IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.301
Volume 3, Issue 11, May 2023

Detection of Arrhythmia using Single-Lead ECG and Deep Neural Network

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Abstract: *Cardiac arrhythmia is a frequent condition in to- day's society. If the detection is made early on, it can be crucial. Early detection might aid in a quick and painless recovery. Using EKG (ECG), a heart specialist discovered an arrhythmia during the medical history. The disadvantage is that detection calls for skilled professionals. Automatic detection is now necessary due to the demand for professionals in every detection. However, these antiquated methods require expert data and are unable to model a wide variety of cardiac illness. Machine learning techniques have recently offered ways to take action on widespread heart disease identification. We have an 8500 single lead ECG recordings dataset for training that contains Around 10–60 seconds. To monitor a live ECG signal, we have also created single-led ECG measuring device utilizing an Arduino and an ECG module. Three categories—Normal, Atrial Fibrillation Rhythm, and Other Rhythms—are used to categorize the dataset. To train our model for the classification of ECG arrhythmia, we used deep neural networks. With the use of a single lead ECG data set used for training and testing, the model has been taught to identify three different forms of arrhythmia. To train our model to categorize the Single lead data obtained via an ECG module and an Arduino, we utilized a 34-layer DNN architecture into three groups. With this method, the Arrhythmia classification can be simply accessible and inexpensive. For a single lead data set, our model's accuracy of roughly 82 percent is extremely impressive*

Problem Statement: Arrhythmia detection is a very time- and money-consuming process when done with a 12-lead ECG. The objective of a portable and straightforward system is to detect arrhythmia using a single lead portable ECG module using deep learning and Arduino

Keywords: Deep learning, CNN, ECG, arrhythmia, single lead

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