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AI System Matches Cardiologists in Detecting Rheumatic Heart Disease

New research reveals that Artificial Intelligence (AI) can identify rheumatic heart disease (RHD) with a level of accuracy comparable to that of a cardiologist. This breakthrough showcases the potential of advanced deep learning technology in addressing this disease, potentially preventing unnecessary deaths.

Conducted at Children's National Hospital and featured in the latest edition of the Journal of the American Heart Association, the innovative AI system integrates cutting-edge ultrasound probes with portable electronic devices equipped with algorithms capable of diagnosing RHD through echocardiograms. The deployment of these devices could empower healthcare professionals, even those without specialised medical training, to detect RHD in regions where it persists.

RHD results from the body's response to repeated Strep A bacterial infections and can lead to permanent heart damage. Early detection allows for effective treatment with widely available antibiotics like penicillin. While RHD has been nearly eradicated in high-income nations, it continues to affect 40 million people in low- and middle-income countries, causing almost 400,000 annual deaths.

The technology has the potential to extend the reach of a cardiologist to anywhere in the world. Individuals trained to use the system could screen children for signs of RHD, facilitating prompt access to specialised care and preventive antibiotics.

Given the limited access to specialised care in impoverished countries, the standard diagnosis of RHD, relying on a cardiologist to interpret echocardiograms, can be challenging. The AI algorithm developed at Children's National demonstrated the ability to identify mitral regurgitation, a key indicator of RHD, in up to 90% of affected children.

The AI algorithm combines machine learning and deep learning to optimise the algorithm trained to interpret ultrasound images for RHD detection. It has already identified features of RHD that are invisible to the naked eye.

The algorithm's ability to adjust for the heart's size as a continuously fluid variable addresses a challenge faced by cardiologists, who traditionally rely on fixed weight categories for diagnosis. The technology can enhance human capabilities, enabling quicker and more precise calculations than the human eye and brain, ultimately saving lives.

Source: Children’s National Hospital

Image Credit: iStock

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