

Automated Detection of Arrhythmias Using Intervals of ECG Signals

Technology Overview

This technology offers a computer-aided diagnosis (CAD) system for Arrhythmia based on ECG and deep learning technology. The neural network automatically classifies cardiac signals into normal (NSR) and life-threatening arrhythmias (Atrial fibrillation (A-Fib), atrial flutter (AFL), and ventricular fibrillation (V-Fib)). The developed network can be run on any computing platform, delivering quick diagnostic result for the clinicians and patients.

Technology Features & Specifications

The developed 11 layered neural network is able to automatically classify ECG signals into normal (NSR), Atrial fibrillation (A-Fib), atrial flutter (AFL), and ventricular fibrillation (V-Fib). The ECG length used by the developed network are 2 seconds and 5 seconds. The network uses classical convolution operations to interpret the input ECG signals. Convolution neural network is invariant to translation. Therefore, the ECG segments are not affected by time shifting and scaling. No QRS detection will be required during the pre-processing stage.

The system was developed and tested on 2 seconds and 5 seconds ECG segments (collated from various publicly available arrhythmia databases). The networks was trained using stochastic gradient descent. The achieved accuracy for 2 seconds ECG was 92.50% on a set of 21,709 segments. The sensitivity and specificity was 98.09% and 93.13% respectively. The achieved accuracy for 5 seconds ECG was 94.90% on a set of 8,683 segments. The sensitivity and specificity was 99.13% and 81.44% respectively.

The developed network is ready for computing and wearable devices integration.

Potential Applications

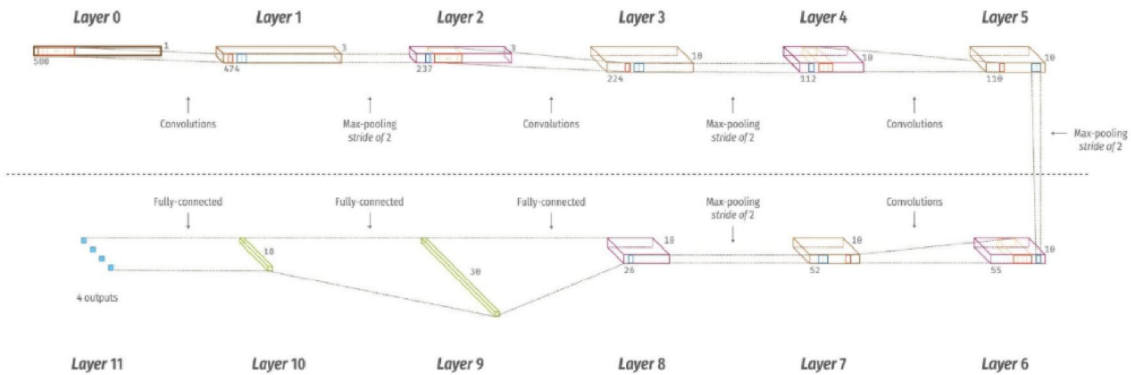
This automated diagnosis solution can be deployed at any clinical facility for the quick screening and wearable devices for cardiac health monitoring.

Customer Benefits

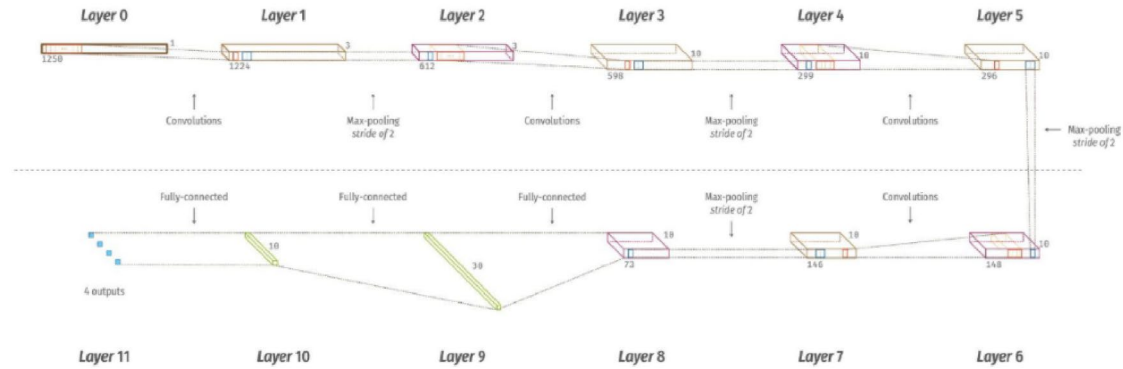
- Diagnosis is instant
- Assessment of the ECG signals is objective and reliable
- Reduce clinician's workload
- Network is compact (small). Readily to be deployed on any computing or mobile devices.
- Live/continuous monitoring

Attachments:

2 seconds Convolutional Neural Network



5 seconds Convolutional Neural Network



Theme:

- Health & Personal Care

Overview

- Technology Category : Health and Biomedical Sciences
- Technology Status : Available



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