



# ECG- Based Arrhythmia Classification by Using Convolution Neural Network Classifier

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I dedicate my work to my Father and Family, Thank you for all the provision and support along the way.

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In the name of God, the most Kind and Beneficent

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# Abstract

An Electrocardiogram (ECG) plays an important role in medical field for detection of cardiac arrhythmia. Moreover, ECG signal contains different types of artefacts, Power line interface, Electromyogram (EMG) Noise, Baseline Wander and Motion artifacts, those are necessary to remove for better prediction of cardiac condition. Therefore, for denoising the discrete wavelet transform method is applied along with band pass filter and derivative method is applied for ECG signal normalization. Although, previously features are extracted manually which increase the computational complexity and time delay problem. Therefore, to cope with these constraints this paper presents a deep convolutional neural network for automatic feature extraction. Spatial pyramid pooling layer is added with CNN layer which enhance the classification performance while reducing the computational cost by giving most useful information to Fully connected layer (FCL). Although, the ECG signals are selected from MIT-BIH arrhythmia database, and for the training and testing of the proposed scheme. Hence, the features are extracted and compressed in CNN architecture. Therefore, Arrhythmias are classified by applying fusion and deconvolution technique. The overall sensitivity and positive predictively of classification is 81.66 and 96.45%, respectively. The results show a significant improvement over previous reported studies and results for automated heartbeat classification systems.

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