Survey data of "Mapping Research output to the Sustainable Development Goals (SDGs)"

This dataset contains information on what papers and concepts researchers find relevant to map domain specific research output to the 17 Sustainable Development Goals (SDGs).

Sustainable Development Goals are the 17 global challenges set by the United Nations. Within each of the goals specific targets and indicators are mentioned to monitor the progress of reaching those goals by 2030. In an effort to capture how research is contributing to move the needle on those challenges, we earlier have made an initial classification model than enables to quickly identify what research output is related to what SDG. (This Aurora SDG dashboard is the initial outcome as proof of practice.)

In order to validate our current classification model (on soundness/precision and completeness/recall), and receive input for improvement, a survey has been conducted to capture expert knowledge from senior researchers in their research domain related to the SDG. The survey was open to the world, but mainly distributed to researchers from the Aurora Universities Network. The survey was open from October 2019 till January 2020, and captured data from 244 respondents in Europe and North America.

17 surveys were created from a single template, where the content was made specific for each SDG. Content, like a random set of publications, of each survey was ingested by a data provisioning server. That collected research output metadata for each SDG in an earlier stage. It took on average 1 hour for a respondent to complete the survey. The outcome of the survey data can be used for validating current and optimizing future SDG classification models for mapping research output to the SDGs.

The survey contains the following questions (see inside dataset for exact wording):

- **Are you familiar with this SDG?**
    - Respondents could only proceed if they were familiar with the targets and indicators of this SDG. Goal of this question was to weed out un knowledgeable respondents and to increase the quality of the survey data.
- **Suggest research papers that are relevant for this SDG (upload list)**
    - This question, to provide a list, was put first to reduce influenced by the other questions. Goal of this question was to measure the completeness/recall of the papers in the result set of our current classification model. (To lower the bar, these lists could be provided by either uploading a file from a reference manager (preferred) in .ris of bibtex format, or by a list of titles. This heterogenous input was processed further on by hand into a uniform format.)
- **Select research papers that are relevant for this SDG (radio buttons: accept, reject)**
    - A randomly selected set of 100 papers was injected in the survey, out of the full list of thousands of papers in the result set of our current classification model. Goal of

this question was to measure the soundness/precision of our current classification model.

- **Select and Suggest Keywords related to SDG (checkboxes: accept | text field: suggestions)**
    - The survey was injected with the top 100 most frequent keywords that appeared in the metadata of the papers in the result set of the current classification model. respondents could select relevant keywords we found, and add ones in a blank text field. Goal of this question was to get suggestions for keywords we can use to increase the recall of relevant papers in a new classification model.
- **Suggest SDG related glossaries with relevant keywords (text fields: url)**
    - Open text field to add URL to lists with hundreds of relevant keywords related to this SDG. Goal of this question was to get suggestions for keywords we can use to increase the recall of relevant papers in a new classification model.
- **Select and Suggest Journals fully related to SDG (checkboxes: accept | text field: suggestions)**
    - The survey was injected with the top 100 most frequent journals that appeared in the metadata of the papers in the result set of the current classification model. Respondents could select relevant journals we found, and add ones in a blank text field. Goal of this question was to get suggestions for complete journals we can use to increase the recall of relevant papers in a new classification model.
- **Suggest improvements for the current queries (text field: suggestions per target)**
    - We showed respondents the queries we used in our current classification model next to each of the targets within the goal. Open text fields were presented to change, add, re-order, delete something (keywords, boolean operators, etc.) in the query to improve it in their opinion. Goal of this question was to get suggestions we can use to increase the recall and precision of relevant papers in a new classification model.

In the dataset root you'll find the following folders and files:

- **/00-survey-input/**
    - This contains the survey questions for all the individual SDGs. It also contains lists of EIDs categorised to the SDGs we used to make randomized selections from to present to the respondents.
- **/01-raw-data/**
    - This contains the raw survey output. (Excluding privacy sensitive information for public release.) This data needs to be combined with the data on the provisioning server to make sense.
- **/02-aggregated-data/**
    - This data is where individual responses are aggregated. Also the survey data is combined with the provisioning server, of all sdg surveys combined, responses are aggregated, and split per question type.

- **/03-scripts/**
    - This contains scripts to split data, and to add descriptive metadata for text analysis in a later stage.
- **/04-processed-data/**
    - This is the main final result that can be used for further analysis. Data is split by SDG into subdirectories, in there you'll find files per question type containing the aggregated data of the respondents.
- **/images/**
    - images of the results used in this README.md.
- **LICENSE.md**
    - terms and conditions for reusing this data.
- **README.md**
    - description of the dataset; each subfolders contains a README.md file to futher describe the content of each sub-folder.

In the /04-processed-data/ you'll find in each SDG sub-folder the following files.:

- **SDG-survey-questions.pdf**
    - This file contains the survey questions
- **SDG-survey-questions.doc**
    - This file contains the survey questions
- **SDG-survey-respondents-per-sdg.csv**
    - Basic information about the survey and responses
- **SDG-survey-city-heatmap.csv**
    - Origin of the respondents per SDG survey
- **SDG-survey-suggested-publications.txt**
    - Formatted list of research papers researchers have uploaded or listed they want to see back in the result-set for this SDG.
- **SDG-survey-suggested-publications-with-eid-match.csv**
    - same as above, only matched with an EID. EIDs are matched my Elsevier's internal fuzzy matching algorithm. Only papers with high confidence are show with a match of an EID, referring to a record in Scopus.
- **SDG-survey-selected-publications-accepted.csv**
    - Based on our previous result set of papers, researchers were presented random samples, they selected papers they believe represent this SDG. (TRUE=accepted)
- **SDG-survey-selected-publications-rejected.csv**

    - Based on our previous result set of papers, researchers were presented random samples, they selected papers they believe not to represent this SDG. (FALSE=rejected)

- **SDG-survey-selected-keywords.csv**
    - Based on our previous result set of papers, we presented researchers the keywords that are in the metadata of those papers, they selected keywords they believe represent this SDG.
- **SDG-survey-unselected-keywords.csv**
    - As "selected-keywords", this is the list of keywords that respondents have not selected to represent this SDG.
- **SDG-survey-suggested-keywords.csv**
    - List of keywords researchers suggest to use to find papers related to this SDG
- **SDG-survey-glossaries.csv**
    - List of glossaries, containing keywords, researchers suggest to use to find papers related to this SDG
- **SDG-survey-selected-journals.csv**
    - Based on our previous result set of papers, we presented researchers the journals that are in the metadata of those papers, they selected journals they believe represent this SDG.
- **SDG-survey-unselected-journals.csv**
    - As "selected-journals", this is the list of journals that respondents have not selected to represent this SDG.
- **SDG-survey-suggested-journals.csv**
    - List of journals researchers suggest to use to find papers related to this SDG
- **SDG-survey-suggested-query.csv**
    - List of query improvements researchers suggest to use to find papers related to this SDG

Table of Contents

Metadata

meta	data
description	Survey data of "Mapping Research Output to the SDGs" presented here is the comprehensive raw, aggregated and processed output of a survey that ran from October 2019 till January 2020. The goal of the survey was to collect data from (senior) researchers, to add and reflect their conceptual knowledge of their specific research domain that contributes to the SDG (Sustainable Development Goals). The outcome of the survey data can be used for validating current and optimizing future SDG classification model for research output.
date	2020-04-23
authors	Maurice Vanderfeesten (VUA); Eike Spielberg (UDE); Yasin Gunes (VUA);

contributors	Alessandro Arienzo (UNA); Roberto delle Donne (UNA); Ignasi Salvadó Estivill (URV); José Luis González Ugarte (URV); Didier Vercueil (UGA); Nykohla Strong (UAB); Eike Spielberg (UDE); Felix Schmidt (UDE); Linda Hasse (UDE); Ane Sesma (UEA); Baldvin Zarioh (UIC); Friedrich Gaigg (UIN); René Otten (VUA); Nicolien van der Grijp (VUA); Yasin Gunes (VUA); Maurice Vanderfeesten (VUA)
related material	Aurora SDG queries version 4
file formats	data files are all in comma separated files (csv) in UTF-8 encoding.
Software used	Data collector: Aurora Data Collector, Survey tool: Survey Gizmo, Data aggregation: Elastic Search + Kibana, Data wranging: Python, Jupyter Notebook, Elastic Painless, KNIME analytics platform

Dataset Content:

Directories and files. Privacy sensitive data is removed in public release version of the data. All sub-directories contain README.md files explaining what data you see and how to interpret.

/dir/ file.*	description
/00-survey-input/	This contains the survey questions for all the individual SDGs. It also contains lists of EIDs categorised to the SDGs we used to make randomized selections from to present to the respondents.
/01-raw-data/	This contains the raw survey output. (Excluding privacy sensitive information for public release.) This data needs to be combined with the data on the provisioning server to make sense.
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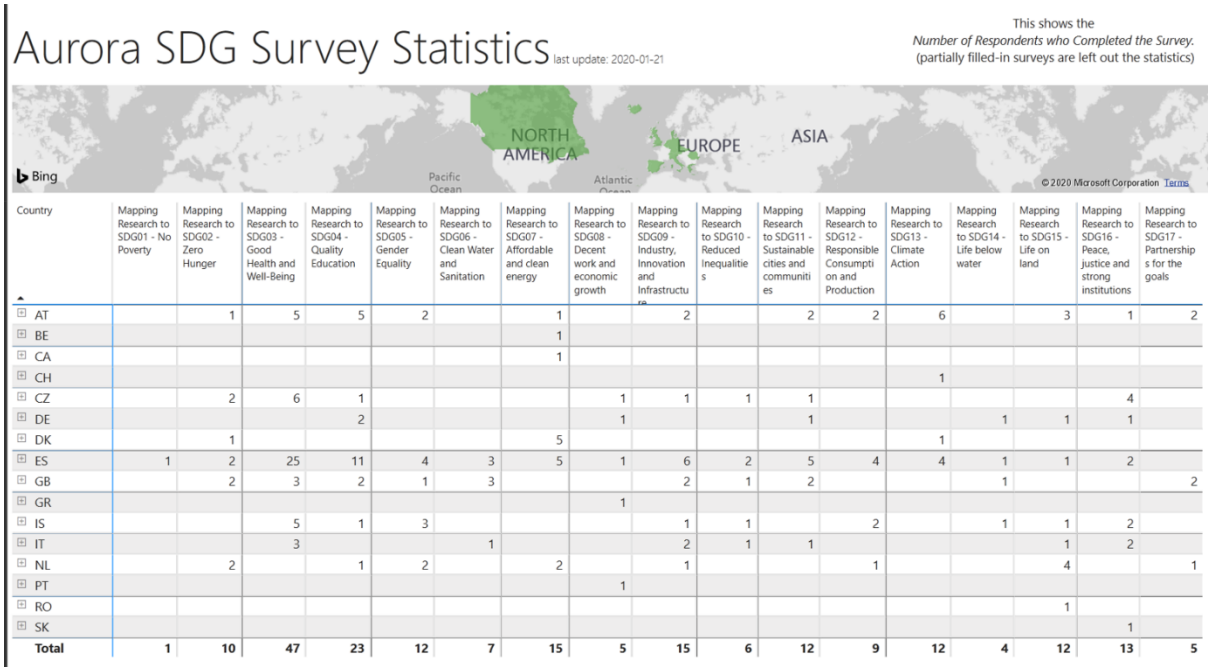
/03-scripts/	This contains scripts to split data, and to add descriptive metadata for text analysis in a later stage.
/04-processed-data/	This is the main final result that can be used for further analysis. Data is split by SDG into subdirectories, in there you'll find files per question type containing the aggregated data of the respondents.
/images/	images of the results used in this document.
LICENSE.md	terms and conditions for reusing this data.

Dataset Takeaways:

- data collection period: Oct 2019 till Jan 2020
- respondents: 224 from 16 counties in Europe and North America
- questions asked for each SDG:
    - Suggest research papers that are relevant for this SDG (upload list)

- Select research papers that are relevant for this SDG (radio buttons: accept, reject)
- Select and Suggest Keywords related to SDG (checkboxes: accept | text field: suggestions)
- Suggest SDG related glossaries with relevant keywords (text fields: url)
- Select and Suggest Journals fully related to SDG (checkboxes: accept | text field: suggestions)
- Suggest improvements for the current queries (text field: suggestions per target)



Country	Mapping Research to SDG01 - No Poverty	Mapping Research to SDG02 - Zero Hunger	Mapping Research to SDG03 - Good Health and Well-Being	Mapping Research to SDG04 - Quality Education	Mapping Research to SDG05 - Gender Equality	Mapping Research to SDG06 - Clean Water and Sanitation	Mapping Research to SDG07 - Affordable and clean energy	Mapping Research to SDG08 - Decent work and economic growth	Mapping Research to SDG09 - Industry, Innovation and Infrastructu re	Mapping Research to SDG10 - Reduced Inequalitie s	Mapping Research to SDG11 - Sustainable cities and communiti es	Mapping Research to SDG12 - Responsible Consumpti on and Production	Mapping Research to SDG13 - Climate Action	Mapping Research to SDG14 - Life below water	Mapping Research to SDG15 - Life on land	Mapping Research to SDG16 - Peace, justice and strong institutions	Mapping Research to SDG17 - Partnership s for the goals
AT		1	5	5	2		1		2		2	2	6		3	1	2
BE							1										
CA							1										
CH													1				
CZ		2	6	1				1	1	1	1					4	
DE				2				1			1			1	1	1	
DK		1					5						1				
ES	1	2	25	11	4	3	5	1	6	2	5	4	4	1	1	2	
GB		2	3	2	1	3			2	1	2			1			2
GR								1									
IS			5	1	3				1	1		2		1	1	2	
IT			3			1			2	1	1				1	2	
NL		2		1	2		2		1			1			4		1
PT								1									
RO															1		
SK																1	
Total	**1**	**10**	**47**	**23**	**12**	**7**	**15**	**5**	**15**	**6**	**12**	**9**	**12**	**4**	**12**	**13**	**5**

License and Attribution, Acknowledgements and how to Cite

Acknowledgements

We would like to thank the presidents of the Aurora Universities for their support and executive representation in this project. Also we would like to thank all researchers involved to have shared their expertise. Many people from within the Aurora University Network were involved making this survey possible.

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Survey data of "Mapping Research output to the SDGs" by Aurora Universities Network (AUR)
doi:10.5281/zenodo.3798385

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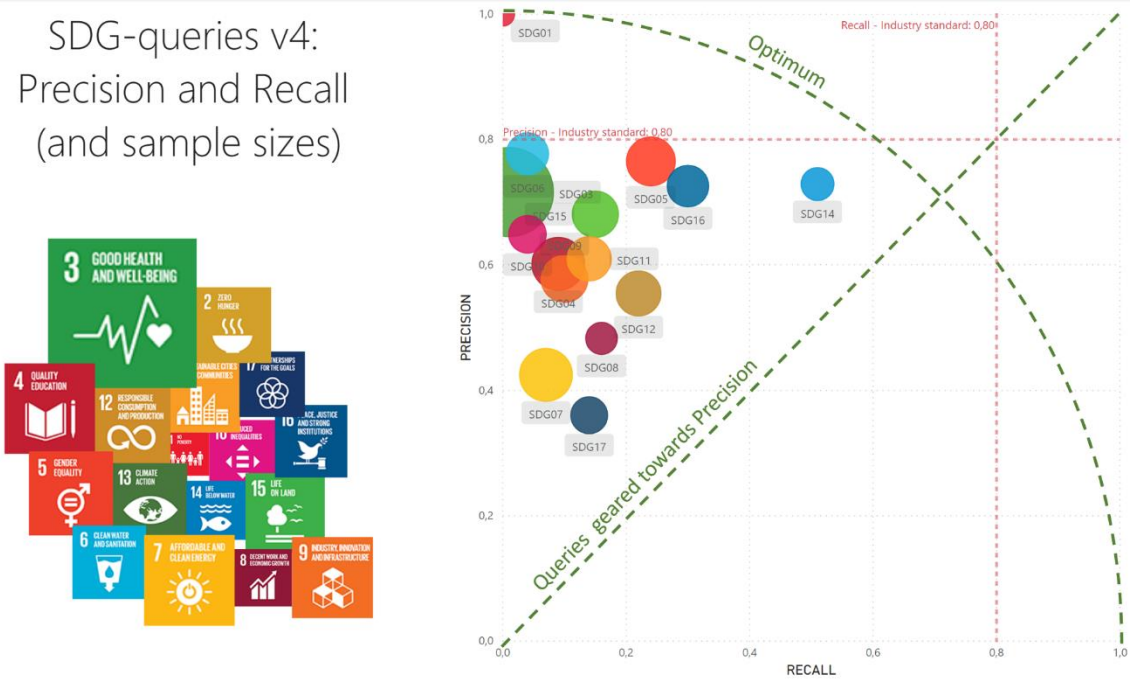
Example Usage, some results:

We used the data for creating a baseline for the SDG classification model, and secondly to gather information on improving a next version.

- precision and recall: how good is our SDG classification model (SDG queries v4)
- suggestions for improving the queries to version 5.



SDG full name	PRECISION A/(R+A)	RECALL (SPRS/SP)	F1-SCORE 2* ((PRECISION*RECALL)/(PRECISION+RECALL))	accepted (A)	rejected (R)	Number of matched suggested publications between 2009 and 2019 (SP)	Number of suggested publications in SDG result set (SPRS)
SDG-01 no poverty	1,00	0,00	0,00	9	0	4	0
SDG-02 zero hunger	0,31			186	414	60	
SDG-03 good health and well-being	0,72	0,01	0,02	1878	745	976	9
SDG-04 quality education	0,60	0,09	0,15	620	411	80	7
SDG-05 gender equality	0,77	0,24	0,36	456	140	318	76
SDG-06 clean water and sanitation	0,78	0,04	0,08	265	76	278	11
SDG-07 affordable and clean energy	0,43	0,07	0,12	357	483	281	20
SDG-08 decent work and economic growth	0,48	0,16	0,24	98	105	37	6
SDG-09 industry, innovation and infrastructure	0,58	0,10	0,18	362	265	193	20
SDG-10 reduce inequalities	0,65	0,04	0,07	253	137	55	2
SDG-11 sustainable cities and communities	0,61	0,14	0,23	373	239	86	12
SDG-12 responsible consumption and production	0,55	0,22	0,31	342	275	110	24
SDG-13 climate action	0,65			367	201	76	
SDG-14 life below water	0,73	0,51	0,60	164	61	49	25
SDG-15 life on land	0,68	0,15	0,24	403	189	188	28
SDG-16 peace, justice and strong institutions	0,73	0,30	0,42	386	146	57	17
SDG-17 partnerships for the goals	0,36	0,14	0,20	141	250	29	4

Contributors, full list

Below you'll see the full list of contributors to this project. With out them this was not possible.

Family Name, First Name	University	ORCiD	role
Vanderfeesten, Maurice	(VUA) Vrije Universiteit Amsterdam	0000-0001-6397-4759	Project leader
Spielberg, Eike	(UDE) University of Duisburg-Essen	0000-0002-3333-5814	Work package leader
Gunes, Yassin	(VUA) Vrije Universiteit Amsterdam	...	Project member
Arienzo, Alessandro	(UNA) University Federico II	0000-0002-2867-5363	Project member
Delle Donne, Roberto	(UNA) University Federico II	0000-0001-8331-9436	Project member
Salvadó Estivill, Ignasi	(URV) Universitat Rovira i Virgili	...	Project member
González Ugarte, José Luis	(URV) Universitat Rovira i Virgili	...	Project member
Vercueil, Didier	(UGA) Université Grenoble Alpes	...	Project member
Strong, Nykohla	(UAB) University of Aberdeen	0000-0002-6137-591X	Project member
Schmidt, Felix	(UDE) University of Duisburg-Essen	...	Project member

Hasse, Linda	(UDE) University of Duisburg-Essen	...	Project member
Sesma, Ane	(UEA) University of East Anglia	0000-0003-3982-8932	Project member
Zarioh, Baldvin	(UIC) University of Iceland	0000-0001-9317-2597	Project member
Gaigg, Friedrich	(UIN) Universität Innsbruck	...	Project member
Otten, René	(VUA) Vrije Universiteit Amsterdam	0000-0002-6485-8810	Project member
Grijp, Nicolien van der	(VUA) Vrije Universiteit Amsterdam	0000-0002-5119-3514	Project member
Besselaar, Peter van den	(VUA) Vrije Universiteit Amsterdam	0000-0002-8304-8565	Supervisor
Both, Joeri	(VUA) Vrije Universiteit Amsterdam	...	Supervisor
Kouwenaar, Kees	AURORA University Network	...	Sponsor
Beukering, Pieter van	(VUA) Vrije Universiteit Amsterdam	0000-0001-7146-4409	Sponsor