ECG Based Personal Info Lock

Human Computer Interfaces (HCI)
SC_45

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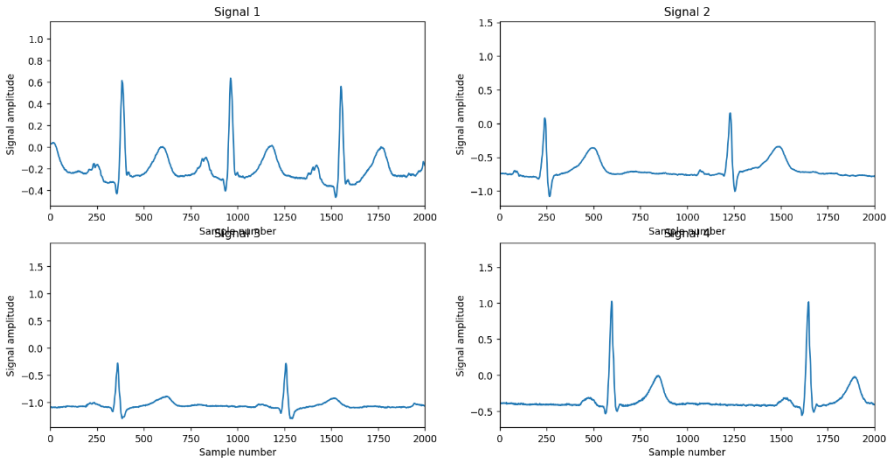
Data Preparation

- ## dataset

We have obtained 4 ECG signals for 4 different healthy subjects from PTB database. The data is split into 80% for training and 20% for testing, The description of the data is:

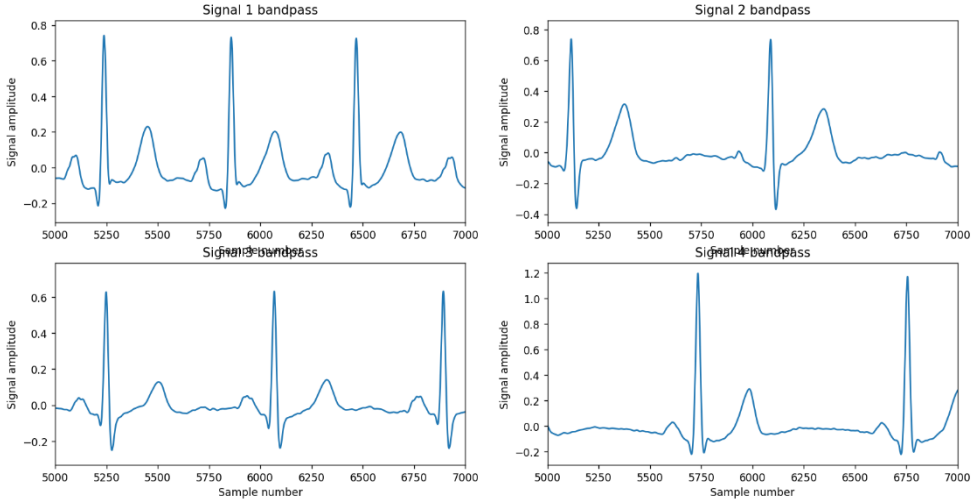
Number of signals	**4**
Sampling frequency	**1000**

Signals Visualization



- ## Preprocessing

ECG data contains noise from multiple sources (e.g., Baseline wander, Power line interface). We have used a simple Butterworth filter with cut-off frequencies between [1 – 40] Hz, which is the ECG spectrum, to remove the noise.



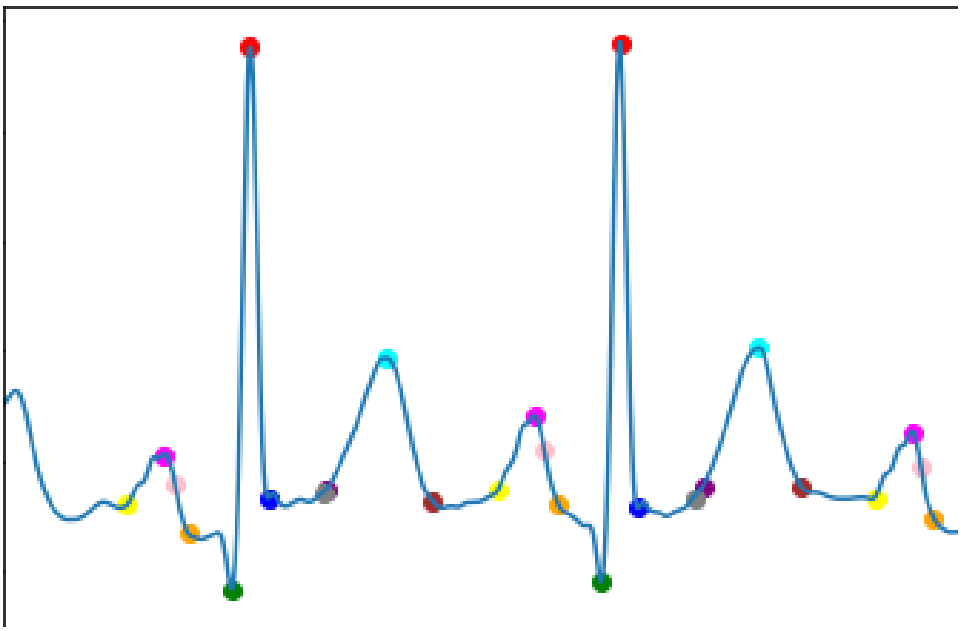
Fiducial Feature Extraction

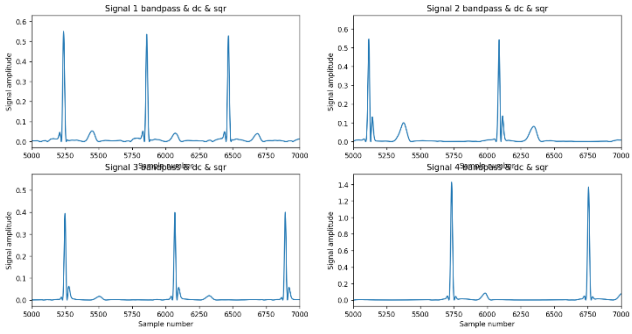
Which represents the amplitude of the signal fiducial points: P, Q, R, S and T and the duration between them.
11 Points to be detected the peak of each of the three Complexes QRS, P, T and the onset and offset of each of them.
At first, we detect the R-peak by using Pan and Tompkins Algorithm which is:

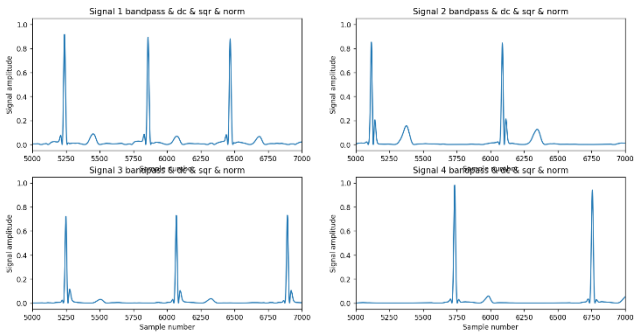
1. Band pass filter	2. Differentiation	3. Squaring	4. Moving window	5. Thresholding

Or simply find the R-peaks by detecting the local maxima on the neighborhood and setting a suitable distance between neighborhood (550 sample).

Here are the 11 detected fiducial points:







Classification

We have tried multiple classifiers:

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Logistic Regression Accuracy: 0.9916666666666667
SVM Accuracy: 1.0
Random Forest Accuracy: 1.0
Naive Bayes Accuracy: 0.9916666666666667
```

GUI