



WG(s): Plen E-meeting, 30 September – 2 October 2020

DOCUMENT

Source: TG-Radiology Topic Driver

Title: Att.2 - CfTGP update (TG-Radiology) [same as Meeting H]

Purpose: Engagement

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Abstract: Radiology has been essential to accurately diagnose diseases and assessing responses to treatment. The challenge, however, lies in the shortage of radiologists globally. As a response to this, a number of Artificial Intelligence solutions are being developed. The challenge Artificial Intelligence radiological solutions however face is the lack of a benchmarking and evaluation standard and the difficulties of collecting diverse data to truly assess the ability of such systems to generalise and properly handle edge cases. This topic group is dedicated to the development of global standards for the evaluation and benchmarking of AI radiological systems. We are also collecting diverse data towards the assessment of AI radiological applications.

This version of the CfTGP is the same as seen in Meeting H (FGAI4H-H-041), reproduced for easier reference as a Meeting J document.

ITU/WHO Focus Group on Artificial Intelligence for Health (FG-AI4H)

Call for Topic Group Participation: AI for Radiology

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 Radiology.

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 15 topic groups. The topic groups are: AI and cardiovascular disease risk prediction, child growth monitoring, dermatology, falls among the elderly, histopathology, neuro-cognitive diseases, ophthalmology (retinal imaging diagnostics), psychiatry, radiotherapy, snakebite and snake identification, symptom assessment, tuberculosis, volumetric chest computed tomography, and AI for Radiology.

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 radiology

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

This topic group is dedicated to AI for Radiology.

Radiology has been essential to accurately diagnose diseases and assessing responses to treatment. The challenge, however, lies in the shortage of radiologists globally. As a response to this, a number of Artificial Intelligence solutions are being developed. Several studies have confirmed such AI systems performing just as well as radiologists, and sometimes better than radiologists at diagnosing conditions including pneumonia, fibrosis, hernia, edema, and pneumothorax via chest x-rays, and breast cancer via mammograms. Artificial Intelligence can provide support to radiologists and alleviate radiologist fatigue. It can help in flagging patients who require urgent care to radiologists and physicians. Deep Learning could also help increase interrater reliability among radiologists throughout their years in clinical practice. The challenge Artificial Intelligence radiological solutions however face is the lack of benchmarking and evaluation standards and the difficulties of collecting diverse data to truly assess the ability of such systems to generalise and properly handle edge cases. This topic group is developing such assessment and benchmarking frameworks to serve as global standards. We are also collecting a diverse pool of test data.

More details about the activities of the topic group can be found in the document [FGAI4H-H-029](#). This can be accessed with a free ITU account (cf. “Get involved”).

Current members of the topic group on AI for Radiology include Darlington Akogo, Founder, C.E.O, Director of Artificial Intelligence, minoHealth AI Labs, GUDRA; Xavier Lewis-Palmer, Biotechnology/Biomedical Engineering Resource Person, minoHealth AI Labs, GUDRA, Vincent Appiah, Machine Learning Engineer, Bioinformatician, minoHealth AI Labs, GUDRA, Benjamin Dabo Sarkodie, Head of Radiology & Interventional Radiologist, Euracare Diagnostic Center.

The topic group would benefit from further expertise of the medical and AI communities and from additional data. Experts in radiology, AI, AI radiological applications, regulations, standardization or policymaking are invited to join and contribute to development of global standards for AI applications in radiology.

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 (darlington@gudra-studio.com). Please use a descriptive e-mail subject (e.g. "Participation topic group AI for Radiology"), 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.

