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: 7.53
Volume 4, Issue 8, April 2024

ECG Arrhythmia Classification using Deep Learning

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Abstract: *An electrocardiogram (ECG) is a painless, noninvasive way to help diagnose numerous common heart problems. ECG plays an important role in diagnosing various Cardiac ailments. In recent years, Deep learning techniques have shown remarkable promise in achieving accurate and automated ECG arrhythmia classification. The primary goal of the system is to develop a robust and accurate system for the automated detection and classification of arrhythmias in electrocardiogram (ECG) data. By leveraging state-of-the-art techniques such as Convolutional Neural Networks (CNNs), we analyze pattern recognition within ECG signals to detect arrhythmias. Furthermore, we address the challenge of dataset scarcity by augmenting the data through nine different image cropping methods during the training phase. The implementation of techniques like Batch Normalization and data augmentation will further enhance the model's adaptability to diverse data sources, making it an invaluable tool for healthcare professionals. The CNN will be trained and tested using the ECG Dataset obtained from the MIT-BIH Database and from it, seven types of signals of arrhythmia will be classified. These seven signals are Premature Ventricular contractions (PVC), Paced beat (PAB), Right bundle branch block beat (RBB), Left bundle branch block beat (LBB), Atrial premature contraction (APC), Ventricular escape beat (VEB) and Normal beat. This system bridges the gap between advanced technology and healthcare, offering a transformative approach to ECG arrhythmia classification that has the potential to significantly improve patient outcomes and reduce the burden of manual diagnosis*

Keywords: Electrocardiogram · Arrhythmia · Convolutional neural network · MIT-BIH Database

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