

New research outlines more effective diagnosis for people with heart conditions

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A new algorithm created by engineering experts at the University of Lincoln, UK, provides more effective Electrocardiogram (ECG) diagnosis for people with heart conditions. The research, which improves ECG signal classification and improved abnormality detection and diagnosis, won an award at the recent International Conference on Medical and Health Science held in Berlin.

Michael Gallimore, from the School of Engineering at the University of Lincoln, UK, presented a paper at the conference, explaining how he and colleagues created a new [algorithm](#) which produces more accurate electrocardiogram (ECG) signal classification when tested on patients.

An ECG is used to record the electrical activity of the heart through a number of electrodes placed on a patient's body, and ECG signal classification is a recognised method for automated detection and diagnosis of heart abnormalities. This is typically achieved through dimensionality reduction, feature extraction and application of various machine learning algorithms to classify signals. However, analysis can be difficult due to variations in accuracy of dimensionality reduction techniques.

The team at Lincoln, which includes Professor Chris Bingham and Dr Mike Riley, present a new algorithm which leads to more accurate and compact representations of ECG signals, improved classification of signal types and improved abnormality detection and diagnosis.

The 'Self-organising Piecewise Aggregate Approximation' algorithm was used on ECG data from 99 patients presenting with three different heart conditions. The new algorithm is able to select optimum parameters based on signal types in order to maximise classification rates and was shown to significantly outperform the standard system by correctly classifying 19.7 per cent more patients.

Mr Gallimore said: "Cardiovascular disease is one of the leading causes of death in the UK, accounting for 28 per cent of all deaths, according to the British Heart Foundation. The ability to improve the classification rates of ECG signals in the automated detection and diagnosis of [heart conditions](#) is significant, and could lead to more effective treatment for patients."

More information: "Self-Organizing Piecewise Aggregate Approximation algorithm for intelligent detection and diagnosis of heart conditions." eprints.lincoln.ac.uk/17747/

Provided by University of Lincoln

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