AUTHENTICATION SYSTEM BASED ON ECG

TEAM: SC_5

Team Members

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Data Acquisition:

TB Diagnostic ECG Database

Data has been collected from https://www.physionet.org/content/ptbdb/1.0.0/

From 52 Healthy control subjects
we selected only 4 for our system

Data preparation:

First, we got the signals and removed isoline drift.

By using high pass filter and moving average filter to get the corrected filter.

(corrected=filtered - baseline)

Then do segmentation to extract ECG segments.

Then split data with ratio 80/20

And save one segment from each person in text file to be used for testing

Used Butterworth filter of order 4 and band (2,40)

Feature Extraction:

Then extract features using three methods:

1. Discrete wavelet transform level 4 or 5 with db4 or sym4 symlet
2. Auto correlation /Discrete Cosine Transform (AC/DCT)
3. Pan Tompkins algorithm for ECG points detection

Classification:

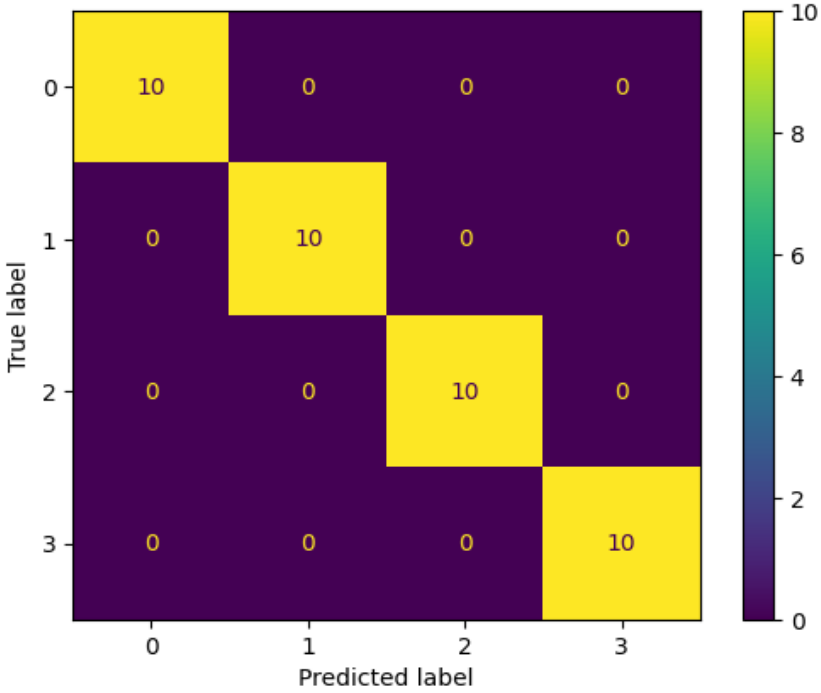
Then used 3 classifiers:

1. Support vector machines (SVM): parms=linear kernel
2. Logistic Regression: parms= default
3. Linear Discriminant Analysis (LDA): parms= default

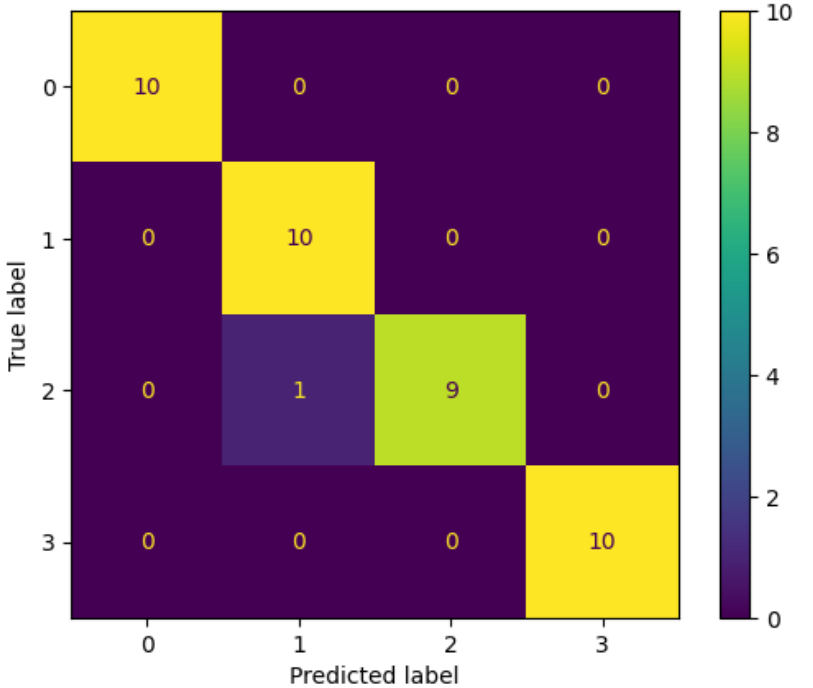
Classification Results:

	Classifier		
Feature extraction method	SVM	Logistic Regression	LDA
Wavelet	100%	100%	100%
AC/DCT	100%	92.5%	100%
Fiducial features /Pan Tompkins	97.5%	87.5%	100%

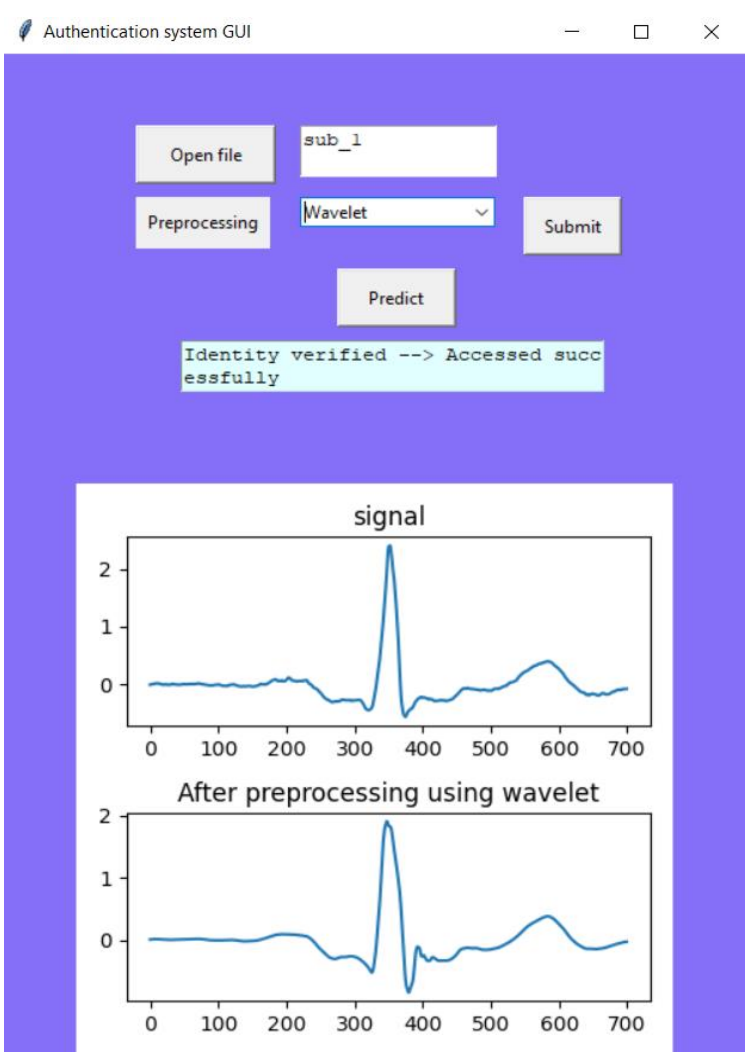
Wavelet with LDA

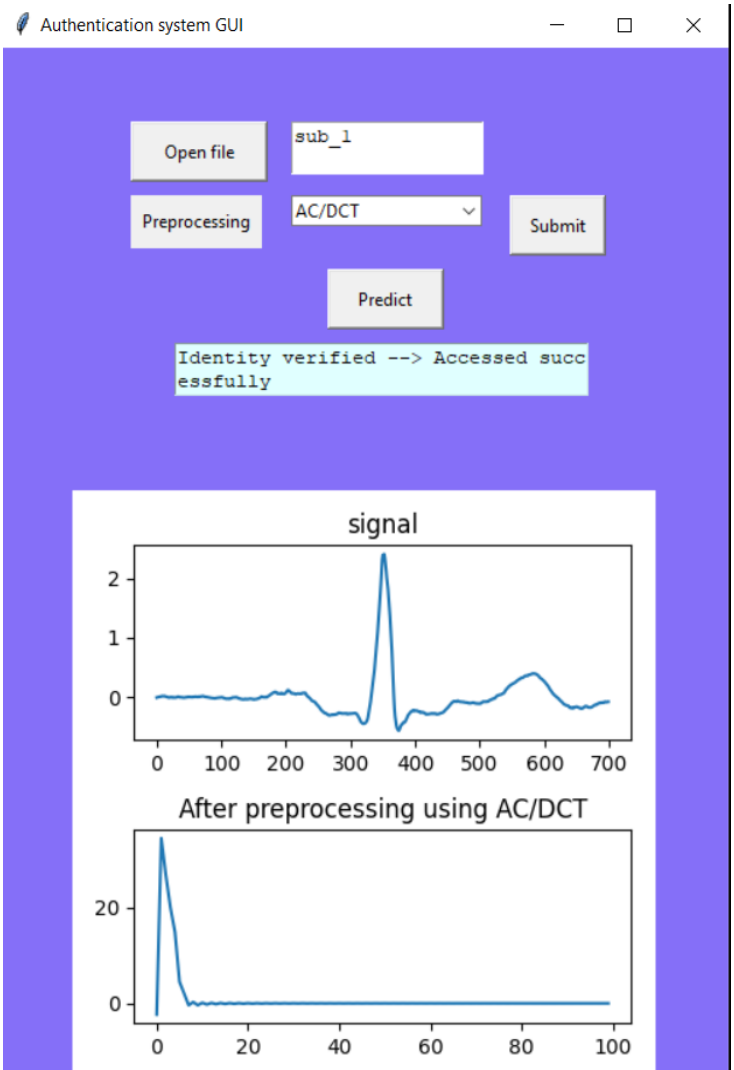


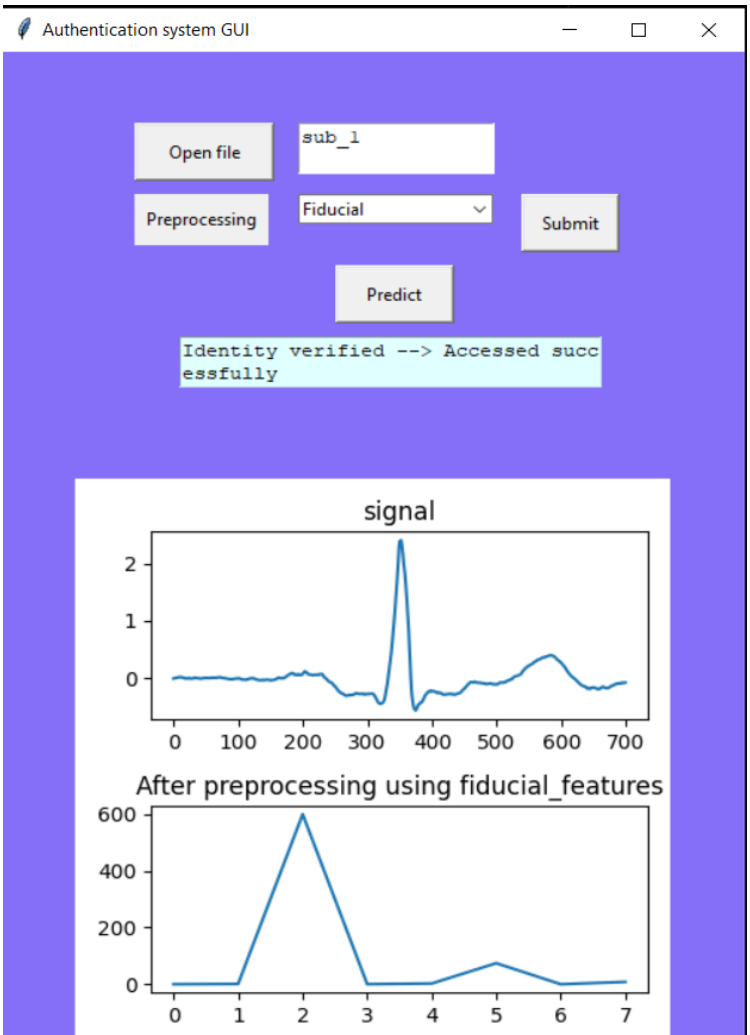
Pan Tompkins with SVM



Screen Shots:







Architecture of the ECG identification