

A Synopsis on

Student Face Recognition

Submitted in partial fulfillment of the requirements
of the degree of

Bachelor of Engineering

in

Information Technology

by

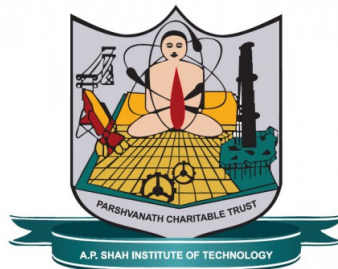
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2019-2020

CERTIFICATE

This is to certify that the project Synopsis entitled “***Student Face Recognition***” Submitted by “***Karan Thakkar (17104039)***” for the partial fulfillment of the requirement for award of a degree ***Bachelor of Engineering*** in ***Information Technology*** to the University of Mumbai, is a bonafide work carried out during academic year 2019-2020.

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Declaration

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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Date:

Abstract

- A face recognition system is one of the biometric information processes, its applicability is easier and working range is larger than others, i.e.; fingerprint, iris scanning, signature, etc.
- It is known to be reliable, effective, secure then why not use it for college as well. In this project we will be developing a face recognition application which will give details about the students by capturing their face.
- The application will reduce the work of staff to report a particular student or identify a student.

Introduction

- Face recognition system is a complex image-processing problem in real world applications with complex effects of illumination, occlusion, and imaging condition on the live images.
- It is a combination of face detection and recognition techniques in image analysis.
- Carrying a photo id on campus may soon become a thing of the past as advances in artificial intelligence have paved the way for making facial recognition technology available and worth implementing on campus. The three main steps include in this project are:
 1. Detection
 2. Embeddings
 3. Recognizer

1.Detection:

Identifying whether face is present in an image or not.

2.Embeddings:

To extract the 128-d feature vectors that quantify each face in an image.

3.Recognizer:

This will be our output model that recognizes faces. It is based on Support vector machine(SVM).

Objectives

In this project we aim to build a face recognition app to help teachers and other college staff to identify students just by taking a snap of student face. Specific objective of this project is:

- To build a face recognition application
- If an outsider arrives at the premises, security should be able to inform concerned staff member or hod, the info along with a photo to identify whether or not to be allowed within the premises.

Problem Definition

- In college campus sometimes students enter without identifying themselves due to which security personnel faces the consequences.
- Sometimes teachers or staff need to take action against other department students but they don't know their proper details. For this there must be proper and secured method to identify students and take actions accordingly.
- This project is been developed considering the above problems face in college campus. From this application any college faculties or security person can snap the student and know there details instantly. They can also report about a particular student to higher management if found misbehaving

Proposed System Architecture/Working

In order to build our OpenCV face recognition pipeline, we'll be applying deep learning in two key steps:

- 1.To apply face detection, which detects the presence and location of a face in an image, but does not identify it.
- 2.To extract the 128-d feature vectors (called “embeddings”) that quantify each face in an image.

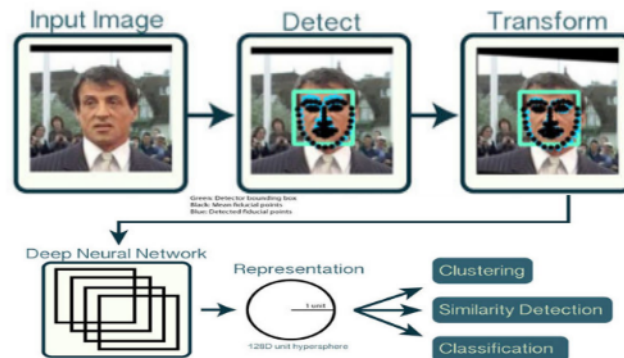


Figure 1: Face Detection

Input Image:

First step is to have set of images for identification. This set should contain images from 10-1000 images based on the result.

Detect:

In this detector checks whether face is present in an image or not. This is done using pre-trained models dlib or opencv.

Transform:

Transform the face for the neural network. This repository uses dlib's real-time pose estimation with OpenCV's affine transformation to try to make the eyes and bottom lip appear in the same location on each image.

Crop:

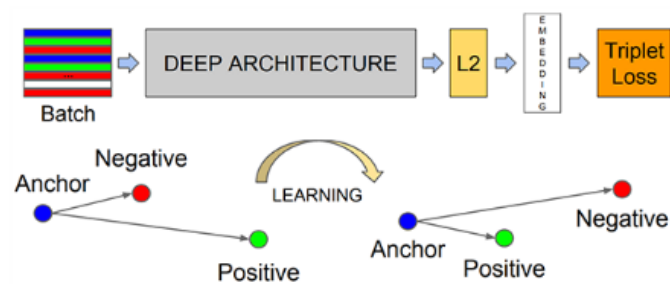
This step crops the face identified and removes the unnecessary background for easy representation in DNN.

Deep Neural Network:

A deep neural network to represent (or embed) the face on a 128- dimensional unit hypersphere. The embedding is a generic representation for anybody's face. Unlike other face representations, this embedding has the nice property that a larger distance between two face embeddings means that the faces are likely not of the same person. This property makes clustering, similarity detection, and classification tasks easier than other face recognition techniques where the Euclidean distance between features is not meaningful.

Classification:

In this we will be using Support vector machine(SVM) machine learning classification algorithm.



Design and Implementation

Home Page:

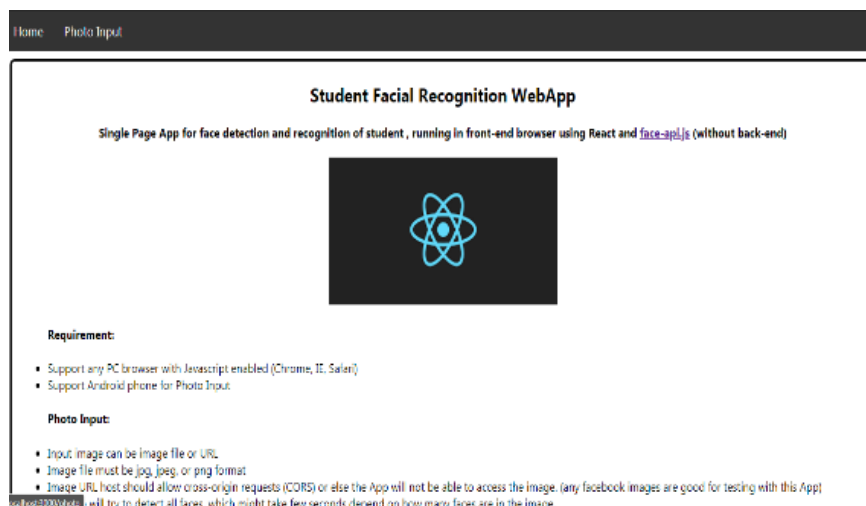


Figure 2: Home page

Photo Input:

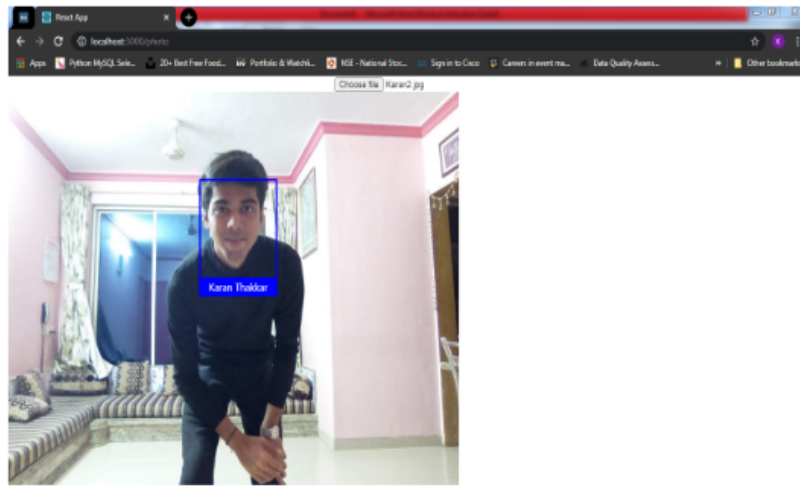


Figure 3: Input

Face Descriptor(128d):

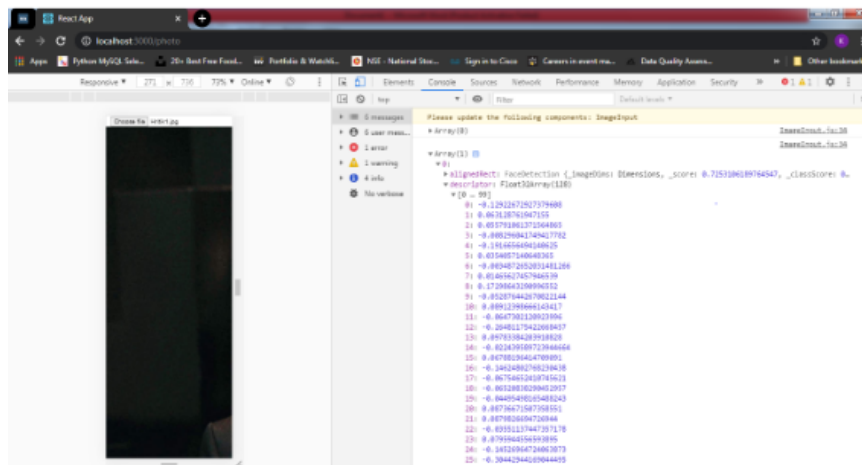


Figure 4: descriptor

Summary

We have built a face recognition app to help teachers and other college staff to identify anyone just by taking a snap of their face. Thus, determining their purpose of visit if it's an outsider.

References

- [1] <https://www.pyimagesearch.com/2018/09/24/opencv-face-recognition/>
- [2] <https://www.pyimagesearch.com/2018/06/18/face-recognition-with-opencv-python-and-deep-learning/>
- [3] <https://www.researchgate.net/publication/262875649-Design-of-a-Face-Recognition-System>