

2. Questions

2.1. As explained in class, the provided third-party iris recognition library is able to extract the binary code from a given NIR iris image, as well as to calculate the distance between two computed iris binary codes. The expected behavior for the software is to generate small distances for two iris images that depict the same eye (genuine pair), and large distances for two iris images that depict different eyes (impostor pair).

Leveraging the content of **only** the “dataset” folder within the iris dataset, the third-party iris recognition library, and metrics learned in class, please determine **what is a good binary iris code distance threshold to separate genuine from impostor pairs**. While providing your answer for the distance threshold, please explain in detail how you computed it. (4 points)

Answer tips: good answers will describe what you did, such as “I generated x genuine and y impostor pairs, and observed FNMR and FMR at EER...”, etc.

The threshold for the System is 0.3274. I generated 33 genuine pairs and 44 imposter pairs. The distances obtained for the genuine pairs are lesser than the distances obtained for the imposter pairs. We need to choose the threshold at Equal Error Rate (EER). This is because at EER, the False Non-Match Rate (FNMR) will be equal to the False Match Rate (FMR) (both errors at an equal rate) which can help in avoiding intrusion and the denial of service and repudiation problem at an equal rate. I have obtained this threshold by finding the value where the FMR=FNMR (ie @EER) and considered that value as the threshold value.

2.2. By leveraging the distance threshold computed above, please classify each one of the six iris images provided within the “queries” folder of the iris dataset as either **genuine** (i.e., the <CLAIMED_IRIS_ID> is correct) or **impostor** (i.e., the <CLAIMED_IRIS_ID> is incorrect). Please justify your answer for each case by providing the distances obtained with the iris recognition library and comparing them to the distance threshold. On the occasion of being possible to obtain more than one iris code distance for a particular <CLAIMED_IRIS_ID>, please base your decision on the minimum distance as the best effort to perform biometric verification. (6 points)

- A) For Image 098312.png Minimum Distance: 0.2211914619846631. This is less than the threshold and hence it is a **genuine** pair.
- B) For Image 817925.png Minimum Distance: 0.4222084751005259. This is more than the threshold and hence it is an **imposter** pair.
- C) For Image 802163_01.png Minimum Distance: 0.14944351045944967. This is less than the threshold and hence it is a **genuine** pair.
- D) For Image 056241.png Minimum Distance: 0.3427165077489945. This is more than the threshold and hence it is an **imposter** pair.
- E) For Image 69646.png Minimum Distance: 0.19451800571345165. This is less than the threshold and hence it is a **genuine** pair.
- F) For Image 997753.png Minimum Distance: 0.15798195930354522. This is less than the threshold and hence it is a **genuine** pair.