics, sensors and energy markets. It will also forge and enrich the AI. The new highly effective system will be demonstrated in five European countries. The project runs to June 2023 under Grant agreement ID 872734.

➤ CATEGORY Energy

TMForum: TMForum

<https://www.tmforum.org/>

TMForum is the global industry association that drives collaboration and collective problem-solving to maximize the business success of communication and digital service providers and their ecosystem of suppliers. Our vision is to help communications service providers (CSPs) and their suppliers to digitally transform and thrive in the digital era. We do this by providing an open, collaborative environment and practical support which enables CSPs and suppliers to rapidly transform their business operations, IT systems and ecosystems.

➤ CATEGORY Connectivity

TTC WG AI4NGS: TTC WG AI for Next Gen. Services

<https://www.ttc.or.jp/e/org/workin-groups>

TTC WG AI for Next Gen. Services study for the realization of a next-generation service platform using AI. We will aim to create use cases for consideration. We collect and disseminate examples of AI use and knowledge from all over the world and promote the creation of new services for member companies and the creation of a cutting-edge business environment.

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W3C AI KR: W3C Artificial Intelligence Knowledge Representation community group

<https://www.w3.org/community/aikr/>

The overall goal mission of this community group is to explore the requirements, best practices and implementation options for the conceptualization and specification of domain knowledge in AI. We plan to place particThe AI KR (ARTIFICIAL INTELLIGENCE KNOWLEDGE REPRESENTATION) Community Group has the overall goal mission to explore the requirements, best practices and implementation options for the conceptualization and specification of domain knowledge in AI. We plan to place particular emphasis on the identification and the representation of AI facets and various aspects (technology, legislation, ethics etc) with the purpose to facilitate knowledge exchange and reuse. Proposed outcomes are (a) A comprehensive list of open access resources in both AI and KR (useful to teaching and research); (b) A set of metadata derived from these resources; (c) A concept map of the domain; (d) A natural language vocabulary to represent various aspects of AI; (e) One or more encoding implementations machine language version of the vocabulary, such as ChatBot

Natural Language Understanding and Natural Language Generation; (f) Methods for KR management, especially Natural Language Learning Semantic Memory. ular emphasis on the identification and the representation of AI facets and various aspects (technology, legislation, ethics etc) with the purpose to facilitate knowledge exchange and reuse.

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W3C COGAI: W3C Cognitive AI Community Group

🔗 <https://www.w3.org/community/cogai/>

The Cognitive AI Community Group aims to enable the creation of cognitive agents that learn and reason based upon prior knowledge and past experience, and which can satisfy the need for transparency in decision making and continuous learning for adapting to ever changing needs. This community group will address opportunities for cognitive agents using graphs, statistics, rules and graph algorithms, starting with an amalgam of RDF and Property Graphs, together with Web architecture for cognitive databases. More specifically, the Cognitive AI Community Group will work on use cases and requirements, demonstrations, open source, and scaling experiments.

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W3C WML: W3C Web Machine Learning Working Group

🔗 <https://w3c.github.io/machine-learning-charter/charter.html>

DRAFT The Web Machine Learning Working Group develops a Web API aiming to expose generic capabilities to the Web required to provide close-to-native machine learning performance in the browser. This Web API for neural network inference hardware acceleration (1) Allow to construct a neural network computational graph by common building blocks, including constant values and base operations such as convolution, pooling, softmax, normalization, fully connected, activation, recurrent neural network (RNN) and long short-term memory (LSTM); (2) Allow to compile the neural network to native optimized format for hardware execution; (3) Allow to setup input from various sources on the Web, e.g. array buffers, media streams, schedule the asynchronous hardware execution, and retrieve the output when hardware execution completes.

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WATCHMAN: WORKLOAD-REDUCTION MACHINE VISION-BASED TECHNOLOGY HUB FOR MANUFACTURING

🔗 <https://www.openinnovation.regione.lombardia.it/it/b/17088/workload-reduction-machine-vision-based-technology-hub-for-manufacturi>

The WATCHMAN project aims to develop a hub of skills and experimentation on the application of Artificial Intelligence techniques in Machine Vision in the manufacturing sector. The main objective of R and D is the creation of a new element of manufacturing processes (process innovation) with a high impact on product quality.

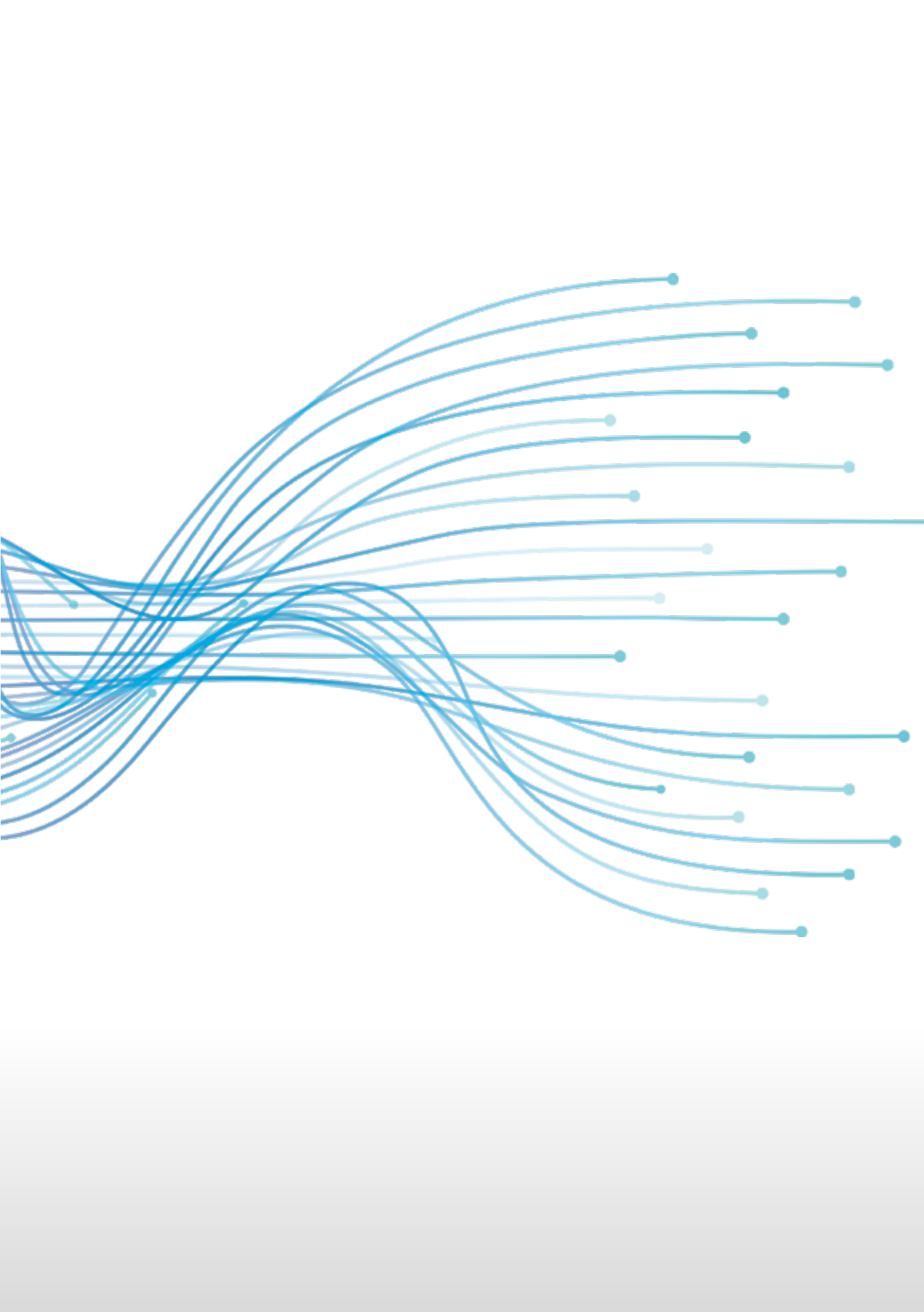
🔗 CATEGORY Manufacturing

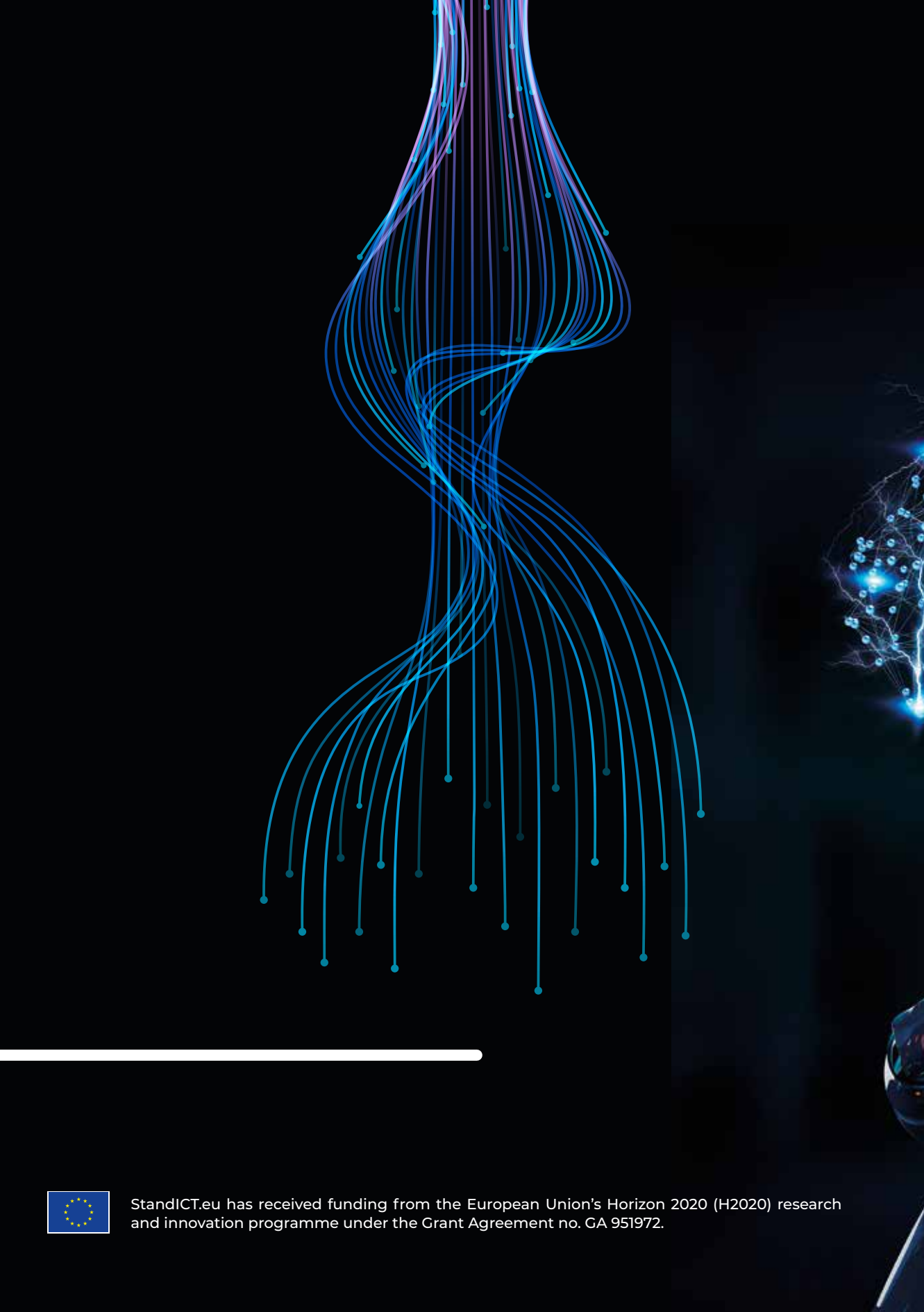
WEF: World Economic Forum

 <https://www.weforum.org/>

The World Economic Forum is the International Organization for Public-Private Cooperation. The Forum engages the foremost political, business and other leaders of society to shape global, regional and industry agendas.

 CATEGORY Organization





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