

Biosignal Recognition for Personal Identification

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Abstract : A biometric security system has become an important application in client identification and verification system. A conventional biometric system is normally based on unimodal biometric that depends on either behavioural or physiological information for authentication purposes. The behavioural biometric depends on human body biometric signal (such as speech) and biosignal biometric (such as electrocardiogram (ECG) and phonocardiogram or heart sound (HS)). The speech signal is commonly used in a recognition system in biometric, while the ECG and the HS have been used to identify a person's diseases uniquely related to its cluster. However, the conventional biometric system is liable to spoof attack that will affect the performance of the system. Therefore, a multimodal biometric security system is developed, which is based on biometric signal of ECG, HS, and speech. The biosignal data involved in the biometric system is initially segmented, with each segment Mel Frequency Cepstral Coefficients (MFCC) method is exploited for extracting the feature. The Hidden Markov Model (HMM) is used to model the client and to classify the unknown input with respect to the modal. The recognition system involved training and testing session that is known as client identification (CID). In this project, twenty clients are tested with the developed system. The best overall performance at 44 kHz was 93.92% for ECG and the worst overall performance was ECG at 88.47%. The results were compared to the best overall performance at 44 kHz for (20clients) to increment of clients, which was 90.00% for HS and the worst overall performance falls at ECG at 79.91%. It can be concluded that the difference multimodal biometric has a substantial effect on performance of the biometric system and with the increment of data, even with higher frequency sampling, the performance still decreased slightly as predicted.

Keywords : electrocardiogram, phonocardiogram, hidden markov model, mel frequency cepstral coefficients, client identification

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