

Face and Gender Recognition project (Assignment 3, 25 marks)

Group project: Maximum Group size is 3

PART I: IIITB Face Dataset (Internal dataset. Please do not circulate or share)

Please find a dataset useful for performing experiments on Face and Gender recognition. Images of same people in different lighting conditions, expression and pose variations. (If the pose is too much away from frontal, you can ignore that image)

https://drive.google.com/drive/folders/1mnxy_cjKhO6zAitG6bh7CtsWH4TW3OPy

PART II Pre-Processing

Explore functions for manipulating images and extracting features. For example,

- a. Locate the center of each eye.
- b. Rotate and Scale the image so that the distance between the two eyes is 128 pixels.
- c. Extract other significant features such as the tip of the nose.
- d. Using these features create an oval region corresponding to the face and reset all pixels outside the oval region to a constant value.
- e. Try other image analysis functions to familiarize yourself with the software.

Save these processed (256 x 256 pixels) images.

We strongly recommend that you use OpenCV for this project. Alternatively, you may explore Irfanview, MatLab, or other software as long as you can create the functions needed for this project.

Part III: Face Recognition (10 marks)

1. Implement PCA algorithm for face recognition and test on the IIITB Face dataset. Use existing implementations of LDA, LBP.
2. Split the data as train and test. Experiment to get the best performance as you vary the parameters (for example, by varying the number of Eigen faces retained).
3. Determine (a) Rank 1 accuracy (correct match is at the top of the ranked list), (b) Top 10% (correct match is within top 3), Top third (correct match is within top 10). Calculate these numbers.
4. Submit a concise final report summarizing all the steps (bulleted list) and your observations.

Part IV: Explore an open source solution and compare (10 marks)

Use this method to get a 128 dimensional feature vector for faces in your dataset, and compare the performance of PCA, LDA, LBP with this implementation

<https://cmusatyalab.github.io/openface/>

A detailed technical report can be found here:

<http://reports-archive.adm.cs.cmu.edu/anon/anon/2016/CMU-CS-16-118.pdf>

You can use this as a black box now, and we will discuss about this method in the second half.

Part V: Gender recognition (5 marks)

Do a literature review of Gender recognition problem, and propose a solution to do Gender recognition using the same dataset. Perform experiments like face recognition and report your results.