****

**- Faculty of Computer and Information Sciences –**

**- AIN Shams University -**

**HCI - SC**

**-----------------------------------------------------------**

**ECG-BASED-AUTHENTICATION-INTERFACE**

**TEAM INFROMATION: SC-14**

|  |  |  |
| --- | --- | --- |
| **القسم** | **رقــــم الجلوس** | **الأســـــــم** |
| **SC** | **20191700221** | **خالد احمد عبدالظاهر محمد** |
| **SC** | **20191700029** | **احمد خالد احمد عبداللاه** |
| **SC** | **20191700034** | **احمد سعيد نوح ابراهيم** |
| **SC** | **20191700040** | **احمد طارق فتحى محمد** |

**- Under Supervision -**

**Dr. Manal Tantawi**

**TA. Manar Sultan**

**Main idea**

Ecg-Based-Authentication-Interface that can recognize Authorized Persons from its ECG After result from Classifier based on fiducial and non-fiducial features extracted from Signal ..

ECG signals have 11 main points differ from person to each other ..

**Dataset**

We used ECG-ID Database The ECG-ID Database is a set of 310 ECGs from 90 volunteers, created and contributed to PhysioBank by Tatiana Lugovaya and Published: March 6, 2014.

The records were obtained from volunteers (44 men and 46 women aged from 13 to 75 years who were students, colleagues, and friends of the author). The number of records for each person varies from 2 (collected during one day) to 20 (collected periodically over 6 months).

The raw ECG signals are rather noisy and contain both high and low frequency noise components. Each record includes both raw and filtered signals:

* Signal 0: ECG I (raw signal)
* Signal 1: ECG I filtered (filtered signal)

**In Our Project** we selected Raw signal with noise to can apply Feature Extraction on it from PERSON\_01,PERSON\_02,PERSON\_52 and PERSON\_72 “ lot numbers of records “

A picture containing line, plot, text, font

Description automatically generated

Figure 1 - PERSON1 RECORD 1

A picture containing line, plot, font

Description automatically generated

Figure 2 - PERSON2 RECORD 11

**Data preparation**

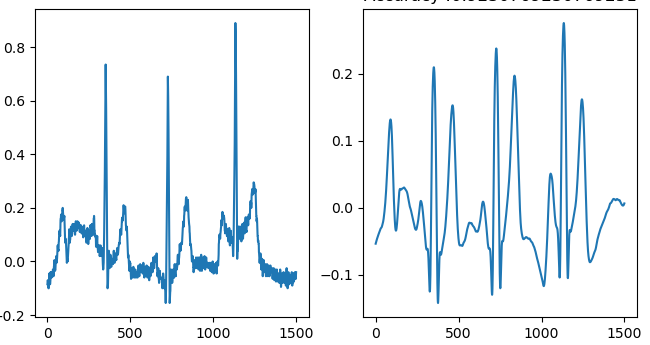
**READ DATA:**

Records was in types of “.atr , .dat , .hea”, so we used **wfdb.rdsamp** method in **wfdb** library that take location of all signals and range of samples from 0 to “Specific Range=1500” and number of channels “ in case our data [ 0:”raw”,1:”filitered”] “

And we when read data we take Label of all signals to can Encoding it before submit to classifier.

**PREPROCESSING:**

due to noise in raw signals

1. Non fiducial features: Firstly using butter bandpass filter with parameters   
   - low cutoff:1.0 Hz , High cutoff:40.0 Hz , samplingRate = 500.0 and order = 4  
   - smoothing signal   
   
2. Fiducial Features: must apply butter bandpass filter in steps of Pan and Tompkins with parameters  
   - low cutoff:1.0 Hz , High cutoff:40.0 Hz , samplingRate = 500.0 and order = 1  
   A graph with blue lines and red dots

   Description automatically generated with low confidence

**Feature Extraction**

1. **Non-fiducial:**Applying Autocorrelation to get segments and then apply DCT to reduce Dimension of signal  
   A picture containing text, diagram, line, plot

   Description automatically generated