Machine learning - Project proposal

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Proposed title: Face features recognition using CNN

Proposal & problem description

Our project will consist on image classification with a Deep Learning approach. More specifically, we want to classify images of people based on their gender: female or male.

Since deep learning consists on an aggregation of different models (which are different neural networks), the approach on the classification can be modeled after neural networks computing:

- Type of hair
- Type of eyes
- Face shape
- Shape of jaw
- Facial hair
- Cheekbones

If we find along the way that this problem is very easy, we propose new additional classification problems in addition to the previous one to classify:

- Age
- Ethnic race (although we do not know how hard this would be)

Note: Although we initially proposed scrapping information from Tinder (and we did so) we fear legal consequences and so we searched for alternative datasets. We have found a couple where faces are centered and we have to do little preprocessing (labeling images by gender to train our models). **We will use a subset of these two datasets.**

Tools

We will use python as our main language for the preprocessing and the Deep Learning implementation, the two main practical stages being:

- The **preprocessing** where images will be adjusted, and the labels for each photo will be created.
- Keras will be used on top of Tensorflow in order to create, **train and evaluate the models.**

Motivation

Despite not having seen the topic of deep learning yet, we wanted to address this topic due to its relevance nowadays.

We know that we will cover Neural Networks at the end of this course and because of this, we feel encouraged to go a little further and see how to aggregate different neural networks and how they interact between them.

On top of it, we are aware that Deep Learning is a topic very relevant nowadays, and so we expect that by doing this project we will obtain a somewhat strong background about its functioning in both a theoretical and practical ways.

References

[1] Open University of Israel. *Face image project Data.* 2014. URL: http://www.openu.ac.il/home/hassner/Adience/data.html.

[2] University of Massachussets. *Labeled Faces in the Wild Home.* Nov. 2007. URL: http://vis-www.cs.umass.edu/lfw/.