



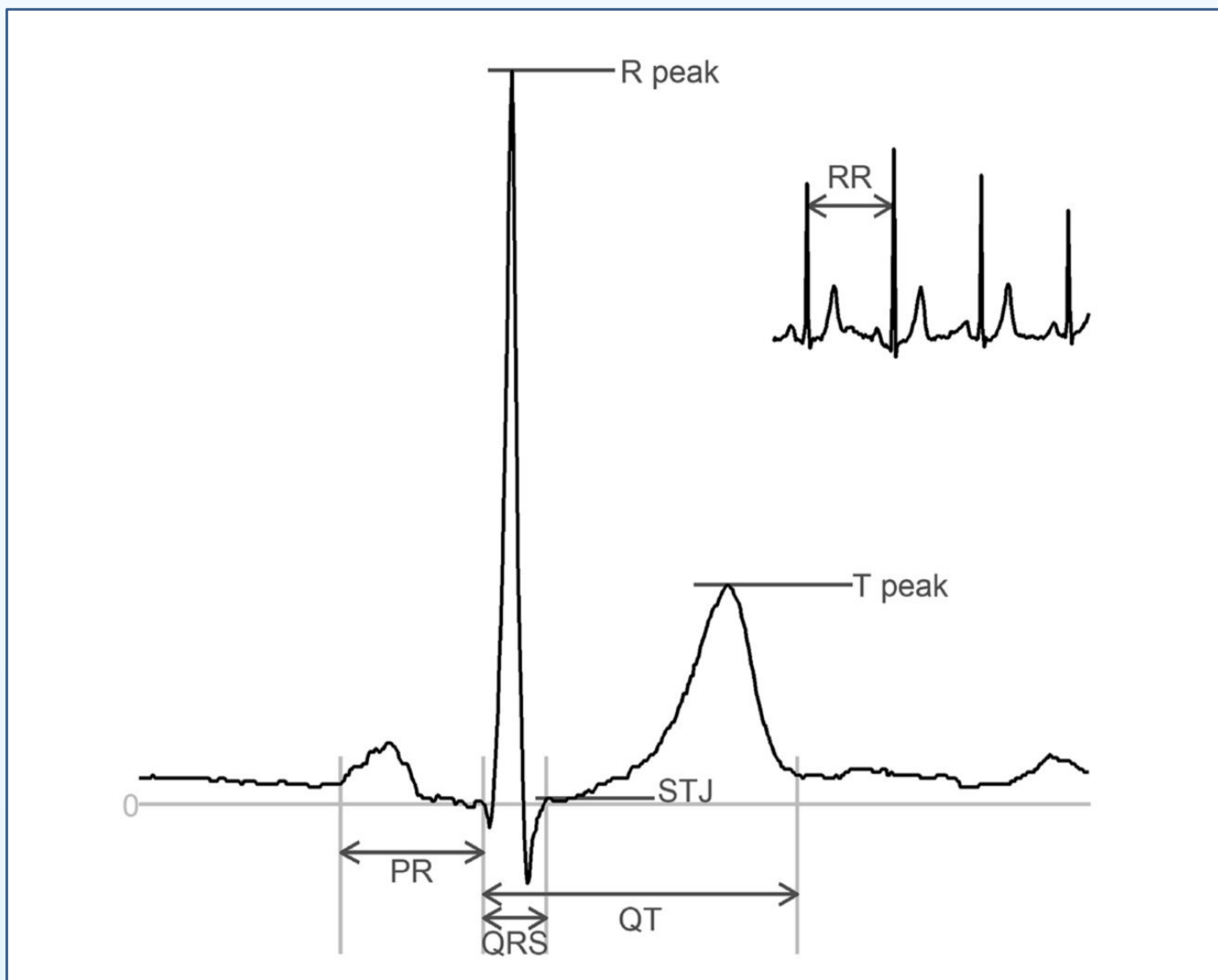
Extracting Insights over Time: A novel Convolutional Block Attention Resnet model for Analysis of ECG Parameters

A. M. H. H. Alahakoon¹, R. L. M. C. Simal¹, C. R. M. Perera¹

Supervised by: Prof. R. Ragel¹, Dr. I. Nawinne¹, Dr. V. Thambawita²

¹Department of Computer Engineering, Faculty of Engineering, University of Peradeniya. ²Department of Holistic Systems, SimulaMet, Norway.

Abstract - This work presents a novel deep learning model for predicting ECG parameters (heart rate, QRS, QT, etc.) from ECG signals. We further developed a software system that plots these predicted parameters over time for individual patients. This allows cardiologists to gain valuable insights into a patient's heart health by visualizing trends and changes, potentially leading to earlier diagnosis and more effective treatment strategies.



THE ECG SIGNAL ANALYSIS (WHY?)

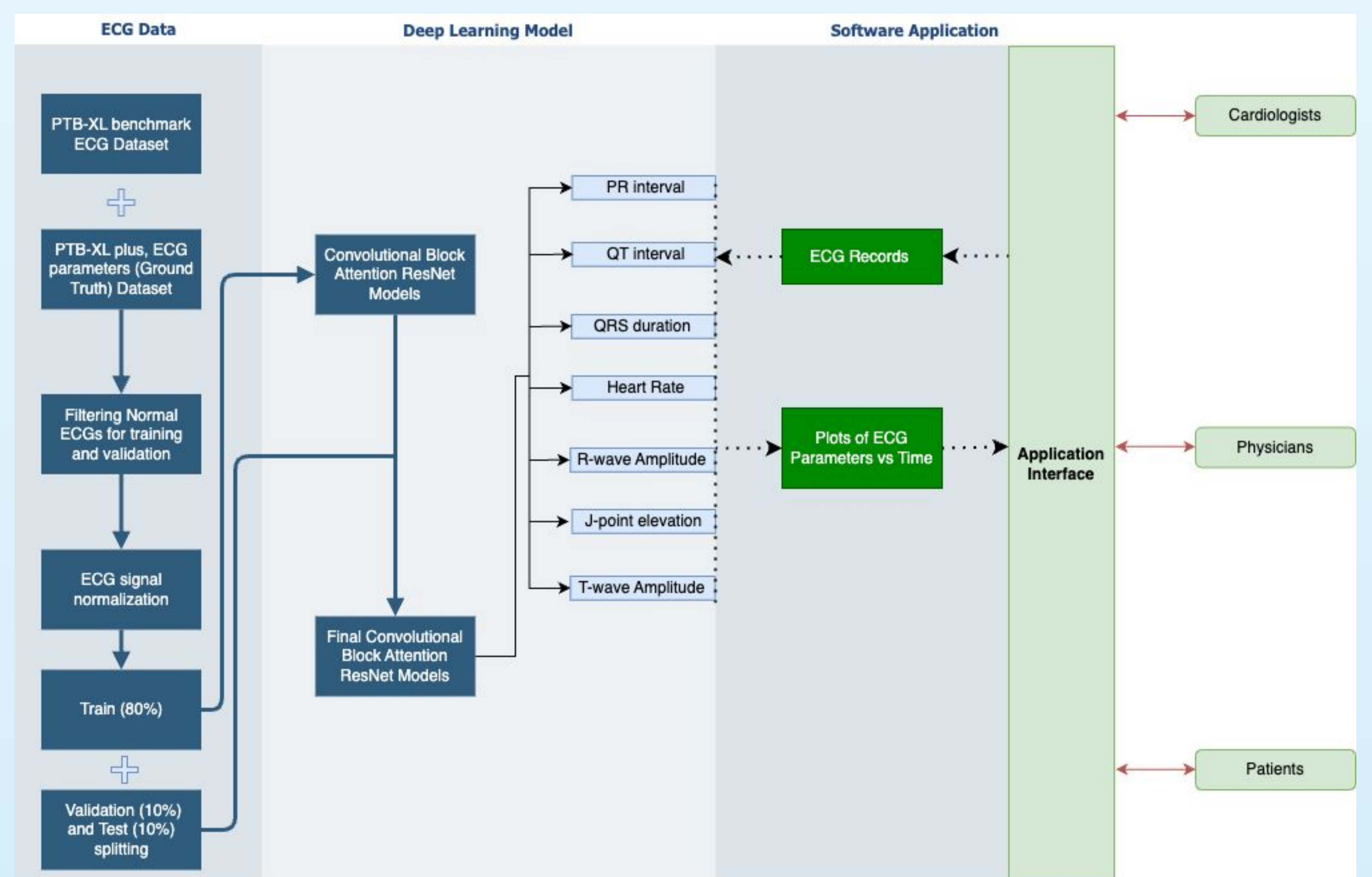
- ECG is one of the cheapest and most commonly used medical procedures. It consists of a set of voltage time-series, with several characteristic waves, which each carry clinical information about the state of the heart.
- The timing and the amplitude (*ECG Parameters*) of these waves contain essential information associated with morbidity and mortality. ECG is one of the cheapest and most commonly used medical procedures.
- Plotting ECG parameters over time for a single patient reveals trends and changes in heart function, aiding diagnosis and monitoring of potential issues.

RESULTS



Parameter	MSE	R ²
HR	11.63	0.98
PR	17.45	0.98
QT	7.67	0.91
QRS	0.22	0.99

METHODOLOGY



Insights for Cardiologists

- A prolonged **QT** interval can point to electrolyte imbalances, an increased risk of arrhythmias and sudden cardiac death.
- Change in **J-point elevation** directly indicate potential ischemia, a significant precursor to a heart attack. Early detection is crucial.
- **Heart rate** trends can reveal arrhythmias (irregular heartbeats), bradycardia (slow heart rate), or tachycardia (fast heart rate).

Contact details

Name : Dr. I. Nawinne
 Tel. No.: +94 81 239 3470
 Email : isurunawinne@eng.pdn.ac.lk

Multidisciplinary AI Research Centre (MARC)
 University Research Council
 University of Peradeniya
 Peradeniya, 20400, Sri Lanka

