



INTERNATIONAL TELECOMMUNICATION UNION

TELECOMMUNICATION
STANDARDIZATION SECTOR

STUDY PERIOD 2022-2024

FG-AI4H-P-024-A02

ITU-T Focus Group on AI for Health

Original: English

WG(s): Plenary Helsinki, 20-22 September 2022

DOCUMENT

Source: TG-Diabetes Topic Driver

Title: Att.2 – CfTGP (TG-Diabetes) [same as Meeting L]

Purpose: Engagement

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Abstract: Calling on members of the medical and artificial intelligence communities with a vested interest in AI for primary and secondary diabetes prediction! Become engaged in the group dedicated to establishing a standardized benchmarking platform for AI for primary and secondary diabetes prediction (TG-Diabetes) within the International Telecommunication Union (ITU)/World Health Organization (WHO) Focus Group on “Artificial Intelligence for Health” (FG-AI4H).

This version of the CfTGP is the same as seen in Meeting L, reproduced for easier reference as a Meeting N document.

Call for Topic Group Participation: AI for primary and secondary diabetes prediction (TG-Diabetes)

The International Telecommunication Union (ITU)/World Health Organization (WHO) Focus Group on “Artificial Intelligence for Health” (FG-AI4H; <https://itu.int/go/fgai4h>) seeks engagement from members of the medical and artificial intelligence (AI) communities (including clinicians, technologists, entrepreneurs, potential benchmarking data providers, machine learning experts, software developers, researchers, regulators, policy-makers, companies/institutions, and field experts) with a vested interest in shaping the benchmarking process of AI for primary and secondary diabetes prediction.

1 About FG-AI4H

Over the past decade, considerable resources have been allocated to exploring the use of AI for health, which has revealed an immense potential. Yet, due to the complexity of AI models, it is difficult to understand their strengths, weaknesses, and limitations. If the technology is poorly designed or the underlying training data are biased or incomplete, errors or problematic results can occur. AI technology can only be used with complete confidence if it has been quality controlled through a rigorous evaluation in a standardized way. Towards developing this standard assessment framework of AI for health, the ITU has established FG-AI4H in partnership with the WHO.

Thus far, FG-AI4H has established 21 topic groups. The topic groups are: use of AI in cardiovascular disease management, dermatology, diagnoses of bacterial infection and anti-microbial resistance, falls among the elderly, histopathology, malaria detection, maternal and child health, neurological disorders, ophthalmology, outbreak detection, psychiatry, radiology, snakebite and snake identification, symptom assessment, tuberculosis, volumetric chest computed tomography, dental diagnostics and digital dentistry, AI based detection of falsified medicine, primary and secondary diabetes prediction, endoscopy, and AI for Musculoskeletal medicine.

Each topic group agrees upon representative benchmarking tasks in a pragmatic, best-practice approach, which can later be scaled and expanded to similar tasks. Every benchmarking task should address a health problem of relevance (e.g. impacting a large and diverse part of the global population or challenging to treat) and for which AI technology would provide a tangible improvement relative to the current practice (e.g. better care, results, and/or cost/time effectiveness).

For a rigorous and sound evaluation, undisclosed test data sets must be available (or have to be collected) for each task. All data must be of high quality and compliant with ethical and legal standards. In addition, the data must originate from a variety of sources so that it can be determined whether an AI algorithm can generalize across different conditions, locations, or settings (e.g. across different people, hospitals, and/or measurement devices). The format/properties of the data serving as input to the AI and of the output expected from the AI, as well as the benchmarking metrics are agreed upon and specified by the topic group.

Finally, the AI-to-be-evaluated will be benchmarked with the undisclosed test data on FG-AI4H computing infrastructure. Here, the AI will process single samples of the undisclosed test data set and predict output variables, which will be compared with the "ground truth." The results of the benchmarking will be provided to the AI developers and will appear on a (potentially anonymized) leaderboard.

2 Topic group: AI for primary and secondary diabetes prediction

A topic group is a community of stakeholders from the medical and AI communities with a shared interest in a topic.

This topic group is devoted to standardized benchmarking of artificial intelligence for diabetes and pre-diabetes and their complications. The specific conditions and diseases of diabetes and pre-diabetes include their complications the following categories (see Table 1):

- a) **Predictive Population Risk Stratification and Clinical decision Support:** Identification of diabetes subpopulations at higher risk for complications, hospitalization, readmissions, and Detection and monitoring of diabetes and comorbidities
- b) **Diabetic retinopathy:** Diabetic retinopathy is a serious eye-disease caused by diabetes that affects blood vessels in the light-sensitive tissue called the retina that lines the back of the eye. It is the most common cause of vision loss among people with diabetes and the leading cause of vision impairment and blindness among working-age adults worldwide. (Source TG-Ophthalmology Topic Diabetic retinopathy)
- c) **Diabetic Foot:** Diabetic foot is a condition in which foot ulcers form on patients with diabetes. People with diabetic foot ulcers (DFUs) have a decreased quality of life and an 8% higher incidence of needing a lower extremity amputation (LEA) in the future.
- d) **Patient Self-Management Tools:** These are tools that provide more active self-management, but in highly defined ways. Examples include sound and text reminders from a tabletop appliance or perhaps a personal digital assistant or telephone, or devices allowing a patient to transmit data such as blood pressure readings with these people have to make choices and decisions about how to manage their life and their diabetes. Through good self-management, people with diabetes can improve their quality of life and reduce the risk of developing complications.

Table 1 – AI and the four categories addressed by TG-Diabetes

Clinical Topics	AI techniques		
	Predictive analytics and deep learning	Image recognition and machine vision	NLP and speech
<i>Predictive population risk stratification and clinical decision support</i>	×		×
<i>Diabetic retinopathy</i>		×	
<i>Diabetic foot</i>		×	
<i>Patient self-management tools</i>		×	

Additional complications and conditions that are relevant to this Topic Group may be added in the future.

The objectives of the topic groups are manifold:

1. to provide a forum for open communication among various stakeholders,
2. to agree upon the benchmarking tasks of this topic and scoring metrics,
3. to facilitate the collection of high-quality labelled test data from different sources,
4. to clarify the input and output format of the test data,
5. to define and set-up the technical benchmarking infrastructure, and
6. to coordinate the benchmarking process in collaboration with the Focus Group management and working groups.

The primary output of a topic group is one document that describes all aspects of how to perform the benchmarking for this topic. (The document will be developed in a cooperative way by suggesting changes as input documents for the next FG-AI4H meeting that will then be discussed

and integrated into an official output document of this meeting. The process will continue over several meetings until the topic description document is ready for performing the first benchmarking.

More details about the activities of the topic group can be found in <https://www.itu.int/en/ITU-T/focusgroups/ai4h/Documents/tg/TDD-TG-Diabetes.pdf> and the Topic Group page collaboration <https://extranet.itu.int/sites/itu-t/focusgroups/ai4h/tg/SitePages/TG-Diabetes.aspx>. The documents in the latter can be accessed with a free ITU account (cf. “Get involved”).

Current members of the topic group on AI for primary and secondary diabetes prediction include:

1. Andrés Valdivieso Ahnfelt, Director of Innovation, Anastasia.ai
2. Marlos Lacayo, CEO, Estación Vital
3. Marcelo Guerra, COO, Tecnigen

The topic group would benefit from further expertise of the medical and AI communities and from additional data. The requirement for this topic group is – to be(come) an active member of the FGAI4H group and have a background, interest or expertise in this topic - primary and secondary diabetes prediction either as a healthcare professional or an AI practitioner with a model or algorithm for DR or in some other capacity.

3 Get involved

To join this topic group, please send an e-mail to the focus group secretariat (tsbfgai4h@itu.int) and the topic driver (avaldivieso@anastasia.ai). Please use a descriptive e-mail subject (e.g. "Participation topic group AI for primary and secondary diabetes prediction"), briefly introduce yourself and your organization, concisely describe your relevant experience and expertise, and explain your interest in the topic group.

Participation in FG-AI4H is free of charge and open to all. To attend the workshops and meetings, please visit the Focus Group website (<https://itu.int/go/fgai4h>), where you can also find the whitepaper, get access to the documentation, and sign up to the mailing list.
