Using LIME-based Techniques for Interpretable Biometric Recognition

Proposta de Projeto

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1 Objetives

"**Interpretability**" is the key concept in this work proposal. Having interpretable systems is of maximum importance for many fields, which has been motivating growing concerns in the research community. Also, the increasingly larger quantities of data available lead to models of increasingly higher complexity, which responses are extremely hard to be interpreted by humans. In this context, neural-based methods are considered a special case of interest, due to this lack of interpretability.

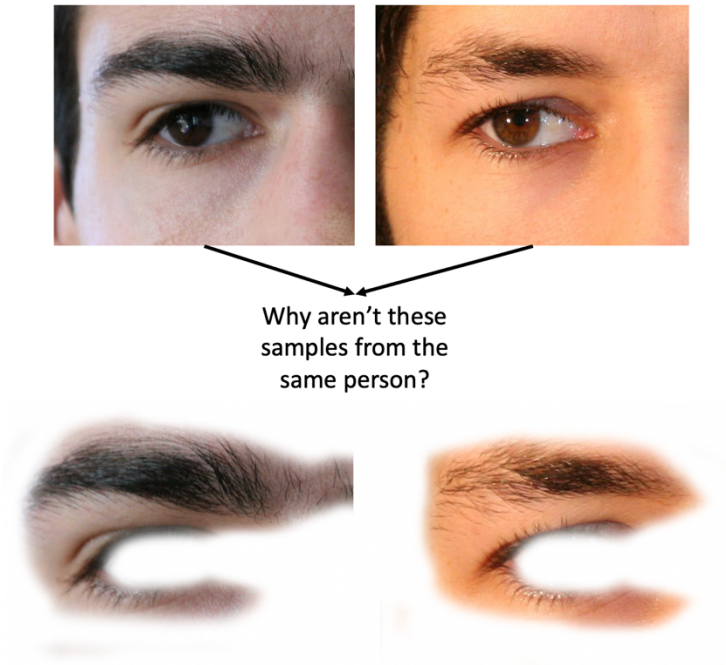

Figure 1: Example of a pair of periocular images to be matched, with the system returning the input regions that were found the most important for the decision made ("accept"/"reject").

Hence, this project aims at developing an interpretable biometric recognition system

based in the well-known LIME algorithm [1]. In particular, for the proof of concept we will use the periocular region as biometric trait [2] [3] [4]. The idea is to receive a pair of biometric samples and highlight the input regions that were found as the most important to support a particular decision ("accept"/"reject") of the biometric recognizer, assuming a "verification" setting.

In the example provided in Fig. 1, the system found that the regions near the corner of the eyes and the eyebrows were the most important to justify a "reject" decision, which provides an interpretable decision for the biometric recognizer.

2 Workplan

T1: Analysis of the interpretable recognition algoriothm LIME.

T2: Implementation and empirical validation;

T3: Debugging and optimization;

T4: Report writing.

3 Academic Requisites

• Interest on Artificial Intelligence and Machine Learning topics of knowledge;

• Solid programming skills, and interest in learning *Python*, Keras and *Tensorflow*.

4 Expected Resulkts

- One computational prototype;
- One report.

5 Contacts

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