**ABSTRACT**

The electrical activity of the human heart is measured by the vital bio medical signal called ECG. This electrocardiogram is employed as a crucial source to gather the diagnostic information of a patient’s cardiopathy. The monitoring function of cardiac disease is diagnosed by documenting and handling the electrocardiogram (ECG) impulses. In the recent years many research has been done and developing an enhanced method to identify the risk in the patient’s body condition by processing and analysing the ECG signal. This analysis of the signal helps to find the cardiac abnormalities, arrhythmias, and many other heart problems. ECG signal is processed to detect the variability in heart rhythm; heart rate variability is calculated based on the time interval between heart beats. Heart Rate Variability HRV is measured by the variation in the beat to beat interval. The Heart rate Variability (HRV) is an essential aspect to diagnose the properties of the heart. Recent development enhances the potential with the aid of non-linear metrics in reference point with feature selection. In this paper, the fundamental elements are taken from the ECG signal for feature selection process where Bat algorithm is employed for feature selection to predict the best feature and presented to the classifier for accurate classification. The popular machine learning algorithm ELM is taken for classification, integrated with evolutionary algorithm named Self-Adaptive Differential Evolution Extreme Learning Machine SADEELM to improve the reliability of classification. It combines Effective Fuzzy Kohonen clustering network (EFKCN) to be able to increase the accuracy.