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Heart Based Biometrics and use of Heart Rate Variability in Human Identification Systems

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Abstract and Figures

Heart rate variability (HRV) is an intrinsic property of heart and active research domain of the medical research community since last two decades. But in biometrics it is still in its infancy. This article is intended to present the state of art into heart-based biometrics and also explore the possibility of using HRV in biometric recognition systems. Subsequently, we designed hardware and software for data collection and also developed software for HRV analysis in Matlab, which generates 101 HRV Parameters (Features) using various HRV analysis techniques like statistical, spectral, geometrical, etc., which are commonly used and recommended for HRV analysis. All these features have their relative significance in medical interpretations and analysis, but among these 101 features reliable features that can be useful for biometric recognition were unknown; therefore feature selection becomes a necessary step. We used five different wrapper algorithms for feature selection, and obtained 10 reliable features out of 101. Using the proposed 10 HRV features, we used KNN for classification of subjects. The classification test gave us encouraging results with 82.22 % recognition rate.

Schematic of an ECG stri… List of features… Schematic of ECG… Workflow of proposed… List of features…

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