Computer Vision Course Project

Subject :

Face Recognition

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Introduction

This is a simple project in computer vision field which is about face recognition using matlab. Here we have two databases. first one includes about 100 images that each five of them belongs to a famous celebrity. This database is used for training our system. The second database involves another 100 images that they also belongs to those celebrities in the train database and is used to test the system. for each image also there is a matlab file in both databases that defines 5 major points of image which includes 2 points from left and right eyes, a point from nose and two for lips. We train our system base on first database and after that, when it is given an image from test database, we expect it to return the name of celebrity. Because we are in the beginning, no complex algorithm is used so accuracy of system might be a bit low but we are doing our best to improve it until end of the semester.

A brief explanation on how this project is implemented

The images which are used to train the system are all faces. Most of them are not straight and can not be used to train the system, so in first step, we need to do an affine transform to make them straight using fitgeotrans and imwrap functions and also 5 fixed points that are given. Output of fitgeotrans is a 3*3 matrix which is called transform function. Then, using imwrap, we transform the moving points to the fixed points and crop the images to be 100*100(note that result of fitgeotrans is an argument of imwrap).

Figure 1- the right image is cropped and transformed of left one

After the affine step is done and images have been fixed, in second step, for each of five major points in the face that mentioned above, in each image, 40 values are calculated in different scales and directions, there for each image we would have 200 values. As soon as there are 100 images, we will have an 100*200 array that each row belongs to an image. By the end of this step, the training process is finished.

Test process includes giving the system an image and it must return the name of image owner (the celebrity). To do this, for test image again as explained above, 200 values will be calculated and stored in a vector. Then we loop through the 100*200 array which was filled in the training section and calculate Euclidean distance between each row of array and vector. As we know, each row of 100*200 array is for one of the training images. image which is owner of row with the lowest Euclidean distance with vector that relates to test image, is the most similar image to the test image. As explained in the introduction, no complex algorithm is used here so we don't expect high accuracy. as predicted before, the system accuracy is %64 (it means that from 100 test images it recognized 53 of them correctly) but it will be improved soon.

These new changes to improve the project will be available through the following link

github.com/hosein-m/FaceRecognition