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DOCTORS COULD GET BETTER AT WHAT THEY DO

How AI can aid healthcare

Artificial intelligence (AI) is the buzzword for all things relating to technology these days.

In particular, healthcare is seen as an area in which AI may be gainfully deployed to improve medical care, especially with big data, exponential computing power and a burgeoning demand on healthcare systems due to ageing populations.

While it cannot solve all problems in healthcare, the ubiquitous nature of technology in every aspect of modern living implies that it is now easier for doctors to care for a larger number of patients with the aid of AI.

AI tools built on current deep learning technologies are especially suited for hospitals where data on a patient's diagnosis, investigation and treatments are abundant.

Improving diagnosis from free text, radiological images and combinations of lab results are areas where AI can be most beneficial.

Highly accurate and early diagnoses resulting from AI could lead to more timely treatments and, ultimately, better patient outcomes.

Such dynamic tools can also learn from AI's mistakes to improve its predictive abilities, unlike static rule-



Artificial intelligence is already being looked at in Singapore for its potential in forecasting incidence of dengue fever. Researchers get it to learn season patterns of the disease over the last decade. TODAY FILE PHOTO

based systems that do not have features of continuous ongoing learning.

AI can also help to predict compli-

cations and hospital readmissions, be applied to operational research to reduce waiting time and discover methods to improve patient satisfaction.

AI tools can be applied in the acute hospital setting as well as in preventative medicine settings to coach patients to better health.

The potential for healthcare AI can best be seen in how clinicians, researchers, data scientists, and engineers are now working together to solve health challenges.

For instance, a group of researchers from the Saw Swee Hock School of Public Health and the National Environment Agency's (NEA) Environmental Health Institute has developed an AI agent to forecast dengue incidence up to four months ahead by learning the seasonal patterns of dengue cases over the last decade.

By providing advanced warnings of impending outbreaks, the AI agent can assist NEA to optimise its response.

This could include measures such as mobilising additional officers and community volunteers, intensifying removal of breeding sites, and providing advice to the public on what the community can do to suppress the mosquito population in their neighbourhood.

As more data sources are integrated, the AI agent will potentially be able to predict and localise outbreaks in specific areas of Singapore by analysing mosquito breeding data and proactively suggesting additional vector control and spot-checking schedules.

The more data and input that is fed to an AI system, the more it learns and improves. This is superior to current static IT systems. A smart AI system

helps save manpower and time.

For example, a team from National University Health System, National University of Singapore and Integrated Health Information Systems took part in the Digital Mammography Dream Challenge between last November and May.

The aim was to improve the predictive accuracy of digital mammography for the early detection of breast cancer using patient mammograms and a GoogleNet-based AI.

The Singapore team's AI began with 500 images, with a breast cancer detection accuracy of 59 per cent — not much better than a random guess. Images that were annotated by professional radiologists to mark the cancer and its locations were added from open source repositories.

With the added annotations as a benchmark, the AI was "taught" to hone its predictions, which helped improve its accuracy to 71 per cent, and ultimately to over 80 per cent with more images added to its database.

Such accuracy is similar to diagnoses by seasoned radiologists with decades of experience.

Such an AI tool can support radiologists in improving diagnosis efficiency and accuracy.

To be clear, AI healthcare systems will never be designed to replace doctors as they contradict a fundamental premise of healthcare — the doctor-patient relationship.

Machines do not owe a duty of care to patients and cannot replace the judgment calls made by doctors even after being presented with the AI-curated suggestions.

AI tools only help doctors to make better diagnostic decisions, improve treatment outcomes, reduce medical errors and cost. But they cannot care for patients directly.

The challenge for AI in healthcare is that it represents a paradigm shift in the practice of medicine that needs doctors to learn how AI recommendations are derived, before they can rely on such systems for day-to-day decision making.

This is currently the subject of AI safety research at the National University Hospital. Training doctors to use AI would allow them to better personalise care for their patients.

Ensuring better flow of information between doctors and caregivers, coupled with predictive insights from AI would go a long way in optimising care and improving patient satisfaction. In conclusion, the use of advanced AI in healthcare is inevitable.

There is no better time than now for doctors to learn how to use these tools to enhance the treatment and care of their patients.

While machines cannot function without doctors, they can help doctors become better at what they do.

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