APPLICABILITY OF LEAD V_2 ECG MEASUREMENTS IN BIOMETRICS

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ABSTRACT

Reference points of the electrocardiographic (ECG) signal, are typically used in clinical applications for diagnostics and evaluation of the cardiac system function. These points have well characterized reference values, and deviations from those may express multiple anomalies.

The ECG provides a visualization of the electrical activity of the cardiac muscle fibres; as measured from the body surface, the ECG is directly related to the physiology of each individual.

Measurements are influenced by physiologic factors which include: skin conductivity, genetic singularities, position, shape and size of the heart, among others. Regardless of what factors originate differences in the measurement, the fact that the ECG contains physiologic dependant singularities makes way for its application to human identification.

This paper presents statistical analysis results for lead V_2 measurements, focusing the ECG applicability potential to Human identification. We analyse the discriminative potential among subjects provided by each individual heartbeat wave by contingency matrix analysis, and extend these results by evaluating the subject recognition rate using only a reduced number of ECG heartbeat waveforms.

Previous work has used ECG signals measured at rest and at stress potentiating tasks. In our work, acquisitions were performed for 25 subjects during the realization of a series of cognitive tasks. Also, the employed signal processing techniques and features extracted from the signal are briefly described.

Preliminary results revealed a 100% identification rate through contingency matrix analysis. Furthermore, we verified that from a single heartbeat waveform high subject recognition rates are achievable. Further improvements were obtained by applying sequential classifier combination techniques to combine individual decisions for a reduced set of heartbeat waveforms.