Project Proposal for Implementation of Face Recognition

Shubham Saoji, UFid: 26364957, CISE, UFL

Abstract*—Face Recognition has received significant attention in past several years. One of the reasons is that face recognition has many applications in commercial as well as law enforcement domain. Another reason is the availability of feasible technologies after many years of research which includes but not limited to availability of high-resolution cameras, cheaper and more memory or cloud storage for images, higher computation power of CPU etc. Face Recognition is classification problem and features of face such as face structure, nose width, width of eyes, pupils are extracted from image and compared to class of features from images introduced during training phase of model and the face is categorized according to closest match. This paper is proposal for project on implementation of face recognition problem and we will state the steps to accomplish the goal

I. Introduction

The face recognition system has many applications in commercial and law enforcement domain and hence gaining significant attention in past several years. Implementing face recognition system can help reduce time to identify person, save manual efforts and cost associated and can improve security if real time face recognition is used in any organization. Due to the high potential of face recognition system, it is finding newer application in variety of domains.

Example of applications of face recognition: [1] The strong need to introduce user-friendly system that can secure our assets and protect our privacy is obvious. At present, we need pin to withdraw money from ATMs. Another secure way to withdraw money would be to introduce biometrics, however, that would require user co-operation. Instead, using face recognition can help design system without user co-operation or knowledge. We can even introduce face recognition as second level of security.

Another example of face recognition: In case of violent protests or protests, where large number of miscreants need to be identified by police from CCTV and other video sources. Face recognition system can be used to identify miscreants and help maintain law and order.

The problem of face recognition can be divided into two subproblems. The first subproblem is to detect the face, that is for a given image we need to detect face/s in that image and then we have faces to be classified into classes. The second subproblem is to identify if the face detected matches any classes of faces identified during training phase.

Face Detection:
It is used to detect and mark face for which it uses algorithms, for example determining similarity of proportions and skin color, the selection of outline in image as compared to outline of faces, the selection of symmetries using neural networks. There are number of algorithms for face detection out of which one of the most efficient one is Viola-Jones method. We can use OpenCV, an external library, for face detection.

Face Recognition:
After detecting the face, we extract important features such as width of nose, width of eyes, pupils, width of nostrils, length of nose, width of chin, height of

forehead, shape of cheekbones etc. This feature vector is compared to one the feature vertices in database and match is given if parameters match.

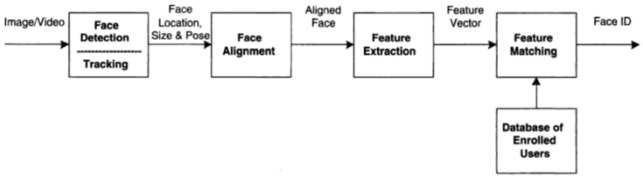

Fig. 1.2. Face recognition processing flow.

In this project, we will design model for face recognition and performance will be measured by testing data simulated on model. We will write a report which will include implementation and working of the project, evaluate performance and demonstrate the working of project through YouTube video with the help of PowerPoint presentation.

II. PROJECT TIMELINE

A. WEEK 1 AND 2

In first week, we will check the resources available on internet, papers published on face recognition so as to learn about different algorithm available for face detection and recognition and performance and accuracy of each of them. We will finalize algorithm to be used in our project.

We need to check for dependency and set up environment for our project. Learn about external as well as in-built libraries to be used in project.

B. Week 3 and 4

After the environment is set, we can proceed to work on face detection and test this subproblem for dataset of images and assert the functioning of this module. We can use OpenCV for this subproblem. Better the performance of face detection module, the better will be performance of face recognition project.

After the first subproblem is completed, we can move forward towards feature extraction and face recognition.

C. Week 5

In this week, we will train and test this model, assert the functioning of project and measure its performance and accuracy. In case of any issues with performance, we can check for improvements in the implementation. Post this, we will do final sanity testing on entire project, prepare report and PowerPoint presentation. We will then proceed to demonstrate the working of project by making YouTube video

D. Week 6

This week is buffer time in case there are any unforeseen delays in project. Towards the end of this week, the project would be completed and submitted for evaluation.

REFERENCES

[1] W. Zhao, R. Chellappa, P. J. Phillips, and A. Rosenfeld. 2003. Face recognition: A literature survey. *ACM Comput. Surv.* 35, 4 (December 2003), 399–458. DOI:https://doi.org/10.1145/954339.954342

[2] M. Kirby and L. Sirovich, "Application of the Karhunen-Loeve procedure for the characterization of human faces," in IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 12, no. 1, pp. 103-108, Jan. 1990.

[3] R. Brunelli and T. Poggio, "Face recognition: features versus templates," in IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 15, no. 10, pp. 1042-1052, Oct. 1993.

[4] A. R. S. Siswanto, A. S. Nugroho and M. Galinium, "Implementation of face recognition algorithm for biometrics based time attendance system," 2014 International Conference on ICT For Smart Society (ICISS), Bandung, 2014, pp. 149-154.