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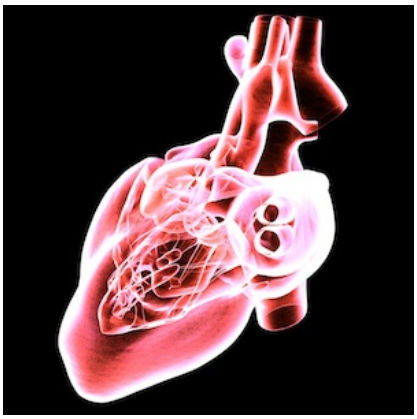
Can AI Read a Cardiac MRI Faster than a Human?



Cardiac MRI scans help clinicians to make precise measurements of heart structure and function that guide patient care and treatment plans. Interpreting a cardiac MRI by a trained physician (cardiologist) takes approximately 13 minutes. In contrast, automated machine learning can do the same analysis in just about four seconds nearly 186 times faster and with similar accuracy to cardiologists, according to new research published in Circulation: Cardiovascular Imaging, an American Heart Association journal.

Results of cardiac MRIs can guide cardiologists in making preoperative decisions for surgical planning. In addition, they help a care team make decisions regarding timing of cardiac surgery, implantation of defibrillators and continuing or discontinuing infusions of cardiotoxic chemotherapy for cancer patients.

Acceleration of data derived from such MRI scans could very well improve speed of clinical decision-making and subsequent health outcomes. For this study, conducted in the UK, researchers trained a neural network to read the cardiac MRI scans of nearly 600 patients. There was no significant difference in accuracy when the machine learning algorithm was tested for precision compared to an expert and trainee on 110 separate patients from multiple centres.

Current manual analysis of cardiac MRIs remains basic and outdated, says study author Charlotte Manisty, MD, PhD, Department of Cardiac Imaging, Barts Heart Centre (London), who cites the potential of automated machine learning techniques to change this analytic process and radically improve efficiency.

In the UK, it is estimated that more than 150,000 cardiac MRI scans are performed each year. Based on the number of scans per year, Manisty and co-researchers say that utilising AI to read scans could potentially lead to saving 54 clinician-days per year at each UK health centre.

"Our dataset of patients with a range of heart diseases who received scans enabled us to demonstrate that the greatest sources of measurement error arise from human factors. This indicates that automated techniques are at least as good as humans, with the potential soon to be 'super-human' transforming clinical and research measurement precision," Manisty points out.

This emerging technology offers promise for both clinical and research-based applications, according to another expert, Jennifer Conroy, MD, Associate Director of Cardiac CT and MRI, Lenox Hill Hospital in New York City, who is not involved in the UK study.

Machine learning will impact how we read cardiac MRI studies in our day-to day work and how we train future

generations of physicians, Dr Conroy said, adding that AI and innovative tools "that increase precision and efficiency are useful not only for individual patient care but also in performing larger scale research studies."

This UK study however did not demonstrate superiority of AI over human experts and was not used prospectively for clinical assessment of patient outcomes.

"I firmly believe that we are not at a point where machines can go unchecked and unsupervised after they deliver an interpretation. Clinicians still need to provide oversight and verify readings to assure patient safety and quality of care. While reduction in clinical hours is certainly an added benefit to such technology, we must first assure that there is no patient harm in larger scale studies," according to Robert Glatter, MD, an emergency physician on staff at Lenox Hill Hospital, who also was not part of the study.

More studies and investigations will certainly be required before this type of approach could become a viable option for healthcare systems, notes Dr Glatter, writing in a blog post for Forbes.com.

Source: American Heart Association; Forbes.com
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