Interactive medical image diagnosis with chatbot assistance

Essam Rashed, University of Hyogo
JST PRESTO, JP

rashed@gsis.u-hyogo.ac.jp

Background

Medical imaging is a common clinical procedure that is associated with several applications such as medical diagnosis, rehabilitation, surgery mapping and radiotherapy. While considering the quality of acquired image is now at a superior level, there are several cases where accurate diagnosis, analysis and characterization of the subject condition is challenging.

acquisition → diagnosis

Challenges

Major concerns of using AI in healthcare are based on potential bias in training these models that may lead to health risks. So, challenges are:

- Promote human well-being, human safety, and the public interest
- Ensure transparency, explainability, and intelligibility
- Foster responsibility and accountability
- Ensure inclusive and equity
- Promote AI that is responsive and sustainable
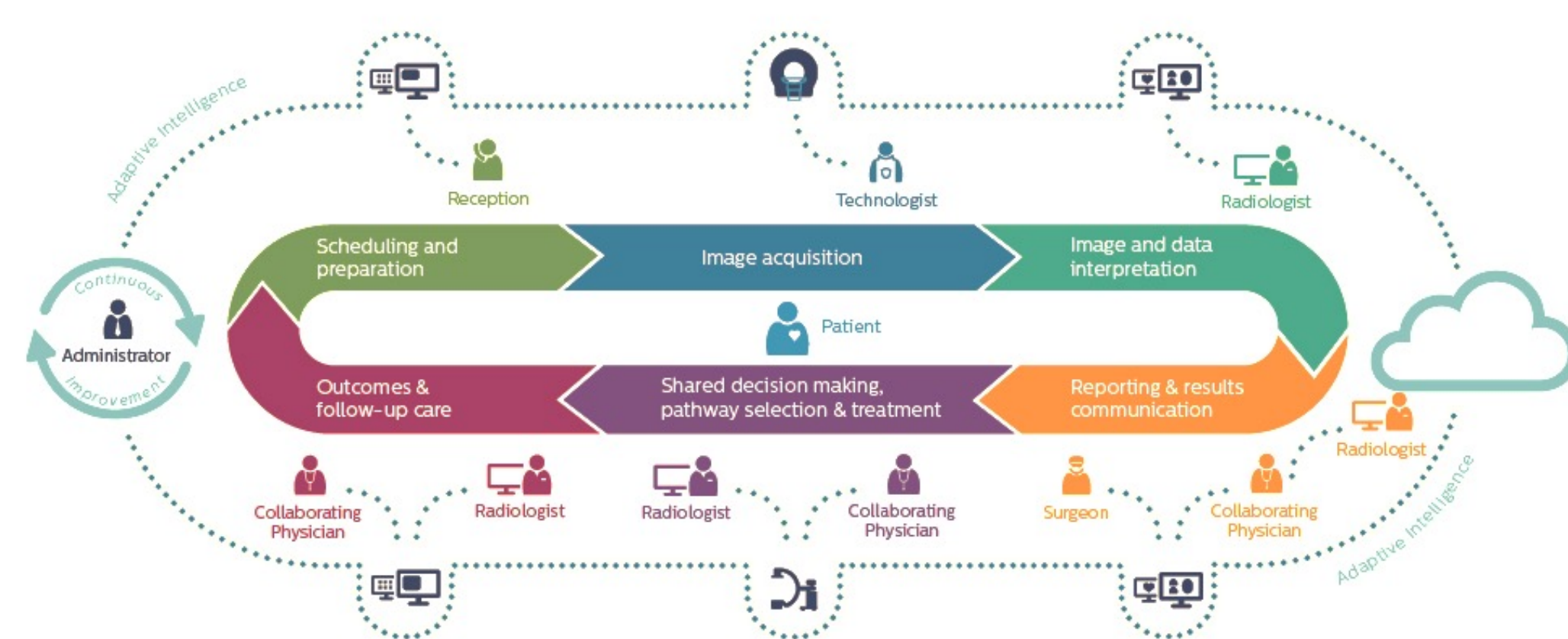
Intellectual Merit

This project proposes to take the lead on an emerging technology that is currently within the focal interest worldwide and expected to outcome innovative breakthrough in healthcare sector within near future. It enables:

- Better understanding of real medical imaging data through deep learning models that mimic the real diagnosis process.
- New framework that enable automatic diagnosis with chatbot assistance.
- Validation and verification of diagnosis output with consultation of medical radiologist would ensure accuracy confidant.

Major Outcomes

The project outcomes are:

- Deep learning models designed for extracting significant image features to enable accurate diagnosis (we focus on brain tumor using MRI).
- Chatbot-enabled radiology medical report generator that can produce expert-like reports.
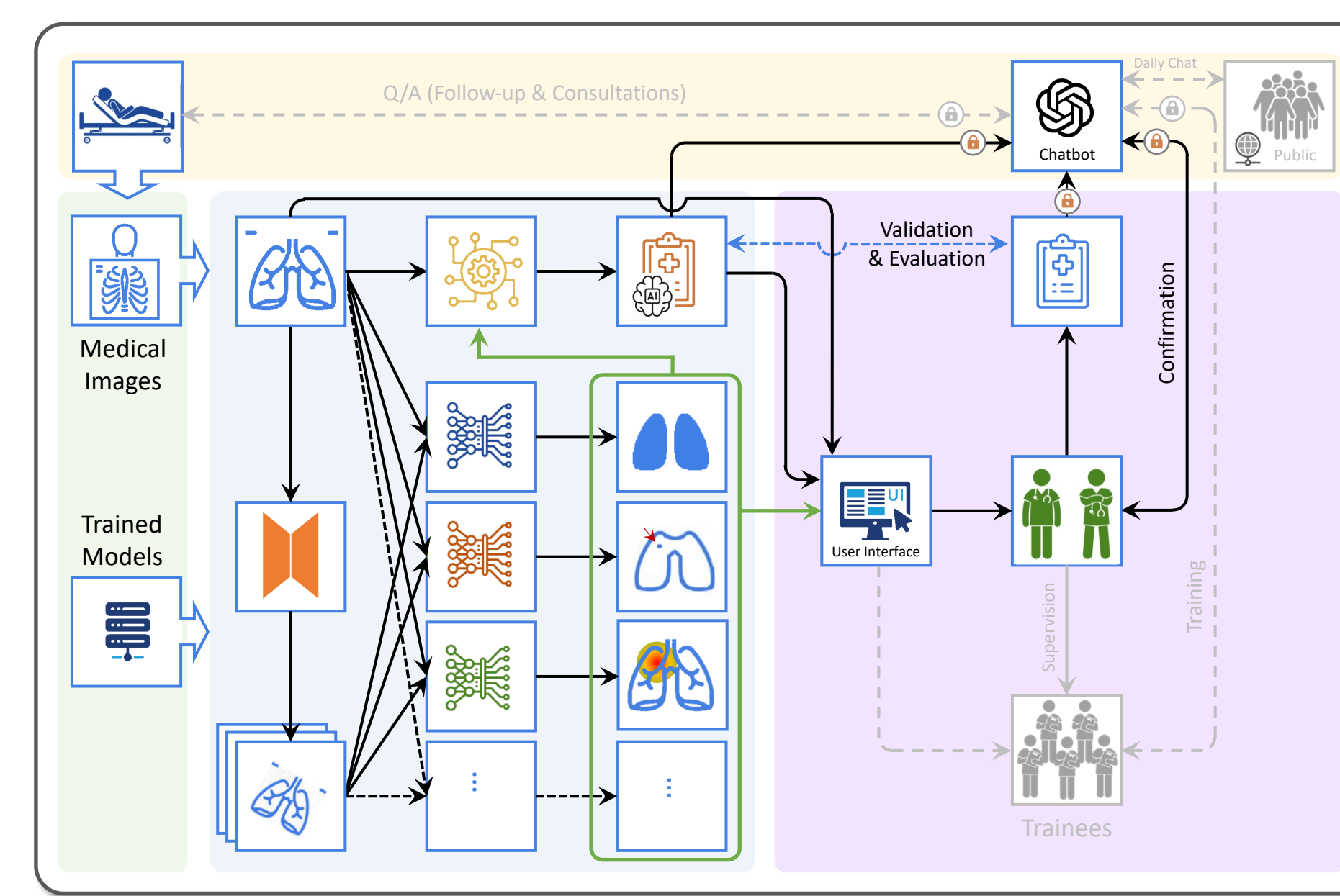
Broader Impact

This project is expected to contribute to the **sustainability of healthcare services** in **aging societies** with **limited human resources**. It also provide better understanding of how **large language models** can be used in healthcare ecosystem. It is expected to improve the **society acceptance** of AI technology in healthcare by using real data acquired from clinics and hospitals and result approval from medical experts.

SUSTAINABLE DEVELOPMENT GOALS
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION

now → future
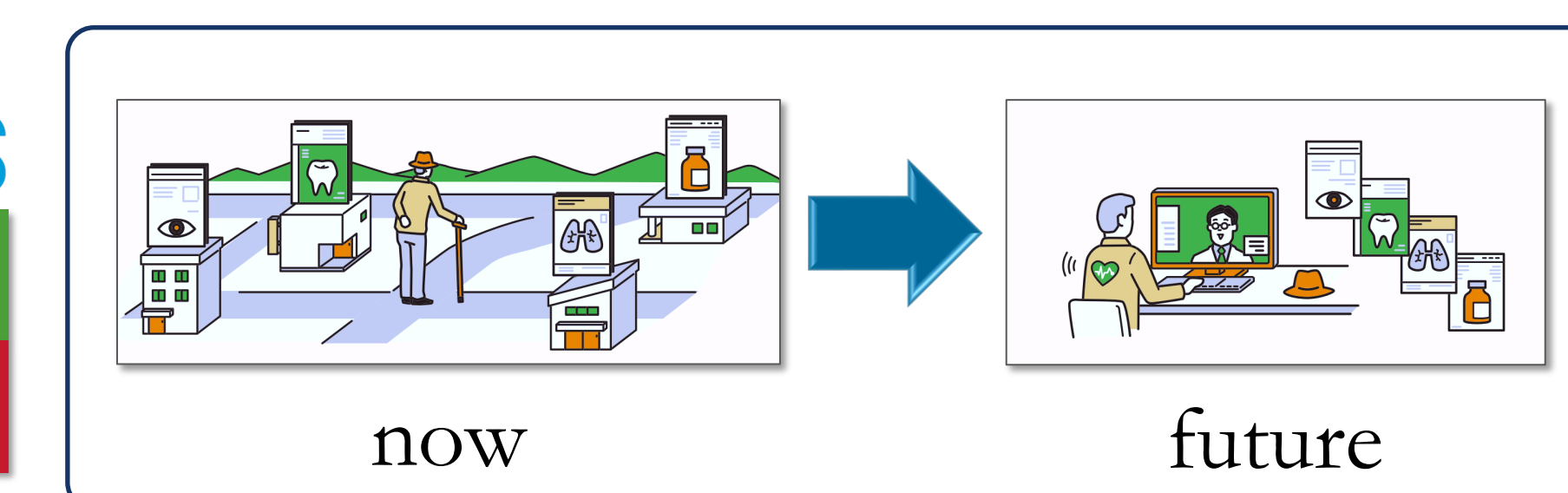
Future Goals

This research is expected to contribute to different aspects in future:

- **Remote education** of junior medical staff through providing Q/A and potential treatment strategies.
- Providing guidance for **early diagnosis of chronic diseases** based on symptoms acquired from patients and daily based lifestyle.
- Support of elderly patients suffering from mental disease through **mutual conversations** and **memory refreshments tasks**.
- Empower **personalized medicine** through individual data processing.
- Support **society engagement** for persons with disabilities through interactive communication.