

DESIGN OF MACHINE INTELLIGENT SYSTEM FOR CARDIAC HEALTH MONITORING

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ABSTRACT

Electrocardiogram (ECG) is periodic cycle of P-QRS-T wave, representative of electrical activity of the heart and ECG has been always chosen as the basic signal for diagnosing the cardiac abnormalities. The R-peak from one cardiac cycle to the next cycle makes a heartbeat. Abnormal heartbeat is called as the arrhythmia. Arrhythmias can be life-threatening.

Our project classifies the heartbeat extracted from MIT-BIH Arrhythmia Database. The MIT-BIH Arrhythmia Database consists of five classes (as per ANSI/AAMI EC57:1998 standard): nonectopic beats (N), supraventricular ectopic beats (S), ventricular ectopic beats (V), fusion beats (F) and unclassifiable beats (Q).

The methodology using MATLAB tool involves ECG denoising using Discrete Wavelet Transform (DWT), R-peak detection using Pan-Tompkins algorithm, feature extraction using Discrete Cosine Transform (DCT) coefficients and feature selection using Principal Component Analysis (PCA) and classification using k-Nearest Neighbor (k-NN) classifier.

This computer aided cardiac arrhythmia detection and classification tool can be significant in the management of cardiovascular diseases and further which may assist the physicians in their ECG reading.