The subject recognition rate is 98% and the ECG window recognition rate is 95.6%. Furthermore, misclassified cases appear only among the arrhythmia subjects while healthy subjects have a 100% window recognition rate.

Our systematic analysis for human identification from ECG data removes the emphasis from fiducial detection and achieves high recognition performance with low complexity and simplicity.

Our appearance based method captures the holistic patterns in a heartbeat signal, and only the detection of the R peak is necessary. This is generally easier since R corresponds to the highest and sharpest peak in a heartbeat. To better utilize the complementary characteristics of different types of features and improve the recognition accuracy, we propose a hierarchical scheme for the integration of analytic and appearance attributes.

Our autocorrelation-based method is a very simple and effective approach that does not require any waveform detection. It depends on estimating and classifying the significant coefficients of the Discrete Cosine Transform (DCT) of the windowed autocorrelation of heartbeat signals. Recently, we have extended this method to cases of arrhythmias by introducing a novel procedure for classification of healthy vs. arrhythmic ECG windows prior to ECG recognition.

We also explore cryptographic key generation and distribution methodologies in body area networks by exploiting time varying characteristics of multiple ECG signals. Our fuzzy key generation and distribution scheme provides a more flexible and computationally efficient alternative to existing solutions.

Recent Publications:

1. F. Agrafioti and D. Hatzinakos, “ECG based human identification in Arrhythmia scenarios”, submitted to Eurasip Pattern Recognition, June 2007

Contact: D. Hatzinakos, (dimitris@comm.utoronto.ca), K. Plataniotis, (kostas@comm.utoronto.ca)