

Monitoring remote of heart rate variability: arrhythmia detection

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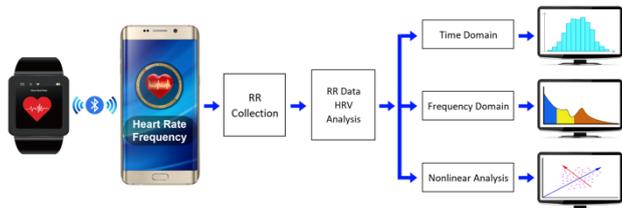
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Remote online cardiac monitoring has been shown an important auxiliary tool to predict arrhythmic episodes and reduce health systems cost. This research aims to present an online smartphone cardiac monitoring through smartphone in an attempt to meet the afore mentioned requirements and still help in predicting deaths correlated to the heart.

Blind cardiac activity recordings from patients with and without arrhythmia disorders were recorded through a smartphone (android 4.0 or higher, 4G/WiFi connection.). A sensor was attached to the patient's wrist (range [25, 250] BPM).

Clinical case evolved a nocturnal recording of the HR during the period between 1 to 4am. Once the sensor has recorded the HR, the signals were transmitted to the web platform. The HRV investigation was conducted using time and frequency domains analysis



and non-linear techniques. Case A: female, 44 years old, sedentary, 1.68m height and 62 kg without pathological history. Case B: female, 46 years old, sedentary, 1.75m, 89 kg, with arrhythmia clinically diagnosed, carrier pacemaker. Case C: male, 45, 122 kg, 1.78m, clinically diagnosed with left myocardial injury and pressure controlled by medication.

The time and frequency domains analysis of the HRV demonstrates that there are no significance differences. Nevertheless, the mean and range HR in case C are up to 5 times higher in relation to Cases A and B. The kurtosis allows to distinguish clearly case B from the other ones. The relationship LF/HF denotes a proper sympathetic/parasympathetic system regulation in cases A and B, different from case C, in which parasympathetic activity is increased. This fact has been confirmed with help of SD1/SD2 ratio obtained from Poincaré diagrams. Finally, it is noted that the variable Sample Entropy is more irregular in case C in relation to Case A and B, respectively.

The method is promising for the detection of cardiac arrhythmias.