VIT®
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

# Report on IIP course

**School name:** School of Computer Science Engineering(SCSE)

**Faculty name (ERP No):** Dr. R. Navamathavan (50588)

**Academic Year:** Fall -2020

**Title of the project:** Face Detection and Recognition for E-Attendance

**Number of students involved in the group:**

**Student name along with the Registration numbers involved in the project**

1. Megha Shree(19BPS1055)
2. M.Akshara(19BPS1061)
3. Arush.T.Susikaran(19BPS1094)

**Brief description of the project (50 - 100 words):**

The main purpose of this project is to build a face recognition-based attendance monitoring system for educational institution to enhance and upgrade the current attendance system into more efficient and effective as compared to before. Here we are trying to develop a system to mark attendance automatically by using image processing technique. An efficient face recognition algorithm has to be developed which can recognize students efficiently. The goal is to implement the system (model) for a particular face and distinguish it from a large number of stored faces with some real-time variations as well. In this project we have implemented the automated attendance system using MATLAB. We have projected our ideas to implement “Automated Attendance System based on Facial Recognition”, in which it imbibes large applications.The application includes face identification, which saves time and eliminates chances of proxy attendance because of the face authorization. Hence, this system can be implemented in a field where attendance plays an important role. The system is designed using MATLAB platform. The proposed system uses Principal Component Analysis (PCA) algorithm which is based on eigenface approach. This algorithm compares the test image and training image and determines students who are present and absent. The attendance record is maintained in an excel sheet which is updated automatically in the system.One of the simplest and most effective PCA approaches used in face recognition systems is the so-called eigenface approach. This approach transforms

faces into a small set of essential characteristics, eigenfaces, which are the main components of the initial set of learning images (training set).

**Outcome of the project (50 – 100 words): (please include the photographs, as applicable)**

## SYSTEM IMPLEMENTATION

### System Pre-Requisites

The first step in implementing the system is to create a database of enrolled student's database. This set of images is referred to as train database for the algorithm. The facial recognition algorithm (here we use Eigenfaces method), then uses the database to calculate the eigenfaces for face recognition.

### Image Processing

### Capture Image

We have used the laptop camera with a resolution of 1366x768 itself since for the prototype this resolution is sufficient. For more accurate processing of a larger classroom, we need to use camera with higher resolution.

### Face Detection and Cropping

The image captured image is read in MATLAB. The image is nothing but a matrix of numbers which correspond to the pixel values.We use the function 'vision.CascadeObjectDetector()' of the Computer Vision Toolbox for the same. This function detects the face based on the Viola-Jones algorithm. The sequence of steps in this algorithm :

• Read the image captured in the previous step

• The faces are detected from the image .

• We crop the area of the image where the faces are marked and saved into a folder as individual image files in JPEG format.

### Face Recognition using Eigenfaces

We have used Eigenfaces algorithm for face recognition in the project. This is a fast and cost effective solution for face recognition giving an appreciable level of accuracy.The two dimensional images in training data set are converted into a one-dimensional vector.The image of the person we want to find in the training set is transformed into a vector, reduced by the mean value and projected with the matrix of the Eigen vector.Classification is done by determining the Euclidean distance between the two vectors of the images of the training data set and the test image. If the minimum distance between the test face and training face is less than the threshold. It is considered to be known and belong to the

person in the database otherwise it is considered to be unknown.Whenever a person is successfully recognized the system automatically marks his or her attendance in the database which is in the MS Excel.

**Store Recognized Entries**

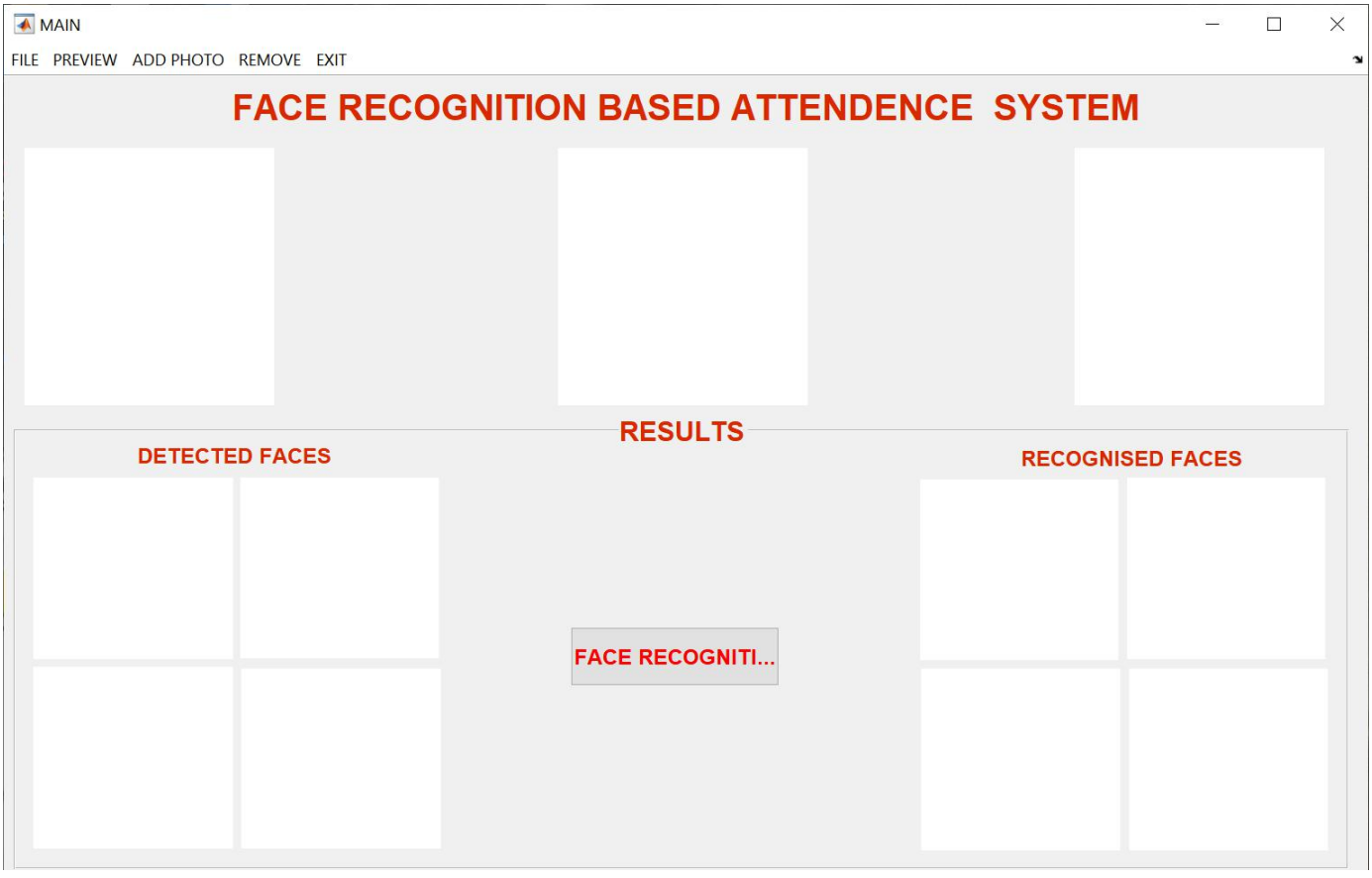
Whenever the algorithm finds a match, we update the corresponding field of the person in the excel sheet with a '1' on that particular date. Else by default it is marked as '0' which says that the person is absent.

## CONCLUSION

Automated Attendance System has been envisioned for the purpose of reducing the drawbacks in the traditional (manual) system. This attendance system demonstrates the use of image processing techniques in classroom. This system not only merely help in the attendance system, but also improve the goodwill of an institution by eliminating Proxy attendance, saving time, high efficiency.

After this Pandemic, we'll be in a need of such a technology that avoids physical contact through any means.Moreover,this project also helped us to explore the features of MATLAB software which is convinient and easy to perform.

## OUTCOMES



N11 fx

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | USN | NAME | SEMESTER | SUBJECT | PRESENT | ABSENT | DATE |
| 2 | 1 | MEGHA | 2 | IIP | 0 | 1 | 21-10-2020 |
| 3 | 2 | AKSHARA | 2 | IIP | 1 | 0 | 21-10-2020 |
| 4 | 3 | ARUSH | 2 | IIP | 0 | 1 | 21-10-2020 |
| 5 | | | | | | | |