1. **Preprocessing :**

To eliminate noises, the signals are processed with filters. The filter is a combination high-pass filter and low-pass filter. Signal S denoted as:

$S(n), \quad n = 1,2,3...N$

2. QRS Detection :

The QRS Complex of ECG Signal is the most distinctive among all the features of ECG. Implementing Pan-Tompkin's Algorithm, allows efficient detection of QRS Complex, and thereby simplifying the task of feature extraction.

$R(n_k)$, $k = 1,2,3..., M$ Where n_k is the location of R peak.

Since the positions of R peaks $R(n_k)$ are determined, a 128-point signal segment SS_k can be obtained by taking data points from the backward 43rd point to the forward 84th point.

$SS_k = [S(n_k - 43) : S(n_k + 84)]$

Four such signal segments form a 512-points synthesis signal F:

$F = [SS_1\ SS_2\ SS_3\ SS_4]$.

3. Obtaining Wavelet Coefficients by Discrete Wavelet Transform :

With 'Haar' wavelet, the 512-points wavelet coefficients decomposed from the signal were used as the biometric “identity card” of the subject. We decompose the signal with level-9 decomposition. Wavelet coefficients decomposed from 512-points synthetic signal is shown in Fig(4).

4. Identification :

ECG of an unknown individual is acquired; Euclidean distance measure is applied to calculate the difference in the 512-point wavelet coefficient feature set between the unknown subject and all enrolled subjects. The subject with minimum computed distance is the final identification result. LDA classifier can be used to classify QRS fragments.

I intend to develop a wearable device using AD8232 ECG sensor, to perform real time ECG based Authentication.