

Clearer and faster: Five-minute MRI on the horizon

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An MRI machine. Credit: Royal Air Force photo by Sgt. Mitch Moore/Released

A five-minute full-body MRI scan could soon become a reality with the help of a promising new AI method developed by Monash University engineers.

In a [study](#) published in *Computers in Biology and Medicine*, researchers have shown how their novel AI technology, McSTRA, outperformed state-of-the-art methods, producing enhanced clinical imaging in record time.

MRI scans can take up to 60 minutes, depending on the size of the area being scanned. The new software is capable of completing scans 10-times faster than current MRI technology, giving it the potential to reduce scan times to just minutes and boost the number of patients accessing diagnostic services.

If further validation of the method is successful, the researchers hope to see it incorporated by manufacturers into next generation MRI equipment for use in patient settings.

With more than 30 million Australians reliant on diagnostic services every year, some patients are forced to wait weeks to secure an appointment, creating significant delays to receiving a diagnoses.

Lead researcher and Monash Ph.D. candidate Mevan Ekanayake, from the Department of Electrical and Computer Systems Engineering, said reducing delays to diagnostic imaging services could save lives by enabling more timely treatment, particularly for at-risk patients. His 60-second video shows how the technology could be used to improve lives.

"When tested on abnormalities in the knee, our research showed that McSTRA could complete scans 10-times faster, and produced clearer, more clinically accurate diagnostic imaging compared to the latest technology," Ekanayake said.

"Speeding up scan times at this rate could eliminate patient wait times and has the potential to save lives by enabling more timely and accurate

diagnoses and treatment monitoring. Our method could also reduce diagnostic risks in MRI and cut costs to the health care system."

Ekanayake said "high-risk patients awaiting urgent diagnosis would benefit most from speedier scan times, along with those living in regional and [remote areas](#) where less diagnostic services were available."

Patients undergoing scans must remain motionless inside an MRI scanner for up to 60 minutes which can be an unpleasant experience for some.

Study senior author Associate Professor Zhaolin Chen, head of the Imaging Analysis at Monash Biomedical Imaging, said faster scan times could reduce patient discomfort.

"McSTRA uses superior deep-learning technology to simultaneously enhance MRI image quality and enable unprecedented scan times," Chen said.

"A much shorter scan time may reduce the level of discomfort experienced by patients undergoing MRI, particularly among the vulnerable including children, the elderly, individuals with disabilities or those with claustrophobia."

More information: Mevan Ekanayake et al, McSTRA: A multi-branch cascaded swin transformer for point spread function-guided robust MRI reconstruction, *Computers in Biology and Medicine* (2023). [DOI: 10.1016/j.combiomed.2023.107775](https://doi.org/10.1016/j.combiomed.2023.107775)

Provided by Monash University

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