Abstract

Electrocardiogram (ECG), a non-invasive diagnostic technique, used for detecting cardiac arrhythmia has gained attention in recent years in medical sciences, industry dealing with Bio-medical instrumentation and research, demanding an advancement in its ability to distinguish different cardiac arrhythmia. Studies conducted in this research work on recent feature extraction methods, such as, Auto Regressive (AR) modeling, Magnitude Squared Coherence (MSC) and Wavelet Coherence (WTC) using standard database (MIT-BIH), also yielded a lot of features. A large number of these features might be insignificant containing some redundant and non-discriminative features that introduce computational burden and loss of performance. A novel technique to classify the ECGs of normal and subjects at risk of SCD using nonlinear technique has been presented. We have predicted SCD by analyzing four minutes of ECG signals prior to SCD occurrence by using Fast CS-SCHT coefficients. This paper presents fast Conjugate Symmetric Sequency Ordered Complex Hadamard Transform (CS-SCHT) for extracting relevant features from the ECG signal. The sparse matrix factorization method is used for developing fast and efficient CS-SCHT algorithm and its computational
burden is examined as compared to that of the HT and NCHT. The applications of the CS-SCHT in the ECG based SCD detection is also discussed. In this work, we have achieved good classification accuracy for prediction of SCD. The proposed method is able to detect a person at risk of SCD four minutes earlier.

References

Index Terms

Computer Science
Applied Sciences

Keywords

Sudden Cardiac Death, ECG, Fast CS-SCHT, Neural Network Classifier