Guidance Tool for Development and Implementation of Safe Healthcare AI

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Background

Artificial Intelligence (AI) has enormous potential to improve productivity and clinical care delivery, throughout the entire healthcare ecosystem. However, these benefits are not risk free and devoid of ethical concerns [1]. Therefore, there is impetus to ensure that AI is ethically designed and properly implemented for safe and effective patient care. In this vein, Singapore's Ministry of Health's Health Regulation Group developed and published the AI Healthcare Guidelines (AIHGle) to provide development and implementation guidance on safe healthcare AI [2].

Problem Statement and Software Objective

While we received positive feedback from the AI healthcare research teams on the AIGHle guidelines, they have highlighted the following concerns: (a) The guidelines were verbose. (b) While the key recommendations pages were useful in highlighting the essence of the guidelines to readers, supporting details could not be found easily. (c) Finally, it was hard to keep track of compliance with the guidance provided in the guidelines. Therefore, we developed the AI Guidance Tool (AI-GT) to address these concerns and improve the utility of the AIGHle guidelines.

Software features

AI-GT has 3 key software features: (1) **Readability** (Figure 1): To address concerns of readability, we summarised the key steps for development of safe healthcare AI espoused by the AIHGle guidelines. The tool ensures they are readable across all web and mobile platforms. (2) **Expandable details** (Figure 2): To allow users to quickly understand summarised key steps for safe healthcare AI development, expandable helper paragraphs are included to explain key steps. (3) **Checklist for task management** (Figure 3): To help users keep track of completed steps, an interactive checklist with a progress bar is provided. Upon completion, the tool will advise users on next steps.

Figure 1 (left): Readable guidance provided by the AI guidance tool; Figure 2 (center): Expandable information to provide more details on a key step; Figure 3 (right): Completed checklist with a full progress bar.

Software development details and software link

The tool was developed with the agile methodology approach. Technologies used include HTML, Javascript, JQuery version 3.6.4 and Bootstrap version 5.3.0. AI-GT was deployed on GitHub's pages and its code was open sourced. Link to the the development guidance tool as follows: https://health-regulation.github.io/development.html

Limitations and future work

As the tool is currently developed as a single webpage prototype without any database support, the tool will not be able to save or persist users' historical actions between user sessions. Despite this limitation, the tool serves its intended purpose for providing practical guidance to users on safe healthcare AI development and implementation. For future iterations of the software, we intend to create features for users to: (1) Provide feedback on the AIGHle guidelines and the AI-GT tool. (2) Submit self-declaration forms of guidelines compliance to government regulators. (3) Interact with other developers and implementers to understand the challenges of making safe healthcare AI.

References

[1] Morley, J., Machado, C. C., Burr, C., Cowls, J., Joshi, I., Taddeo, M., & Floridi, L. (2020). The ethics of AI in health care: a mapping review. Social Science & Medicine, 260, 113172.

[2] Ministry of Health, Singapore (2022). Artificial Intelligence in Healthcare Guidelines (AIGHle). https://www.moh.gov.sg/docs/librariesprovider5/eguides/1-0-artificial-in-healthcare-guidelines-(aihgle)_publishedoct21.pdf