Iris Recognition: Characterizing the Success/Failures Cases of COTS systems.

Proposta de Projeto

Orientador: Hugo Proença

1   Objetives

As stated in the Wikipedia, "**Iris recognition** is an automated method of biometric identification that uses mathematical pattern-recognition techniques on video images of one or both of the irises of an individual's eyes, whose complex patterns are unique, stable, and can be seen from some distance. The discriminating powers of all biometric technologies depend on the amount of entropy[1] they are able to encode and use in matching. Iris recognition is exceptional in this regard, enabling the avoidance of "collisions" (False Matches) even in cross-comparisons across massive populations" (https://en.wikipedia.org/wiki/Iris_recognition).
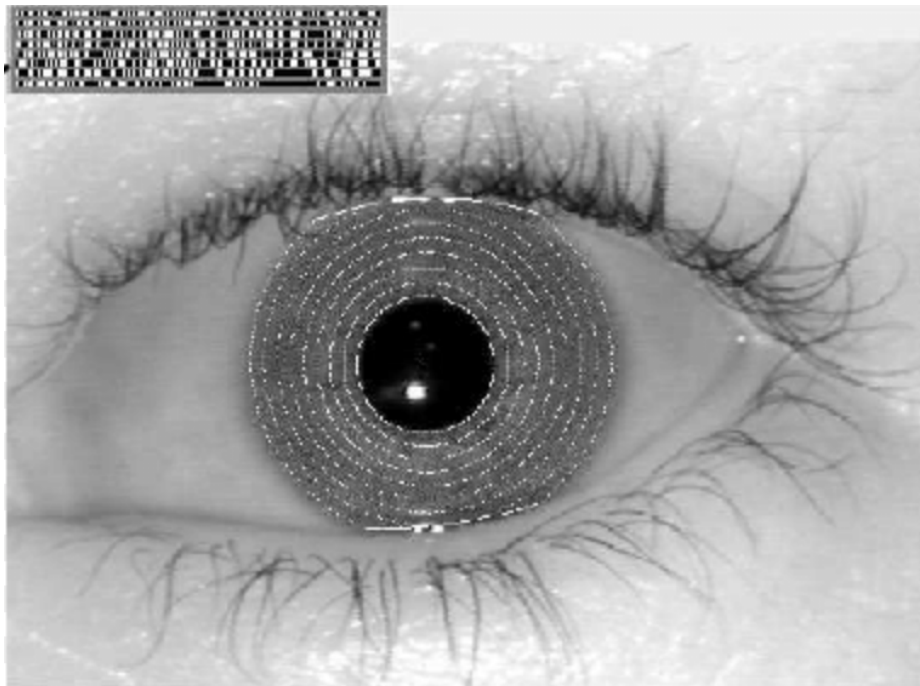

Figure 1: example of one iris image taken at near infrared light, and the corresponding biometric signature.

However, one of the weaknesses of the mainstream solution for iris recognition is its lack of robustness in case of degraded data, i.e., when the images have one or more quality degradation factors (ie., occlusions, blur, severe pose variations,). This project aims at evaluating the variations in performance with respect to each of those data variation factors, known as "performance covariates".
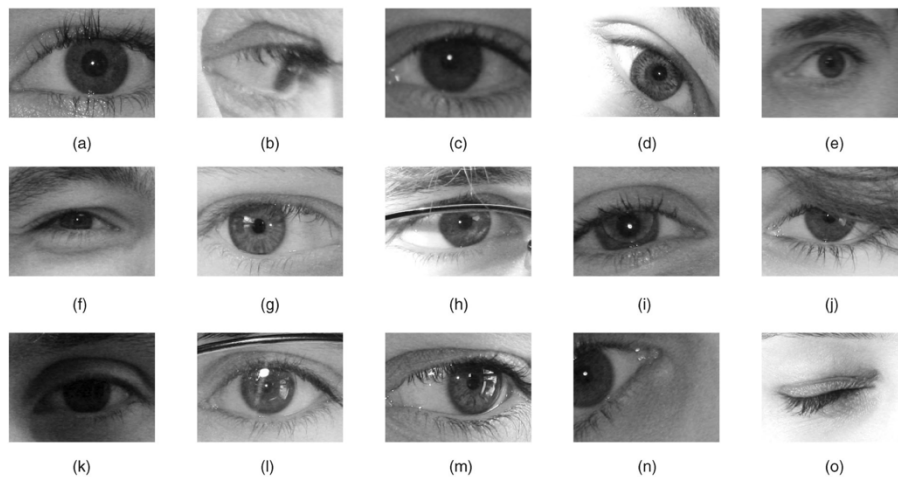

Fig.2: Illustration of data variations factors that might degrade the performance of iris recognition systems.

2   Work Plan

T1: Analysis of the COTS algorithm for performing iris recognition.

T2: Implementation of the chosen approach;

T3: Debugging, tests and analysis of effectiveness

T4: Report writing.

3   Academic Pre-requisites

• Interest in Machine Learning, Computer Vision and Artificial Intelligence domains;

• Solid programming competence, preferably with expertise in Python language.

4   Expected Results

• One computational prototype;

- One technical report describing the work carried out.

5 Contacts

Hugo Proença (hugomcp@di.ubi.pt)

References

[1] Wen-Huang Cheng, Sijie Song, Chieh-Yun Chen, Shintami Chusnul Hidayati, Jiaying Liu. Fashion Meets Computer Vision: A Survey. arXiv:2003.13988, 2021