Prediction of Heart Disease Using Integrated Vector Cardiogram System

Researchers at the University of South Florida have developed the integrated VectorCardiogram (iVCG) a compact, wireless, and wearable device for providing 24x7 diagnostic quality detection of heart disease. Current research indicates that the combination of personalized big data and Machine Learning (ML) technology may enable a method for the timely prediction of cardiac events such as atrial fibrillation.

Atrial fibrillation (AF) is the most common cardiac arrhythmia, affecting an estimated 6 million people in the US alone. AF occurs when the beating in the upper chambers of the heart is irregular, which decreases proper blood flow through the heart. AF is also associated with an increased risk of stroke and mortality. Pacing therapy can be used to reduce the incidence of AF and maintain the heart’s normal sinus rhythm. Current methods of predicting AF episodes are inaccurate and difficult to deploy long-term, which decreases the effectiveness of pacing therapy.

The iVCG is a wireless vector cardiogram system that is less expensive and more accurate than available products and requires only 3 orthogonal leads, which may be contained within a single miniaturized housing. The device can detect cardiac events with diagnostic quality. This makes it compact enough to be worn continuously by the patient and includes the ability to transmit the data wirelessly to a remote device, such as a pacemaker or remote monitoring station for continuous real-time patient monitoring.

Our inventors have also developed a method, which can be implemented on the iVCG, and holds the promise of more accurately predicting heart disease and AF episodes. This method produces patient specific models, which distinguish between epochs of ECG located far away from AF rhythms and those located just prior to the onset of episodes. These two technologies have the potential to create a paradigm shift in cardiology by both improving detection and prediction of atrial fibrillation and related disorders.

ADVANTAGES:
- Compact and less expensive
- Enables remote monitoring of patient
- Patient specific models
- More accurate data and predictions

Continuous Real-Time Monitoring and Prediction of Cardiac Function

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