**ABSTRACT**

The Electrocardiogram is a tool used to access the electrical recording and muscular function of the heart and in last few decades it is extensively used in the investigation and diagnosis of heart related diseases. It must be noted that the heart rate fluctuates not only because of cardiac demand, however is also influenced as a result of the occurrence of cardiac disease and diabetes. In addition, it has been shown that Heart Rate Variability (HRV) may well be utilized as an early indicator of cardiac disease susceptibility and the existence of diabetes. As a result, the HRV can be exercised for early clinical test of these diseases. Most existing systems make use of Support Vector Machine (SVM), owing to the generalization performance, it is not sufficient for the accurate classification of heart rate data. In order to overcome this complication, Improved Extreme Learning Machine (IELM) classifier is used, to obtain the best parameter value and best feature subset through the use of Bacterial Foraging Optimization (BFO) that feed the classifier. Here in this work, features of linear and nonlinear are extracted from the HRV signals. Following the preprocessing, feature extraction is done effectively together with feature selection with the assistance of BFO for the purpose of data reduction. Subsequently, proposed a scheme to integrate Kernel Fuzzy C-Means (KFCM) clustering and classifier to adequately enhance the accuracy result for ECG beat classification. The accuracy result for classification of heart rate data is shown in the proposed scheme.