

CMPE58Z Introduction to Biometrics

Assignment 1 – Performance Evaluation of Biometric Systems

Due: March 15th, 23:55

In this assignment, you will analyze verification performance of a biometric system. Assume that a biometric matching algorithm produces a similarity matrix (SM) that contains similarity or dissimilarity scores. Given the SM and its corresponding class labels, you are asked to:

- Compute Equal error rate (EER) and the threshold that provides the EER. In addition to the EER, provide FRR values at the following FAR points: FAR=10%, FAR=1%, FAR=0.1%
- Plot genuine and impostor score distributions
- Plot ROC curve

Class label information is provided to you to find out which matrix entries in the SM are genuine and impostor scores.

You're required to submit your Matlab function (name your function as `analyze_similarity_matrix.m`) that outputs the EER, FAR/FRR values to the command prompt, and plots the required curves. Your function should take two variables as input arguments:

- Input similarity matrix (SM)
- Class labels (person identities) of every sample for the similarity matrix (Class_Labels)

SM and class labels data are provided to you as text files. You will be given four different data files. Provide outputs for all data files. Sample assignment report is provided as an example below.

Note for Other Programming Languages: You are free to use other programming languages. Your program should load a single data file, and output required outputs (EER, FAR/FRR values and ROC plot) automatically.

Submission Details

Upload the following files as a single zip file (name_surname.zip) to the course Moodle page:

1. **Report:** Report (to be submitted in PDF format) should contain the results of the assignment, described below. A sample report can be found at the end of this document.

- A table containing the Equal error rate (EER) with EER threshold, and required FAR & FRR values
- Genuine and impostor score distribution plots.
- ROC plot
- Brief explanation of how you computed EER point.

2. **Source Code:** All required source codes. Do not submit the input data files provided to you.

Important Notes

Late Submission Policy: Maximum late submission delay is two days. Late submissions will be graded on 50% of the original grade.

Submissions are Mandatory: Assignment submissions are mandatory. Otherwise, you fail the course.

Assignment 1 Sample Report

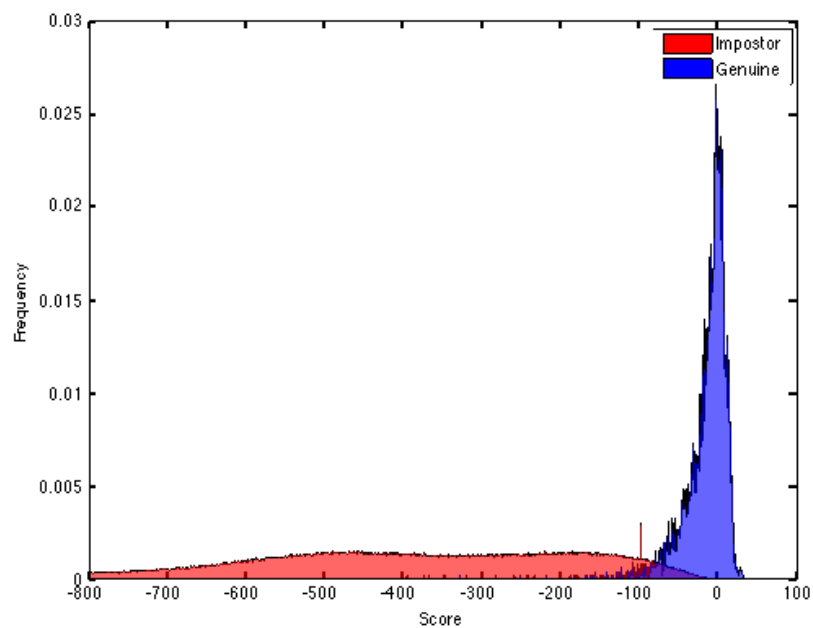
Student Info: Name, ID, E-mail

Results shown below are for a single data file.

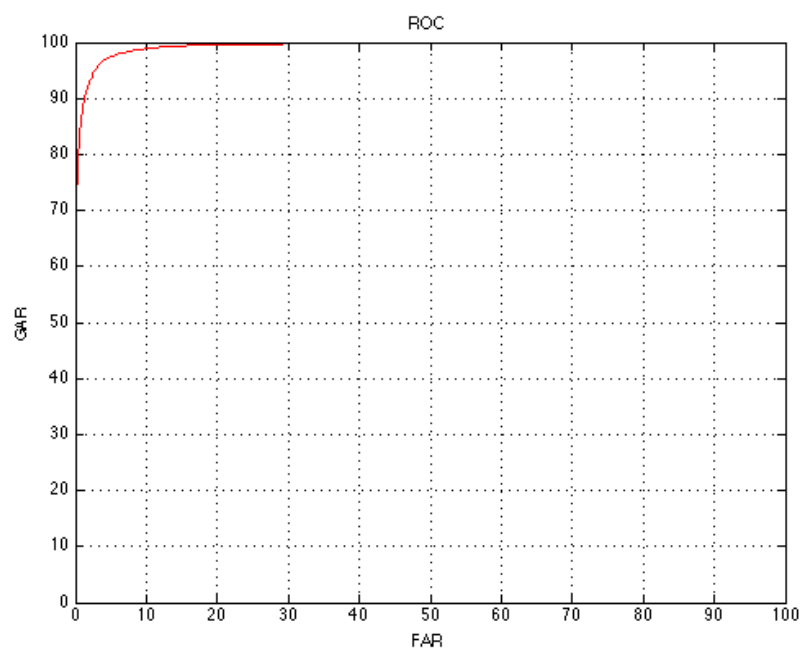
1. EER and EER Threshold, FAR/FRR values:

EER	3.65%	EER Threshold	-20.1
FRR	43.87%	at FAR point	0.1%
FRR	25.34%	at FAR point	1%
FRR	6.76%	at FAR point	10%

2. Genuine and Impostor Score Distribution Plot:



3. ROC Plot:



4. Explain very briefly how you compute the EER?