EXPLORATORY PROJECT

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LIBRARIES USED

FaceNet – Deep Learning Model for face identification

OpenCV – Python framework used for Image Processing

Face_Recognition

ALGORITHM

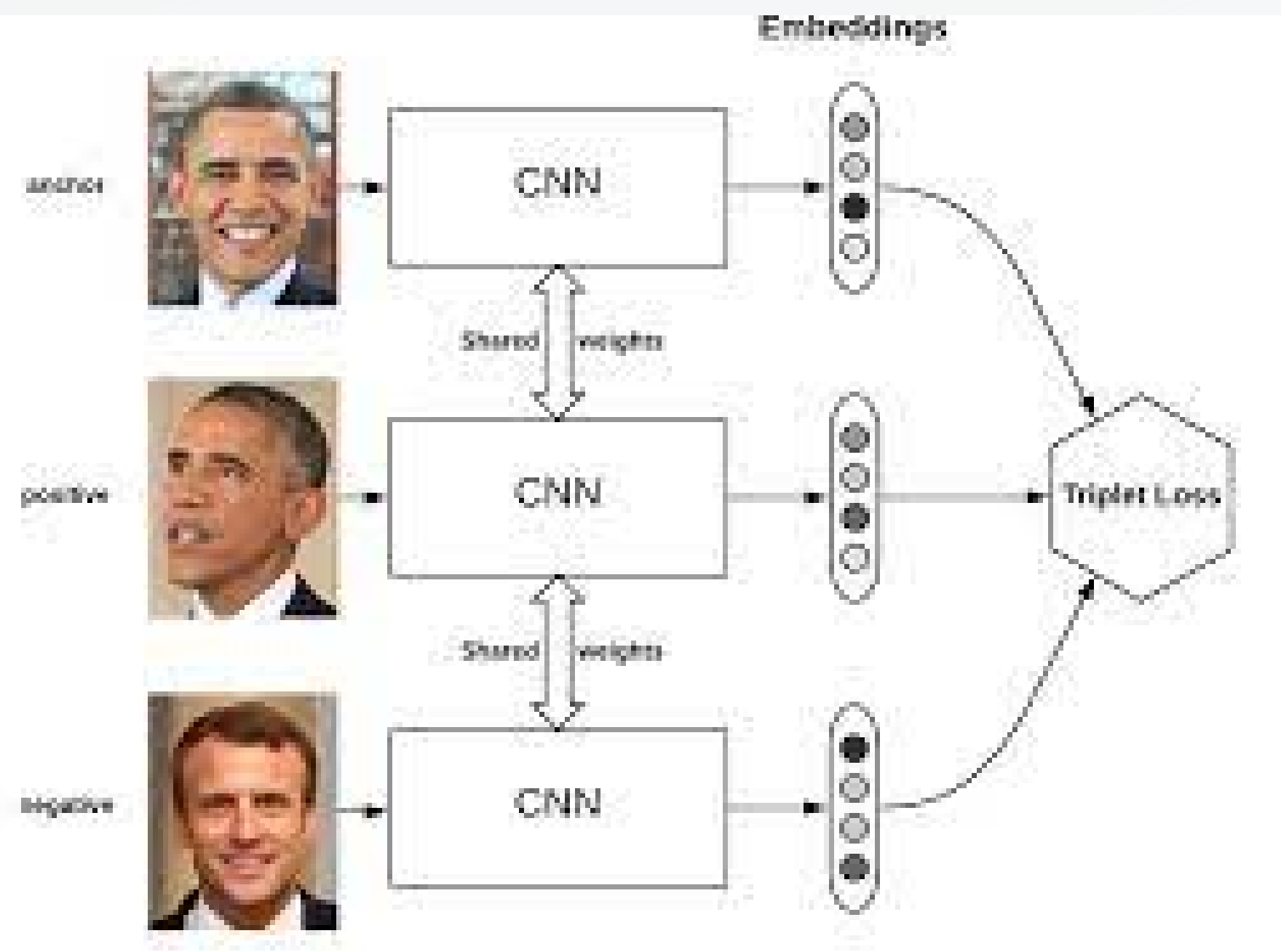## HOG –(Histogram Of Oriented Gradients) Technique

Firstly the image is converted into black and white image

- . For every single pixel, we want to look at the pixels that directly surrounding it:

- Then we want to draw an arrow showing in which direction the image is getting darker:

- If you repeat that process for **every single pixel** in the image, you end up with every pixel being replaced by an arrow.
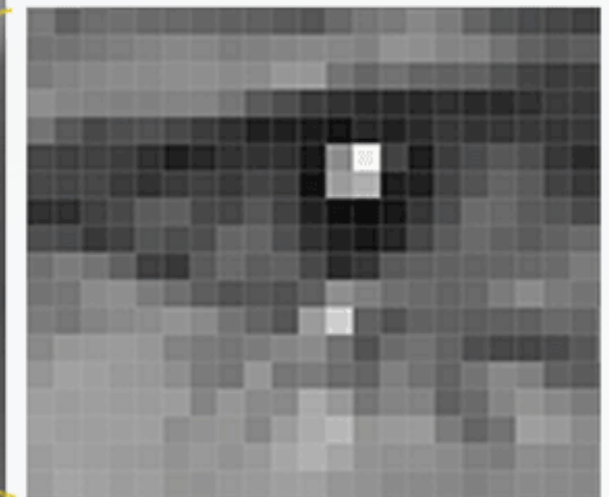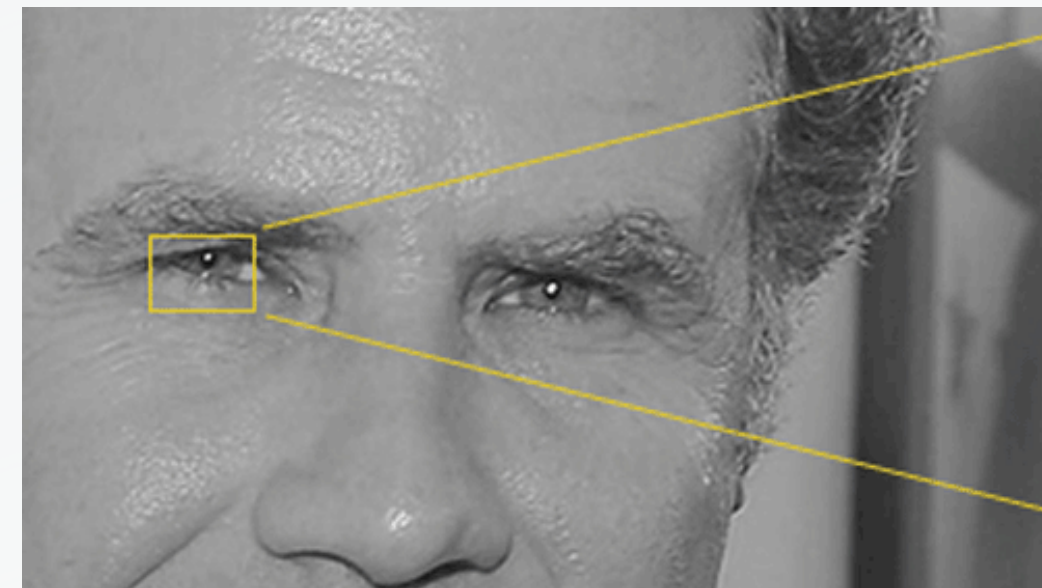
FACENET FOR FACE IDENTIFICATION

FaceNet provides a unified embedding for face recognition, verification and clustering tasks. It maps each face image into a euclidean space such that the distances in that space correspond to face similarity, i.e. an image of person A will be placed closer to all the other images of person A as compared to images of any other person present in the dataset

WORKFLOW

01
Photos are taken from device camera and the mode is trained on it

02
Dlib's Histogram of Oriented Gradients Technique is Used

03
FaceNet for Face Identification. It uses triplet loss function (refer to Fig 1). In order to calculate the triplet loss, we need 3 images namely anchor, positive and negative

04
SVM Classifier is used to query the database rapidly. In an SVM classifier, data is represented as points in a high-dimensional space, where each point corresponds to a feature vector representing the object
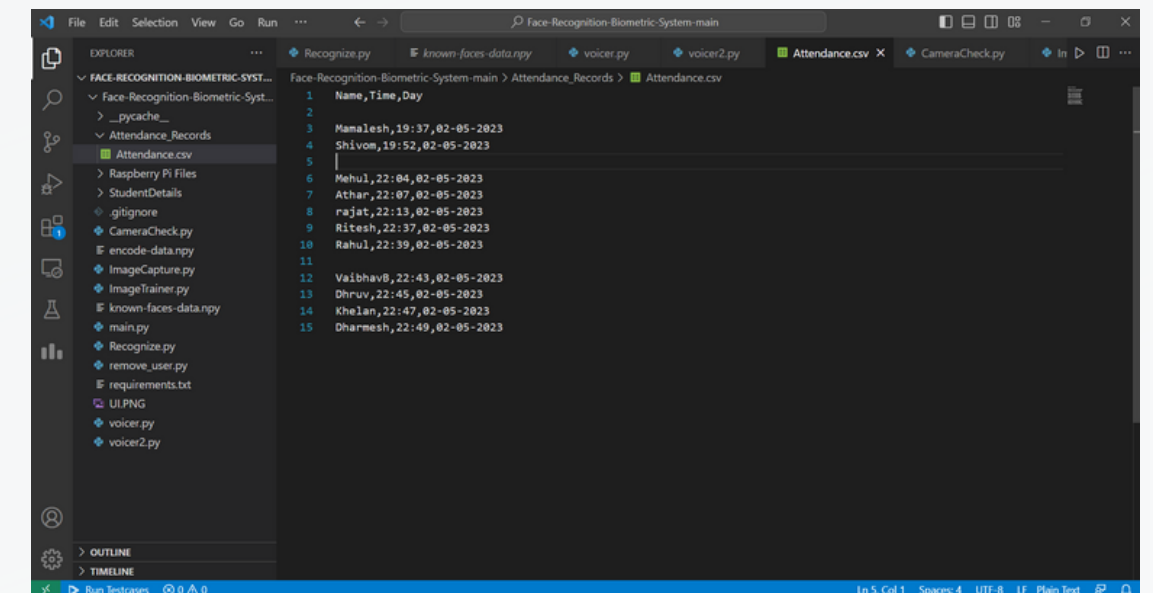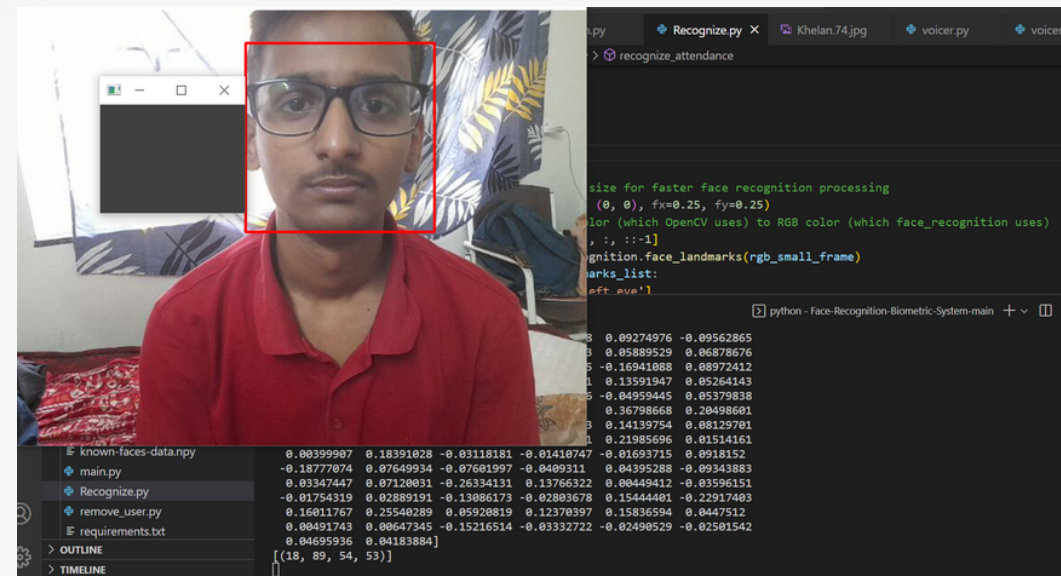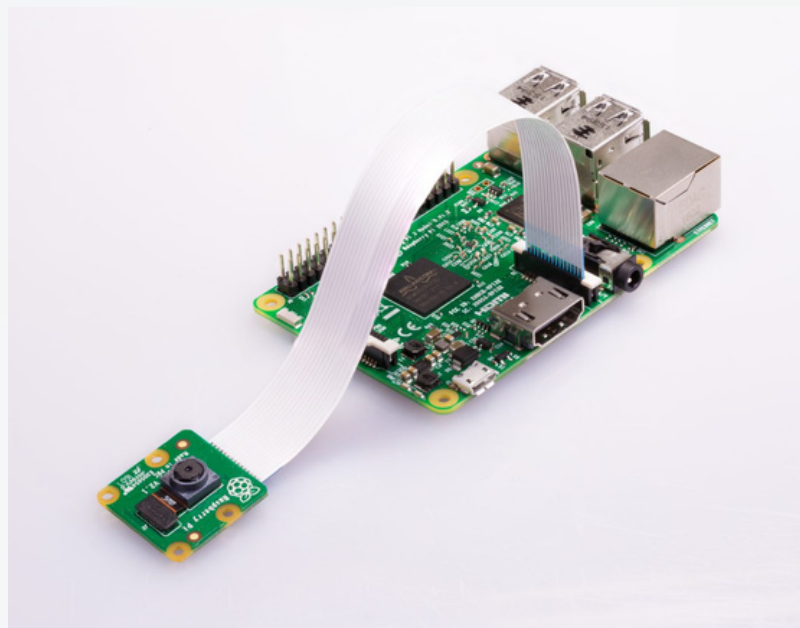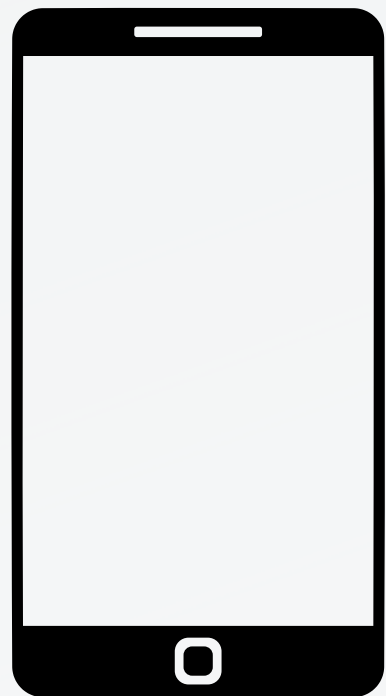
05
Liveness detection using blinking of the eye: To detect the presence of the candidate and not just a mere photo of him, liveness detection is employed through blinking of the eye. This is done by taking the Eye Aspect Ratio into account. Eyes are represented as 6 points the by face_recognition algorithm

DEMO

A demo of our project is here : link

Deployed Code : link

Attendance detected either through mobile camera, RasPi cam or laptop as per convenincet

Live demonstration of taking attendance

Recorded Attendance