EEE-6561 Fundamentals of Biometric Identification
Spring 2020 Homework #2

January 18, 2020

Due: Janurary 31, 11:59 PM

This assignment should be completed individually by the student. Late submissions will not be accepted. Proper citation should be provided for any references used. Points will be awarded based upon the thoroughness of the answers you provide.

This assignment involves analyzing the performance of two different biometric systems; System1 and System2. You are provided with similarity matrices from two closed-universe performance experiments involving 466 subjects sorted within the probe and gallery sets named *simMatrix1.txt* and *simMatrix2.txt*. The scores of systems are similarity-based. Using this data, complete the following:

PART I Identity System Evaluation [20 points]

(a) For each of the systems, plot the genuine and impostor score distributions.

(b) For each of the systems, plot the Cumulative Match Characteristic curves.

(c) For each of the systems, calculate the d' (decidability index).

(d) For each system, what is the lowest rank at which the system achieves performance greater than 70%?

PART II Verification System Evaluation [20 points]

(e) For each of the systems, plot the Receiver Operating Curve (FAR vs. FRR)

(f) For each of the systems, calculate the Equal Error Rate. At what operating point is this rate achieved for each system?

(g) For each of the systems, determine what the FRR is when the FAR = 1%, FAR = 5%, FAR = 10%, and FAR = 20%. Present results in tabular format.

(h) Which of the systems would you consider the best performing? Explain how you came to this determination.

Any programming language is acceptable, but it is recommended that MATLAB be used for the assignment. You should provide your graphs, plots, and question responses in a formatted report. Aside from the correctness of your responses, your plots and graphs will be graded based upon their appearance. You should use the graphs/plots depicted in the text as a reference.