**ABSTRACT**

Background/Objectives: Heart Rate Variability is an essential feature which decides the condition of human heart. ECG is used as diagnostic tool to access the electrical function of the heart. Methods/Statistical Analysis: The nine linear and nonlinear features are derived from the HRV signals. The feature extraction is carried out with the help of Particle Swarm Optimization (PSO) for data reduction. In proposed scheme Fuzzy C-Means (FCM) clustering and classifier integrated to enhance the accuracy result for ECG beat classification. Findings: The Enhanced SVM classifier classifies the heart rate data. Enhanced SVM classifier groups the linear and non-linear parameters as inputs, which are derived from the HRV signal. The denoise signals are classified and identifies the pattern for better classification of ECG signal. Application/Improvements: The proposed scheme is experimented with the assistance of the most commonly used MIT-BIH arrhythmia database and adequate results were obtained with an accuracy level of 98.38% than the other well-known approaches