

Sudden cardiac death prediction using ECG signal derivative (heart rate variability): a review

Abstract

Sudden cardiac death (SCD) prediction using Electrocardiogram (ECG) signal is a popular area of research because of the seriousness of the matter. There are tons of papers published in this research which available online. Severe importance for prediction and recent development of new algorithms fuels this research further. There are numerous methods to detect or predict SCD based on Heart Rate Variability (HRV), T-Wave Alternans (TWA), Heart Rate Turbulence (HRT), Signal Averaged Electrocardiogram (SA-ECG), Data Mining, and Non Linear Analysis to state few. Researchers favors statistical analysis over other classifier (Neural network, KNN etc.) based methods since it gives more perspective to the research findings. Various statistical methods like Kaplan-Meier method, t-test, Mann-Whitney U test, Wilk's Lambda test were carried out to describe correlation between ECG derived parameters (HRV, TWA, HRT etc.) and SCD. Even though there are many papers published, none of them are clinically practicable because of its own limitations. In this review, we would see methods and techniques based on HRV used by researchers in order to detect and predict sudden cardiac death.

Keywords — Electrocardiogram (ECG), heart rate variability, HRV, sudden cardiac death (SCD)