Deep Learning For Face Forensics

Methods for matching facial sketches to mugshot pictures

Enquadramento

Facial composites are widely used by law enforcement agencies to assist in the identification and apprehension of suspects involved in criminal activities. These composites, generated from witness descriptions, are posted in public places and in the media with the hope that some viewers will provide tips about the identity of the suspect. This method of identifying suspects is slow, tedious, and may not even lead to the timely apprehension of the suspect. Hence, there is a need for a method that can turn facial composites into realistic renderings of suspect faces. Furthermore, it could also aim to automatically and efficiently match them to photographs available in large police or government databases.

As in many other fields of computer vision in general, and biometric recognition in particular, deep learning techniques are providing promising results and outperforming the other state-of-the-art methods. The use of artificial neural networks in face recognition is a very hot topic and a path to be pursued in this research field.

This internship will provide a quick glance to the topic and a hands-on experience in the use of deep learning techniques at the level of state-of-the-art methods. The work that will be developed will not only make the student acquainted with the topic but also lay a foundation for subsequent development of further work in the field.

Objetivos

The main goal of this work is to apply deep learning techniques and evaluate their performance in this particular face recognition challenge. This work is expected to result in an effective method for sketch-to-photo matching, with applications in law enforcement. Additionally, the method for realistic photo synthesis based on sketches could have a wider applicability in arts, design, and illustration.

Plano de trabalhos

1. Brief update on the state of the art;
2. Data preparation and data pre-processing:
3. Implementation/running selected methodologies:
    3.1. Synthesis of life-like renderings based on face sketches;
    3.2. Matching between the renderings and the mugshot pictures from the database;
4. Evaluation of the performance;

5. Report writing;
6. Final presentation.

Orientador(es)

Ana F. Sequeira & João Ribeiro Pinto
& Ana Rebelo
ana.f.sequeira@inesctec.pt / joao.t.pinto@inesctec.pt

Observações

- As candidaturas devem ser submetidas até **7 de junho 2019** usando o formulário disponível aqui.
- Possibilidade de continuidade do trabalho como tese de mestrado

Referências

A. S. J. Klum, *FaceSketchID: A System for Facial Sketch to Mugshot Matching*, Master thesis, Michigan State University, 2014. http://biometrics.cse.msu.edu/Publications/Thesis/ScottKlum_FaceSketchID_MS14.pdf
B. X. Wang and X. Tang, 'Face Photo-Sketch Synthesis and Recognition,' *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 31(11), 2008. https://pdfs.semanticscholar.org/b8d3/61d45f6fe4d8dc6129d205b0ae8c8e615939.pdf

Databases

A. CUHK Face Sketch Database (CUFS) http://mmlab.ie.cuhk.edu.hk/archive/facesketch.html
B. CUHK Face Sketch FERET Database (CUFSF) http://mmlab.ie.cuhk.edu.hk/archive/cufsf/