

# CHECKING THE TRUST BETWEEN DOCTOR AND AI

Artificial intelligence will have an invaluable role in **SUPPORTING HEALTHCARE PROFESSIONALS**, providing it is applied in a reliable and clear way.

**Like many healthcare professionals,** Naoki Okada, an emergency physician at the Osaka General Medical Center, quickly found himself overwhelmed at the beginning of 2020 as he and his co-workers battled to save lives while the COVID-19 virus spread. But while viruses have existed for as long as humans, Okada — who also works in the Japanese government's COVID-19 AI & Simulation Project — is helping to diagnose them, and all diseases, in a very contemporary way. He has joined forces with other clinicians and software engineers at a company called fcuro Inc. to develop and apply emergency medicine artificial intelligence (AI) systems, with a particular focus on diagnostic imaging.

Imaging is a textbook example of a healthcare field that is perfectly suited to AI. Images are less subjective than a patient's list of symptoms: they are, often quite literally, black and white.

AI can alleviate the burden placed on healthcare professionals by analysing the truly enormous number of images generated in a modern hospital, be it from magnetic resonance imaging (MRI), ultrasound, or modern X-ray techniques such as computed tomography (CT). Spotting tiny anomalies in millions of images is well beyond what humans can manage manually, particularly in countries such as Japan that are facing a shortage of trained radiologists.

But despite this clear and



▲ Analysis of medical images could benefit from application of artificial intelligence.

urgent use case for AI, the move from laptop to the lab is taking longer than expected.

## JAPANESE FOR IMPROVEMENT

An analysis published in March 2021 identified 2,212 separate machine learning models in the scientific literature for the diagnosis or prognosis of COVID-19 based on chest radiographs or CT scans<sup>1</sup>. And this was just during the first nine months of 2020. But the authors didn't believe that any of these could be translated to clinical use.

The problem is one of trust. "Current AI models often lack documentation that sufficiently describes the model in a way that clinicians can understand," explains Okada. "And they also lack details that affect implementation, especially how

AI models make inferences."

Trust comes through knowing that the AI has been developed according to pre-agreed best practice; that it comes with accessible documentation that ensures the users can apply the AI in a reproducible manner; and it requires thorough verification that the AI works reliably with a demonstrated ability to distinguish between similar diseases.

Okada and his colleagues at the Osaka General Medical Center, together with AI engineers from fcuro, and input from 12 emergency medicine centres across Japan, are developing such documentation. Named after the Japanese word for improvement, their KAIZEN checklist provides detailed guidance on what is necessary for the implementation of AI

diagnostic imaging systems in real-world hospitals. "Our checklist makes AI research more objective, enabling its application in a uniform, dependable, trust-worthy way," Okada explains.

The Okada team are already starting to use their checklist to develop clinically plausible AI technologies trained on almost 2.5 million CT slices from twelve emergency medicine centres across Japan.

Such checklists will be key to the implementation of AI across all healthcare sectors for a number of reasons, says Okada. They help reassure healthcare professionals by guiding them through AI analysis. They help confirm accurate patient data, appropriate imaging protocols, and image acquisition quality. And by adhering to a checklist, healthcare professionals can systematically assess the integrity of the medical images and minimize errors, leading to more reliable AI outcomes, and ultimately the adoption of these technologies for faster and more precise patient care. ■

## REFERENCE

1. Roberts, M. *et al. Nat. Mach. Intell.* **3**, 199-217 (2021).

**COVID-19  
AI & Simulation Project**

[www.covid19-ai.jp/en-us](http://www.covid19-ai.jp/en-us)

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