

FGAI4H-R-055

Cambridge, 21-24 March 2023

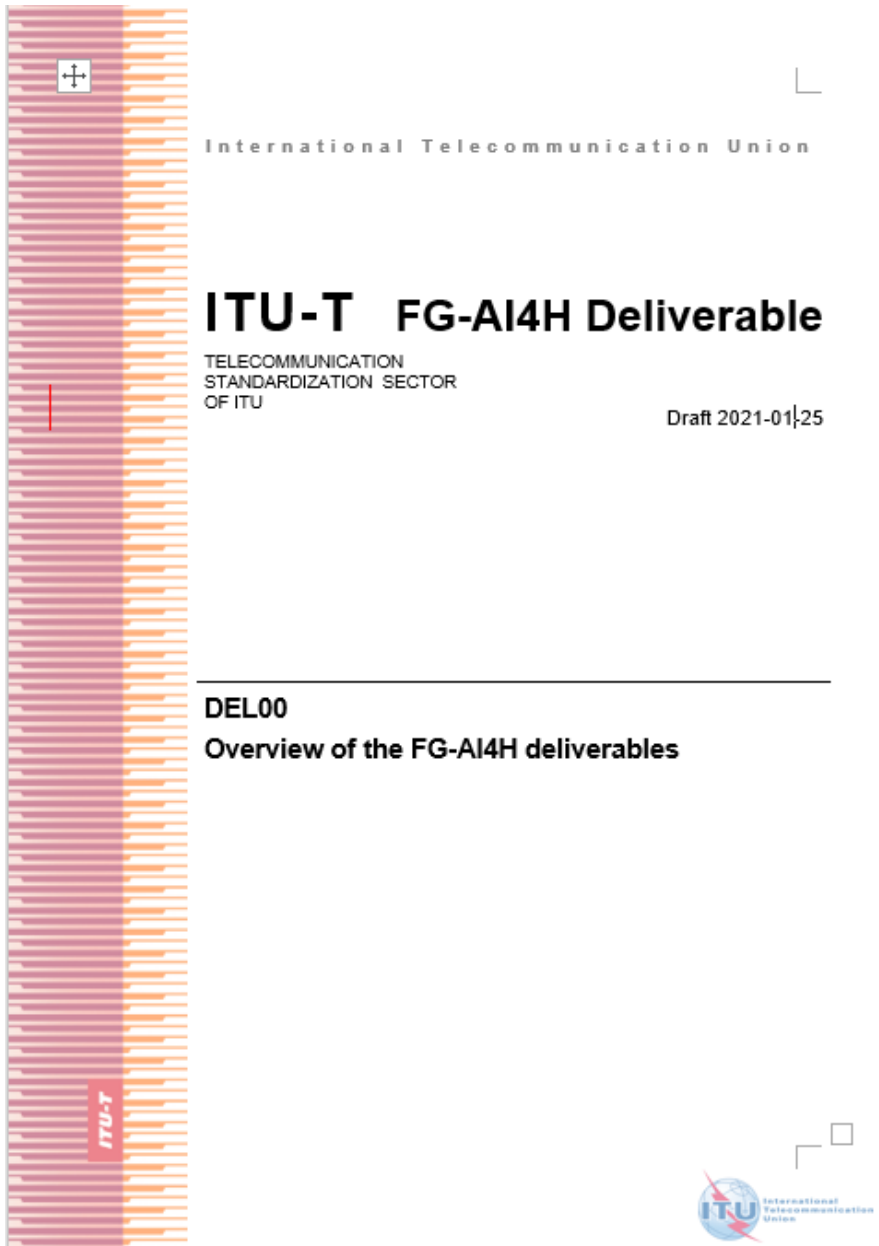
Source: Editor

Title: DEL00: Overview of the FG-AI4H deliverables – Presentation

Contact: Shan Xu, CAICT, China

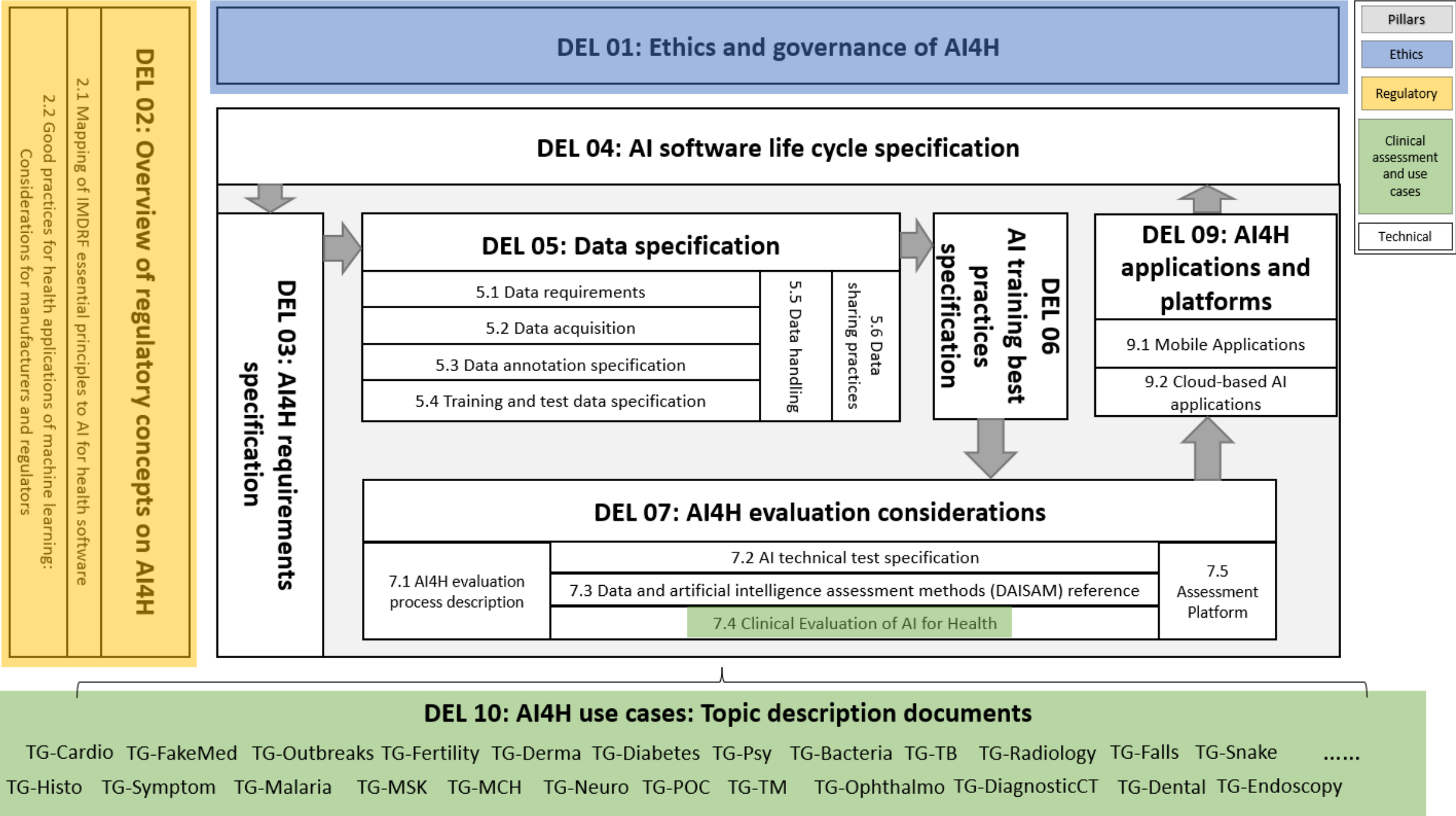
E-mail: xushan@caict.ac.cn

Abstract: This PPT contains a presentation of DEL00 presented at Meeting R of the FG-AI4H, 21-24 March 2023.



Abstract

- This document provides the overview of the planned deliverables for the ITU-T Focus Group on AI for health (FG-AI4H) to provide a standardization framework on artificial intelligence for health.
- With the increase and development of the deliverables, a compiled overview is to be built to give a quick review of all deliverables, therefore to facilitate collaboration and management of FG activities. It can also be used as a quick guild for new participants to understand FG-AI4H activities.



FG-AI4H deliverables from machine perspectives

Shan XU, CAICT

xushan@caict.ac.cn

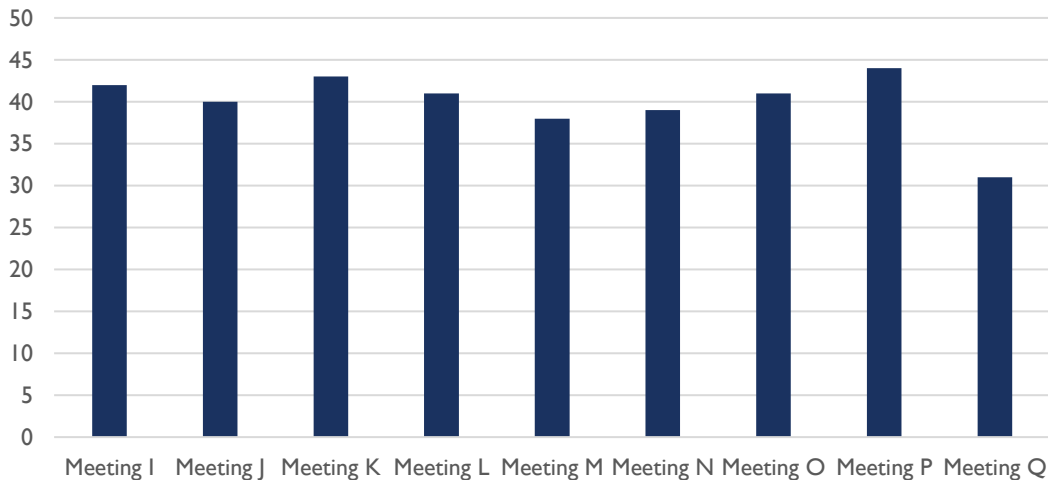


DELIVERABLES UPDATES

	Meeting I	Meeting J	Meeting K	Meeting L	Meeting M	Meeting N	Meeting O	Meeting P	Meeting Q
TOTAL docs deliverables	42	40	43	41	38	39	41	44	30
DEL 00	•	•	•	•	•	•	•	•	•
DEL 00_1									
DEL 00S									
DEL 01		•		•		•		•	
DEL 02	•	•	•	•	•	•	•	•	•
DEL 02_1									
DEL 02_2	•	•	•	•	•	•	•	•	•
DEL 03	•	•	•	•	•	•	•	•	•
DEL 04		•	•	•	•	•			
DEL 05								•	
DEL 05_1	•								
DEL 05_2									
DEL 05_3	•	•	•		•			•	
DEL 05_4	•		•	•	•				
DEL 05_5	•								
DEL 05_6	•	•	•	•					•
DEL05.x:	•								
DEL 06	•	•	•						
DEL 07	•	•	•	•	•	•	•	•	•
DEL 07_1						•			
DEL 07_2	•	•		•		•	•	•	
DEL 07_3	•		•	•		•	•	•	
DEL 07_4	•	•	•	•	•	•	•	•	•
DEL 07_5						•	•	•	
DEL 08			•				•	•	
DEL 09	•	•	•	•					
DEL 09_1	•	•	•			•	•	•	•
DEL 09_2	•	•	•				•	•	
DEL10_0	•	•	•	•	•	•	•	•	•

	Meeting I	Meeting J	Meeting K	Meeting L	Meeting M	Meeting N	Meeting O	Meeting P	Meeting Q
b-TG-Cardio (Cardiovas	•	•	•	•	•	•	•	•	•
c-TG-Derma (Dermatol	•	•	•	•	•	•	•	•	•
d-TG-Bacteria (Diagnos	•	•	•	•	•	•	•	•	•
e-TG-DiagnosticCT (Vol	•	•	•	•	•	•	•	•	•
f-TG-Dental (Dental dia	•	•	•	•	•	•	•	•	•
g-TG-FakeMed: AI-base	•	•	•	•	•	•	•	•	•
h-TG-Falls (Falls among	•	•	•	•	•	•	•	•	•
i-TG-Histo (Histopathol	•	•	•	•	•	•	•	•	•
j-TG-Malaria: Malaria de	•	•	•	•	•	•	•	•	•
k-TG-MCH: Maternal an	•	•	•	•	•	•	•	•	•
l-TG-Neuro: Neurologic	•	•	•	•	•	•	•	•	•
m-TG-Ophthalmol (Oph	•	•	•	•	•	•	•	•	•
n-TG-Outbreaks (AI for	•	•	•	•	•	•	•	•	•
o-TG-Psy (Psychiatry)	•	•	•	•	•	•	•	•	•
p-TG-Snake (Snakebite)	•	•	•	•	•	•	•	•	•
q-TG-Symptom (Sympt	•	•	•	•	•	•	•	•	•
r-TG-TB (Tuberculosis)	•	•	•	•	•	•	•	•	•
s-TG-Radiology (Radiol	•	•	•	•	•	•	•	•	•
t-TG-Diabetes	•	•	•	•	•	•	•	•	•
u-TG-Endoscopy	•	•	•	•	•	•	•	•	•
v-TG-AI for Musculoskeletal medicine Word&PPT(ne Word&PPT					•	•	•	•	•
w-TG-AI for Human Reproduction and Fertility					•	•	•	•	•
x-TG-Sanitation (AI in sanitation for public health)				•	•	•	•	•	•
y-TG-POC (Topic Group on AI for point-of care diagnostics)				•	•	•	•	•	•
z-TG-Nephrology: Role of artificial intelligence in kidney disease						•	•	•	•
Scalable digital platform for proactive brain health							•	•	•
New TG on AI for traditional medicine								•	•

TOTAL docs in eachmeeting



DEL 00: OVERVIEW OF THE FG-AI4H DELIVERABLES

A	B
Frequency	Word
63	ai
62	data
58	health
39	fg-ai4h
36	del
34	document
29	evaluation
28	deliverable
18	practices
17	considerations
17	training
17	specification
16	topic
15	artificial
15	intelligence
15	model
15	applications
15	ai4h
14	group
14	software
14	process
13	annotation



DEL 00_1: COMMON UNIFIED TERMS IN ARTIFICIAL INTELLIGENCE FOR HEALTH

A	B
Frequency	Word
85	data
51	ai
40	terms
34	iso
34	clinical
31	system
30	learning
28	ai-eg
27	iec
26	defined
26	used
25	note
24	information
23	use
20	health
18	machine
15	definitions
15	training
15	model



WORD CLOUD ANALYSIS OF SOME CURRENT PUBLISHED DELIVERABLES



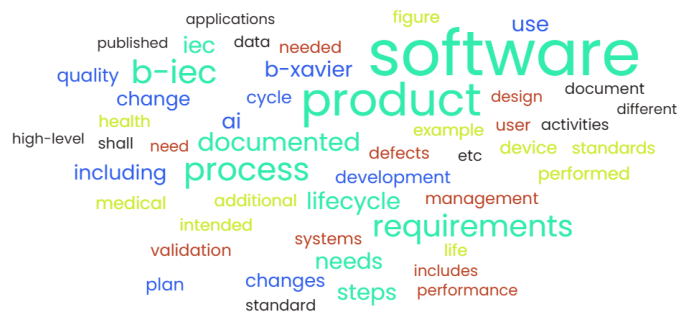
DEL 00: Overview of the FG-AI4H deliverables



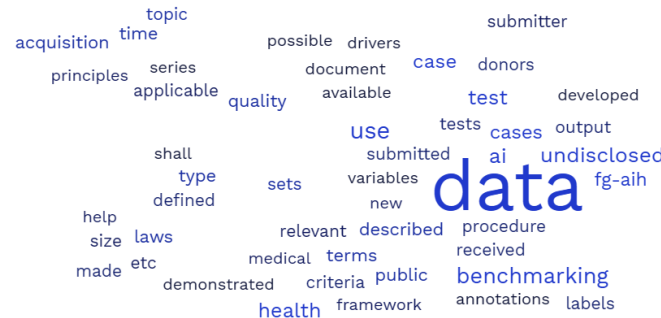
DEL 00_I: Common unified terms in AI4H



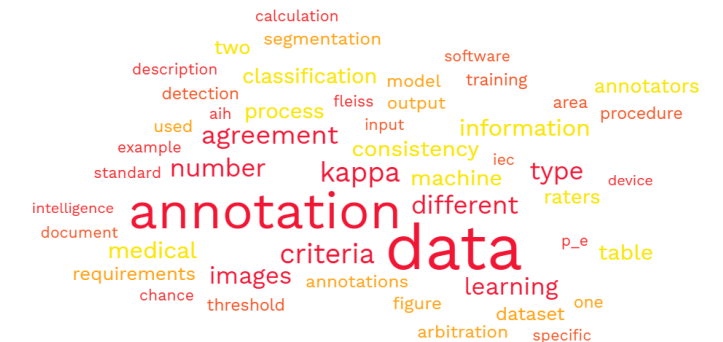
DEL 02_I: AI software life cycle specification



DEL 04: AI software life cycle specification

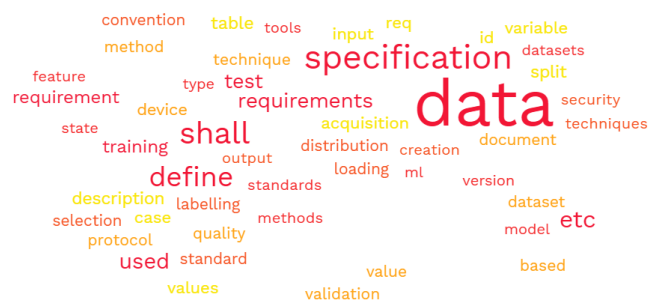


DEL 05_I: Data requirements



DEL 05_3: Data annotation specification

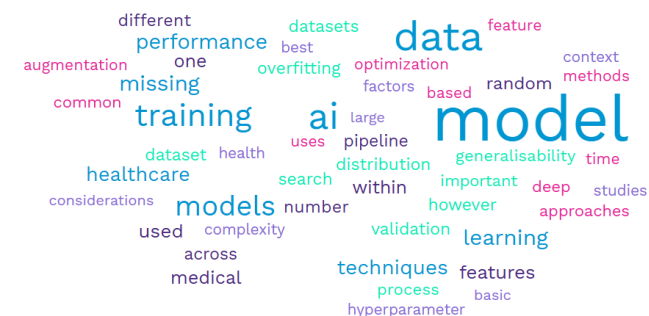
WORD CLOUD ANALYSIS OF SOME CURRENT PUBLISHED DELIVERABLES



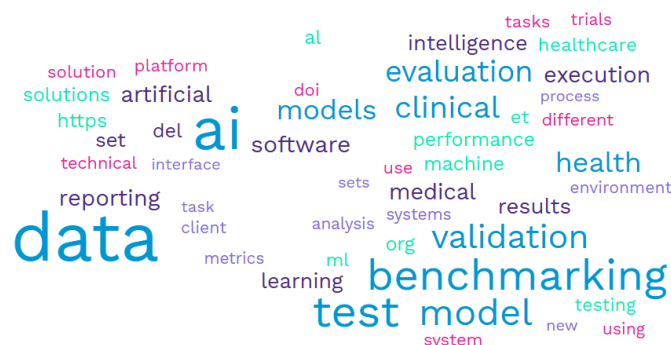
DEL 05 4: Training and test data specification



DEL 05 5: Data handling



DEL 06: AI training best practices



DEL 07: AI4H evaluation considerations

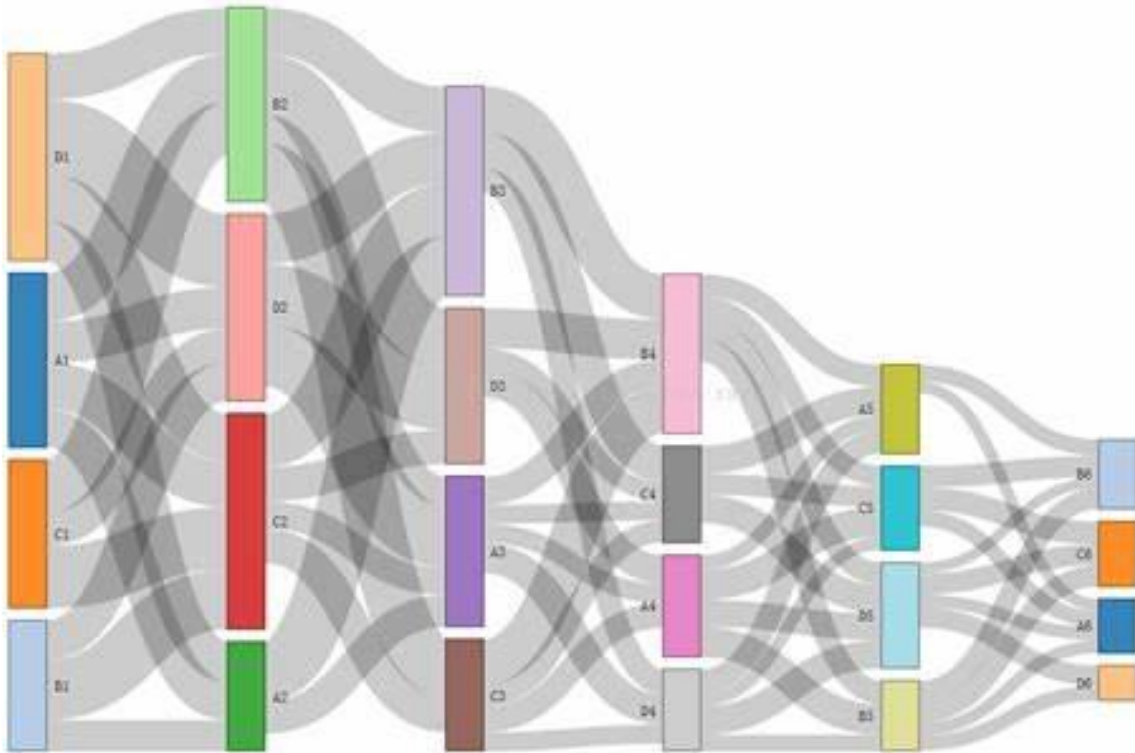


DEL 07 4: Clinical evaluation of AI4H



DEL 10:AI4H use cases TDD

QUESTIONS CAN BE ANSWERED BY THIS ANALYSIS...



A Sankey diagram visualizes the proportional flow between variables (or nodes) within a network. Transform the word frequency analysis result into a multicategorical data, it can visualizes the flow between different deliverables within the diagram.

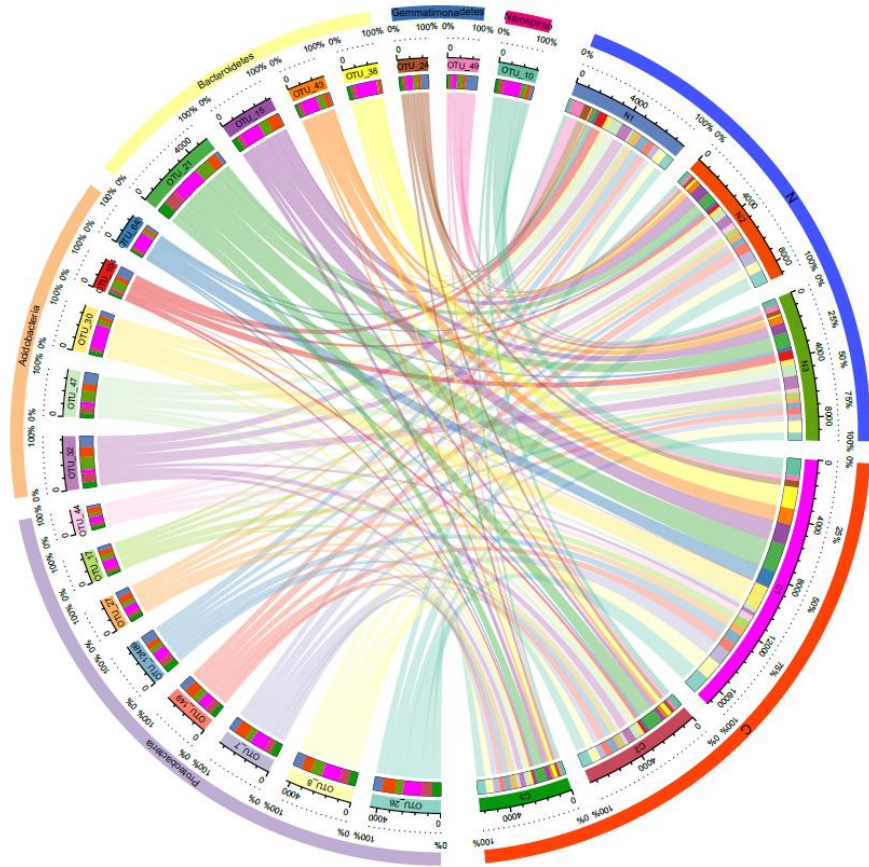
_____single word cloud analysis_____

- 1) What is the nature/material of each deliverable?
- 2) What is the nature/material of this FG-AI4H?
- 3) Does the current nature/material reflect your expectation towards this deliverable?

_____when mapping between two DELs_____

- 1) Have all important terms been defined and included in the DEL 00_I: Common unified terms?
- 2) Does the umbrella document cover all key points?

QUESTIONS CAN BE ANSWERED BY THIS ANALYSIS...



_____when mapping among several DELs_____

- 1) What are the connections between the set of docs?
- 2) Any implication/revision to the structure figure?
- 3) Promoting more collaborations between two similar groups?
- 4) May peer review groups be set up referring to this basis?

* Could dive deep into the nature of these connections (e.g., tech, ethics, regulatory, clinical, etc. as different colors)

A chord diagram represents flows or connections between several entities (called nodes). Each entity is represented by a fragment on the outer part of the circular layout. Then, arcs are drawn between each entities.

A CHAT WITH AI MODEL ON AI FOR HEALTH

S hello



Hello! How can I assist you today?



🔄 Regenerate response

|



TROUBLESHOOTING

S could you please send me the link of "AI for Health: A Framework for Action" report



Certainly! Here is the link to download the "AI for Health: A Framework for Action" report from the official ITU&WHO AI for Health Focus Group website:



https://www.itu.int/dms_pub/itu-t/opb/fg/AI4H/TF_AI4H_001-3-2019/en/ai4h-framework-for-action-190517.pdf

I hope this helps!



it is not found



I apologize for the confusion. It's possible that the link I provided earlier may have been outdated or no longer available.



Here is an updated link to download the "AI for Health: A Framework for Action" report from the official ITU&WHO AI for Health Focus Group website:

https://www.itu.int/content/dam/itu-t/pub/ai4h/TF_AI4H_001-3-2019/en/ai4h-framework-for-action-190517.pdf

Regenerate response

Server Error

404 - File or directory not found.

The resource you are looking for might have been removed, had its name changed, or is temporarily unavailable.

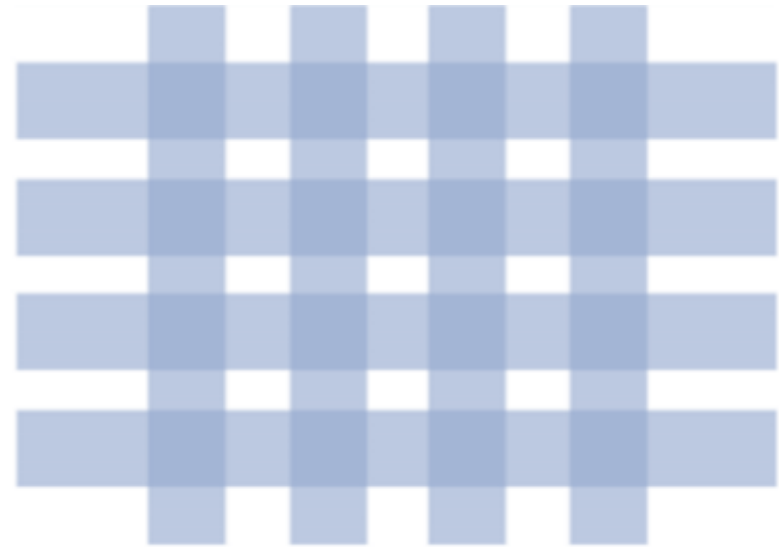
PROPOSALS

- A in-depth follow up with AI for health deliverables:
 - *Coverage of the terms*
 - *Connections and structure among deliverables*
 - *Visualized summary of the set of deliverables*
- A development of knowledge repository of FG-AI4H deliverables:
 - *AI interventions with AI for health*
 - *Simple and intuitive interactions with audience*

ANNEX

- Generalized specifications (DEL 1-9): focus on generalized specifications including ethics, regulatory, requirement, data, training, evaluation, application, etc. Each part is interconnected to form a life cycle process of AI-based methods for health.
- Topic groups (DEL 10.1-10.24): focus on use cases in specific health domains with corresponding AI/ML tasks. Each case can be regarded as an example of a whole process recommended by generalized specifications (DEL 1-9), and profiled in a specific application scenario.

Generalized specifications (DEL 1-9)



Topic groups (DEL 10.1-10.24)

Table 2 – Summary of generalized documents (DEL 1-9)

Deliverable		Scope	Last update
1- AI4H ethics considerations		The rapidly developing field of AI raises a number of ethical, legal and social concerns, e.g. regarding equitable access, privacy, appropriate uses and users, liability and bias and inclusiveness. These issues are trans-national in nature, as capturing, sharing and using data generated and/or used by these technologies goes beyond national boundaries. Many questions remain unanswered concerning the ethical development and use of these technologies, including how low- and middle-income countries will benefit from AI developments. This document is to develop a harmonised ethics guidance for the design and implementation of AI in global health.	05/31/2022
2- AI4H regulatory best practices		This document is aimed as a general, high-level, and nonexclusive overview of key regulatory considerations' topic areas delivered by the WG-RC on AI for health. It highlights some of the key regulatory principles and concepts, such as risk/benefit assessments and considerations for the evaluation and monitoring of the performance of AI solutions.	05/31/2022
2.1	Mapping of IMDRF essential principles to AI for health software	This document provides a number of new aspects that have not been considered when developing the regulatory framework for software as a medical device (SaMD) as described by the IMDRF Essential Principles (EPs) in “Essential Principles of Safety and Performance of Medical Devices and IVD Medical Devices”, IMDRF Good Regulatory Review Practices Group, IMDRF GRRP WG/N47 FINAL, 31 October 2018. This document provides a suggested mapping of the EPs to related aspects of AI4H software. Its purpose is to cover all aspects considered in the regulation of SaMDs and whether and if yes, how they are applicable to AI4H.	5/18/2020
2.2	Good practices for health applications of machine learning: Considerations for manufacturers and regulators	This document recommends a set of good machine learning practice guidelines to the manufacturers and regulators of data driven Artificial Intelligence based healthcare solutions on conducting comprehensive requirements analysis and streamlining conformity assessment procedures for continual product improvement in an iterative and adaptive manner. This set of good machine learning practice guidelines gives prime priority to the factor of patient safety and focuses on a streamlined process for risk minimization and quality assurance for AI/ML based health solutions and tries to establish a system of transparency and accountability of all the processes involved in AI/ML based health solutions.	05/31/2022
3- AI4H requirements specification		This document is to define the System Requirement Specifications (SyRS) that explains the informational, functional, behavioural and operational aspects a generic AI for health (AI4H) system. SyRS serves as the basis and helps to create system design, system verification and validation plans and procedures. System requirements analysis methodology follows a collaborative team-oriented approach, involving all the working groups and topic groups of AI4GH FG, to help the project team identify, control and track various requirements and changes to those requirements during the AI4H system development lifecycle.	05/31/2022
4-AI software life cycle specification		This deliverable includes the following considerations: a) Identification of all standards and best practices that are relevant for the AI for health software life cycle. Similar to other software life cycle processes, the AI software life cycle process needs to be specified. b) Summary and critical review of the identified documents including a discussion of their limits/gaps and need for action. C) Identification of life cycle steps that are specific/characteristic for AI for health software, such as training and test procedures based on data that potentially need to be annotated. d) Specification of the AI for health software life cycle and definition of best practices for the different life cycle steps in one document (under consideration of a, b, and c). Overview and examples of best practices	9/28/2020

Table 2 (continued)– Summary of generalized documents (DEL 1-9)

Deliverable		Scope	Last update
5-Data specification		This document combines a set of six separate deliverables as umbrella, which address six important aspects related to data specification when used for artificial intelligence (AI) and machine learning (ML) models/methods for health purposes. Each editor will propose an initial outline (=Table of Contents), define the objectives of the future deliverable, and collect a bibliography of existing literature and material relevant for the development of the respective document. A short call for participation, the expertise profile of potential contributors, a time plan, and a brief characterisation of the target audience serve as preface.	6/17/2020
5.1	Data requirements	This document lists acceptance criteria for data submitted to the FG-AI4H and states the governing principles and rules. These principles are crucial because the core of the benchmarking framework for AI for health methods will be an undisclosed test data set – per use case of each topic area to be defined – that will not be made accessible to the AI developers.	5/19/2020
5.2	Data acquisition	This document presents a framework for public healthcare data acquisition and management model based on standard protocol for its easy adoption by any country or international health organizations. This paper assumes basic digitization of electronic health record (EHR) at basic health facilities. There is a gap in developing an integrated and comprehensive framework that addresses the use of EHR in a standardized way for public health, privacy issue by anonymizing patient specific information, fusing multiple records with slight changes in the same information, augmenting a broad spectrum of contextual data, and so on.	5/19/2020
5.3	Data annotation specification	This document is committed to give a general guideline of data annotation specification, including definition, background and goals, framework, standard operating procedure, scenario classifications and corresponding criteria, as well as recommended metadata, etc. A questionnaire is attached to seek input and collaboration with topic groups in FG-AI4H regarding data annotation.	1/27/2021
5.4	Training and test data specification	This document is intended to guide the target audience with a systematic way of preparing technical requirements specification for datasets used in training and testing of machine ML models This document explains the best practices of data quality assurance aimed at minimizing the data error risks during the training and test data preparation phase of machine learning process lifecycle. The training and test data requirement specifications follow the data integrity, data security and data safety norms of the AI data governance lifecycle process.	5/20/2020
5.5	Data handling	This document outlines how data will be handled, once they are accepted. Health data are one of the most valuable and sensitive types of data. Handling this kind of data is often associated with a strict and factual framework defined by data protection laws. There are two major issues that the data handling policy should address: (a) compliance with regulations dealing with the use of personal health data; and (b) non-disclosure of the undisclosed test data held by FG-AI4H for the purpose of model evaluation.	4/1/2020
5.6	Data sharing practices	This document aims to provide an overview of the existing best practices for data sharing of health-related data, including the requirement to enable secure data sharing and issues related to data governance. The documents described established solutions and novel approaches based on distributed and federated environments.	5/19/2021

Table 2 (continued)– Summary of generalized documents (DEL 1-9)

Deliverable		Scope	Last update
6-AI training best practices specification		This document aims to provide best practices for training and documentation so as to facilitate maximum performance and transparency. This document provides a review of the different aspects of AI model training pipeline. The first part discusses the best practices for data pre-processing aspects, while the second part discusses the best practices for AI model training aspects.	1/25/2021
7-AI for health evaluation considerations		This introduction with considerations on the evaluation of AI for health sets the scene for the five related documents DEL07.1-5. In this document, an overview of the deliverables DEL7.1-5 is given, preliminary considerations on the evaluation process are being made, characteristics of health AI validation and evaluation that are novel are identified, and the concept of standardized model benchmarking is introduced. Moreover, requirements for a benchmarking platform are considered in detail and best practices for the health AI model assessment are collected from selected sources.	05/31/2022
7.1	AI4H evaluation process description	The AI4H evaluation process description serves as overview of the state of the art of AI evaluation principles and methods and a forward-looking initiator for the evaluation process of AI4H. This process description includes a review of existing evaluation principles and methods, evaluation need and solutions specific for AI4H. It will also look into ethics and risks aspects of AI4H evaluation. Furthermore, based on the fundamentals of AI, the description will gain insights on the direction of how the current evaluation methods evolve towards the concept of REAL AI.	5/20/2020
7.2	AI technical test specification	This document specifies how an AI can and should be tested in silico. Among other aspects, best practices for test procedures known from (but not exclusively) AI challenges will be reviewed in this document. Important testing paradigms that are not exclusively related to AI applications should be mentioned too.	5/20/2020
7.3	Data and artificial intelligence assessment methods (DAISAM) reference	This document provides a summary of how to understand and identify algorithmic bias at different stages of the AI-based product that may have critical implications when the algorithm is applied in a real-world clinical setting. The aim is to train the most accurate model for each group without harming any minority group of patients. Furthermore, methods to mitigate bias according to the problem at hand are provided. These guidelines aim to provide a framework for technologists that build health related AI based products to investigate the presence of algorithmic bias.	05/31/2022
7.4	Clinical evaluation of AI for health	This document is to outline the current best practices, the principles and outstanding issues for further considerations related to clinical evaluation of AI health technologies. It serves as the output document of the WHO/ITU Focus Group on AI for Health (FG-AI4H) Working group on Clinical Evaluation of AI for Health (WG-CE).	05/31/2022
8-AI4H scale-up and adoption		TBD	—
9-AI4H applications and platforms		This document contains a discussion on development of AI tool for Health using Mobile Applications & Cloud-based AI applications. This document describes type of mobile applications and the development of App based system for disease surveillance in the health sector.	5/20/2020
9.1	Mobile applications	This document contains a draft set of rules for development of AI tool for Health using Mobile Applications, their testing and benchmarking. It is to prepare the rules for development of AI tool for Health using Mobile Applications, and discuss the regulatory/ethical rules for Mobile Apps with AI for Healthcare.	5/21/2021
9.2	Cloud-based AI applications	This document contains a draft set of rules for development of Cloud-based AI applications, their testing and benchmarking. It is to discuss on technology, security and legal issues related to cloud-based AI tools, and to provide a forum for open communication among various stakeholders.	5/21/2020

Topic Groups (Examples)	Domain (Cardiovascular/ Dermatology/ Histopathology/etc.)	Task (Classification/ detection/ segmentation/ prediction/etc.)	Gold Standard (state-of-the-art task intervention method)	Input data type (Text/ Image/ video/ audio/ numerical/etc.)	Testing/ Training dataset (Public dataset/ Collected by myself/etc.)	Data annotation (Procedure/ annotator number/ tool/etc.)	Algorithm (specific model used in this TG)	Evaluation (Metrics used in this TG)
TG-Bacteria	Diagnoses of bacterial infection and anti-microbial resistance	Classification	clinical microbiologists with 4 to 5 years of specialization	2D Image	TBD	TBD	TBD	accuracy
TG-Cardio	cardiovascular disease	prediction	clinical CVD risk scoring tools/calculators (WHO, 2019)	Quantitative & qualitative data (structured)	De-identified retrospective secondary data from healthcare/EMR & research data repositories	Structured data are used, thus simple R programming is used to recode structured data to required standardized labels.	Support Vector Machines/SVM; Random Forest/RF; & Artificial Neural Networks/ANNs	Accuracy of each risk prediction; Kappa statistic
TG-Dental	Dental diagnostics and digital dentistry	Classification/ detection/ segmentation/ prediction	Histology, Cross-image validation, human annotations	2D Image, 3D Image, Video, Text	Self-built	Custom made tool	TBD	TBD
TG-Derma	Dermatology	Classification	TBD	2D Image	Public dataset (EDRA, ISIC, Dermofit, AICOS) and private data	Manual annotation	Not mentioned	Sensitivity; Specificity; F1-score
TG-Diabetes	Primary and secondary diabetes prediction	TBD	TBD	TBD	TBD	TBD	TBD	TBD
TG-DiagnosticCT	Volumetric chest computed tomography	TBD	TBD	TBD	TBD	TBD	TBD	TBD
TG-Endoscopy	Endoscopy	Classification/ detection/ segmentation	Pathological report, Cross annotation by doctors	2D Image, Video	Public dataset, self-built	Cross annotation, Self-built annotation tool	TBD	TBD
TG-FakeMed	AI-based detection of falsified medicine	Classification/ detection/ prediction	TBD	2D Image, Text	Self-built	TBD	TBD	TBD
TG-Falls	Falls among the elderly	TBD	TBD	TBD	TBD	TBD	TBD	TBD
TG-Fertility	human reproduction and fertility	TBD	TBD	TBD	TBD	TBD	TBD	TBD
TG-Histo	Histopathology	TBD	TBD	TBD	TBD	TBD	TBD	TBD
TG-Malaria	Malaria detection	TBD	TBD	TBD	TBD	TBD	TBD	TBD

Table 3(continued) – Summary of Topic Groups (DEL 10.1-10.24)

Topic Groups (Examples)	Domain (Cardiovascular/ Dermatology/ Histopathology/etc.)	Task (Classification/ detection/ segmentation/ prediction/etc.)	Gold Standard (state-of-the-art task intervention method)	Input data type (Text/ Image/ video/ audio/ numerical/etc.)	Testing/ Training dataset (Public dataset/ Collected by myself/etc.)	Data annotation (Procedure/ annotator number/ tool/etc.)	Algorithm (specific model used in this TG)	Evaluation (Metrics used in this TG)
TG-MCH	Maternal and child health	TBD	TBD	TBD	TBD	TBD	TBD	TBD
TG-MSK	Musculoskeletal medicine	TBD	TBD	TBD	TBD	TBD	TBD	TBD
TG-Neuro	Neurological disorders	Classification/ detection/ prediction	Post-mortem pathology evaluation, and biological markers.	2D Image, 4D Image, clinical scores, genetics and biomarkers (e.g. csf)	Public dataset, self-built.	Manual	TBD	TBD
TG-Ophthalmology	Ophthalmology	Classification/ detection/ segmentation/	Pathological report, Cross annotation by doctors	2D Image, 3D Image, Text	Public dataset, self-built	Cross annotation, Self-built annotation tool	TBD	TBD
TG-Outbreaks	Outbreak detection	TBD	TBD	TBD	TBD	TBD	TBD	TBD
TG-POC	point-of care diagnostics	TBD	TBD	TBD	TBD	TBD	TBD	TBD
TG-Psy	Psychiatry	TBD	TBD	TBD	TBD	TBD	TBD	TBD
TG-Radiology	Radiology	TBD	TBD	TBD	TBD	TBD	TBD	TBD
TG-Sanitation	Sanitation for public health	TBD	TBD	TBD	TBD	TBD	TBD	TBD
TG-Snake	Snakebite and snake identification	Classification	Snake expert (herpetologist) identification	2D Image	Public dataset, self-built.	Expert identification, crowdsourcing	TBD	TBD
TG-Symptom	Symptom assessment	Classification	Average doctor opinion.	Text, semantically structured cases.	Self-built.	a new case-creation tool	TBD	TBD
TG-TB	Tuberculosis	TBD	TBD	TBD	TBD	TBD	TBD	TBD