Proposta de Dissertação de Mestrado

1. Title

Ocular Recognition in Uncontrolled Environments: Proof-of-Concept

2. Supervision

Hugo Pedro Proença (UBI-DI)

3. Description

The use of biometrics (e.g., irises, faces, fingerprints, palmprints) for recognizing individuals is becoming increasingly popular and many applications are already available[Chandra2012] [Komogortsev2012]. However, the feasibility of biometric recognition with uncontrolled data acquisition setups and without imposing any constraints on subjects participation is still considered a grand-challenge [Ricanek 2010][Jain2004], due to the evident economic and security implications that it could have in modern societies. The ability to perform recognition in uncontrolled environments will broaden the applicability of biometric technology to any domain where the subject cooperation is not expectable (e.g., surveillance and forensics), or whenever only a very limited user cooperation is to be asked for (e.g., access control) [Honeywell2007].

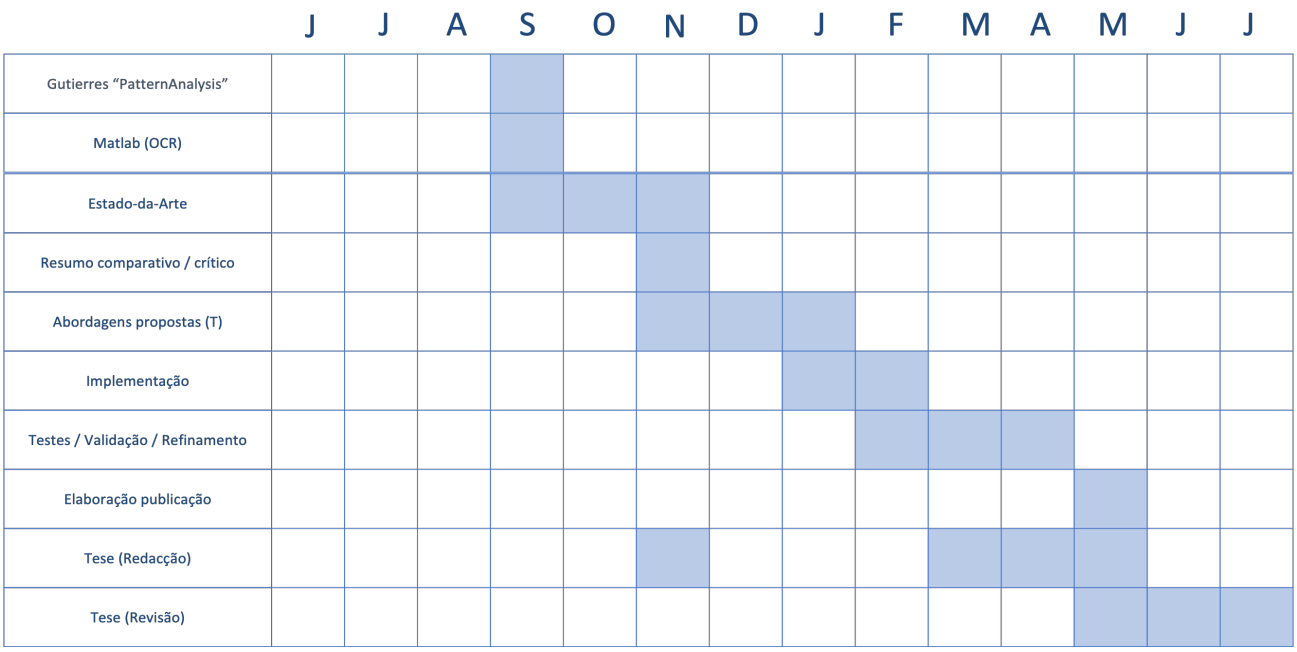
Hence, the main objectives of this Master dissertation is the development of a proof-of-concept system able to perform biometric recognition in less controlled conditions. The challenges behind this goal can be summarized as follows:

- Acquisition of data with enough discriminating information;
- Accurate biometric data segmentation;
- Correction of pose and illumination variations;
- Robust user identification;

4. Work Plan

1- Comparative study of the methods previously published;
2- Development, implementation and test of a strategy to perform the automatic segmentation of ocular data;
3- Development of a feature encoding and matching strategies;
4- Implementation at low-level languages of the above described algorithms.

5. Chronogram



6. Pré-Requisites

- Basic skills in English writting/reading.
- Ability to use programming languages.

7. References

[Honeywell2007] Honeywell International Inc., "Distance Iris Recognition", US Patent no. 20070036397, 2007.

[Jain2004] A. K. Jain, S. Pankanti, S. Prabhakar, L. Hong, A. Ross, "Biometrics: A Grand Challenge", Proc. of the International Conference on Pattern Recognition (ICPR 2004), vol. 2, pp. 935– 942, Cambridge, UK, August 2004.

[Ricanek2010] K. Ricanek Jr., M. Savvides, D. L. Woodard, G. Dozier, "Unconstrained Biometric Identification: Emerging Technologies", IEEE Computer, vol. 43, no. 2, pp, 56-62, February 2010.

[Chandra2012] Chandrashekhar Padole, Hugo Proença. Periocular Recognition: Analysis of Performance Degradation Factors. In Proceedings of the Fifth IAPR/IEEE International Conference on Biometrics – ICB 2012, doi: 10.1109/ICB.2012.6199790, New Delhi, India, March 30-April 1, 2012.

[Komogortsev2012] Oleg V. Komogortsev, Alex Karpov, Corey Holland, Hugo Proença. *Multimodal Ocular Biometrics Approach: A Feasibility Study*. In Proceedings of the IEEE Fifth International Conference on Biometrics: Theory, Applications and Systems – BTAS 2012, doi: 10.1109/BTAS.2012.6374579, Washington DC, U.S.A., September 23-26, 2012.