

A Synopsis on

# **E-Attendance System**

Submitted in partial fulfillment of the requirements  
of the degree of

**Bachelor of Engineering**

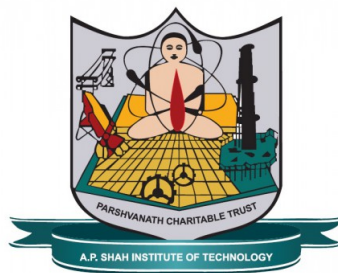
in

**Information Technology**

by

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2020-2021

## CERTIFICATE

This is to certify that the project Synopsis entitled “***E-Attendance System***” Submitted by “***Jayesh Bhosale (17104014)***), ***Tejas Bhanushali (17104031)***, ***Yash Gangani (18204009)***” 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 2020-2021

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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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# Abstract

The management of the attendance can be a great burden on the teachers if it is done manually. To resolve this problem, smart and auto attendance management system is being utilized. But authentication is an important issue in this system. The smart attendance system is generally executed with the help of biometrics. Face recognition is one of the biometric methods to improve this system. Being a prime feature of biometric verification, facial recognition is being used enormously in several such applications, like video monitoring and CCTV footage system, an interaction between computer humans and access systems present indoors and network security. By utilizing this framework, the problem of proxies and students being marked present even though they are not physically present can easily be solved. This report proposes a model for implementing an automated attendance management system for students of a class by making use of face recognition technique and alerting parents about the student's presence with the help of a message alert system, parents will also be able to visualize their kids overall attendance with the help of a dashboard. The primary goal of this research was the practical employment of these state-of-the-art deep learning approaches for face recognition tasks.

# Introduction

One necessary component of every education system is recording students and staff attendance, despite the capacity of the system. This process could be time consuming if it is managed manually. As a result of a rapid growth in information technologies, automatic solutions have become a standard option for these types of education processes.

To verify the student attendance record, the personnel staff ought to have an appropriate system for approving and maintaining the attendance record consistently. By and large, there are two kinds of student attendance framework, i.e. Manual Attendance System and Automated Attendance System. Practically in Manual Attendance System, the staff may experience difficulty in both approving and keeping up every student's record in a classroom all the time. In a classroom with a high teacher-to-student ratio, it turns into an extremely dreary and tedious process to mark the attendance physically and cumulative attendance of each student. Consequently, we can execute a viable framework which will mark the attendance of students automatically via face recognition. It may decrease the managerial work of its staff. Especially, for an attendance system which embraces Human Face Recognition, it normally includes the students' facial images captured at the time he/she is entering the classroom, or when everyone is seated in the classroom to mark the attendance. Generally, there are two known methodologies to deal with Human Face Recognition, one is the feature-based methodology and the other is the brightness-based methodology. The feature-based methodology utilizes key point features present on the face, called landmarks, of the face, for example, eyes, nose, mouth, edges or some other unique attributes. In this way, out of the picture that has been extricated beforehand, just some part is covered during the calculation process.

Once student is identified, a message alert at the start and end of the day will be send to parents via SMS and a dashboard will be created where parents will be able to review their wards attendance of a particular day and time, parents will also be able to visualize overall attendance of their wards in a graphical format.

## Objectives

- To develop a smart attendance management system using facial recognition that will take care of the problems which are being faced in manual attendance systems.
- To develop a message alert system to notify parents about ward's attendance.
- To make a dashboard to review and visualize attendance of a student.
- To make it useful not only to wards but also to faculties for scheduling or rescheduling the lectures.

# Literature Review

Sr.No	Authors	Year	Methodology	Advantage	Disadvantage
1.	P.C Mahalanobis.	1936	Mahalanobis distance measure can be used to identify the distance between the query and the images stored in the database. Mahalanobis distance is used for data clustering and disingenuous. the two data points measured in the space described by the related features.	This system uses improved PCAalgorithm in which is Integrated with Curvelet transforms. The recognition rate of this system is 89.12%.	This system is not suitable for real-time applications and accuracy reduces when the number of face image increases.
2.	Marko Heikkila	2009	Asymmetric Local Binary Pattern (AS-LBP). for facial expression recognition along with the modified convolution techniques results in high rate of face recognition without the loss of appearance information. The face image is detected with the help of viola jones algorithm. SVM is used to identify the facial expression which has high accuracy.	The face recognition rate increases when the width is more than the height of the operator.	When the width and height of operator is recognition rate will not Improve. though there is an increase in the operator.
3.	K. Simonyan, A. Zisserman	2014	Visual Graphic Group (VGG) model for face recognition including. illumination pre-processing algorithm	This system can achieve 100% accuracy under good illumination. environment of poor illumination. the accuracy is 85.9% but the accury can reach more than 90% through preprocessig.	attitude and expression of individual changes a lot when take photos which will have Certain effect on face recognition results And illumination is too poor. The accuracy of this system is not constant.

4.	Florian Schroff, Dmitry Kalenichenko, James Philbin	2015	Author suggested method based on learning a Euclidean embedding per image using a deep convolutional network. The network is trained such that the squared L2 distances in the embedding space directly correspond to face similarity: faces of the same person have small distances and faces of distinct people have large distances.	Much greater Representational efficiency.	indirectness and its inefficiency.
5.	Mrs. Madhurm M, B. Prithvi Kumar, Lakshman Sridhar, Nishanth Prem, Venkatesh Prasad.	2018	Author suggested Eigenfaces using grayscale images. This paper shows us that it is easy to convert color images to grayscale (also called grayscale) and then to apply Histogram Equalization. It is a very simple method of automatically standardizing the brightness and contrast of your facial images. For better results, apply more processing stages such as edge enhancement, contour detection, motion detection, etc, OpenCV uses a face detector algorithm called a Haar Cascade Classifier.	Classification is fast, even when it's applied at several scales.	Assumes a Fixed scale for the face.

Figure 1: Literature Review



## Problem Definition

The management of the attendance can be a great burden on the teachers if it is done manually, and sending report of each student's attendance to respective parents manually also becomes tedious. To resolve this problem, smart and auto attendance management system with message alert system is being utilized. But authentication is an important issue in this system. The smart attendance system is generally executed with the help of biometrics.

Face recognition is one of the biometric methods to improve this system. Being a prime feature of biometric verification, facial recognition is being used enormously in several such applications, like video monitoring and CCTV footage system, an interaction between computer humans and access systems present indoors and network security. By utilizing this framework, the problem of proxies and students being marked present even though they are not physically present can easily be solved.

# Proposed System Architecture/Working

Finding faces is the most integral part in face detection. There are various techniques from which faces could be found. In this paper, we will be comparing the various algorithms used previously by implementing them and analysing them. Even though face detection is the most important step in the area of image processing still the techniques used for its implementation need to be reworked upon so as to optimize its performance and bring down the hurdles it is cladding. The working of face detection algorithms is majorly based on the accuracy of the face detection, due to this face detection is the cusp point in the entire process of face detection and tracking.

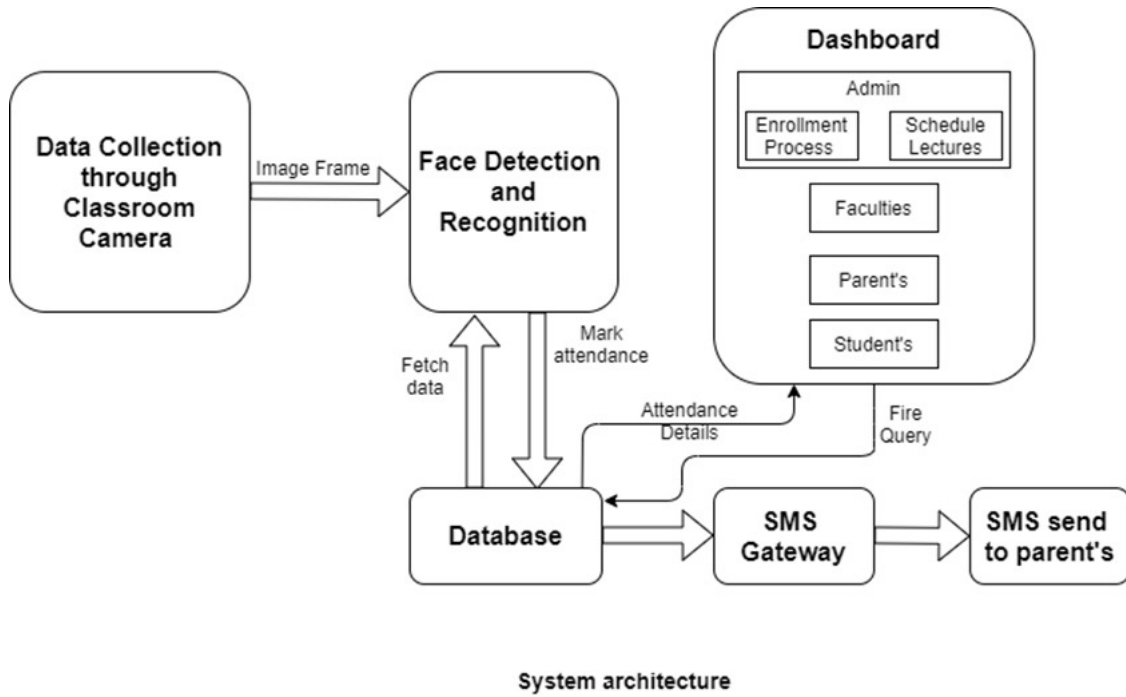


Figure 2: System Architecture

## System architecture consists of 5 Main module:

Face Detection, Face Recognition, SMS alert To parents, DashBoard, Data Visualization.

### 1.Face Detection:

A proper and efficient face detection algorithm always enhances the performance of face recognition systems. Various algorithms are proposed for face detection such as Face geometry based methods, Feature Invariant methods, Machine learning based methods. Out of all these methods, Viola and Jones proposed a framework which gives a high detection rate and is also fast. Viola-Jones detection algorithm is efficient for real time application as it is fast and robust. Hence we chose Viola-Jones face detection algorithm which makes use of Integral Image and AdaBoost learning algorithm as classifier. We observed that this algorithm gives better results in different lighting conditions and we combined multiple haar classifiers to achieve a better

detection rates. A Torch, machine learning framework is used for developing this face detector used as the first step of face recognition model.

## **2.Face Recognition:**

Face Recognition is automatic identification or verification of a person from an image/video. It is one of the most active and widely used techniques because of its reliability, accuracy in the process of recognizing and verifying the person's identity. Problem that may occur with face recognition are different people may look similar; characteristic of the face may change with time. Face can be recognized by two approaches that are based on geometry of face and based on appearance of face. The recognition process is done by comparing the extracted features from the image with the one previously stored in the database. Face recognition can be implemented by using Principal Component Analysis (PCA), Linear Discriminant Analysis (LDA). Support Vector Machine (SVM).

## **3.Automated SMS alert delivery system:**

This system also allows the institution to SMS automatically to the students Parents informing them about their absence.

## **4.Dashboard:**

The Web dashboard is used to monitor the class attendance and view the attendance status of any date which Parents wants to see. It is built using HTML, CSS and PHP. jQuery are used to build the UI of the website dashboard and gives it a neat and professional look.

## **5.Data Visualization:**

Data Visualization is used for visualize the attendance record of students which will easy to understand for parents. The simplest understanding of data visualization is the mapping from data space to graphic space. Python3 scripts will be used for data visualization with the help of libraries like pytorch and tools like tensorflow.

## Working:

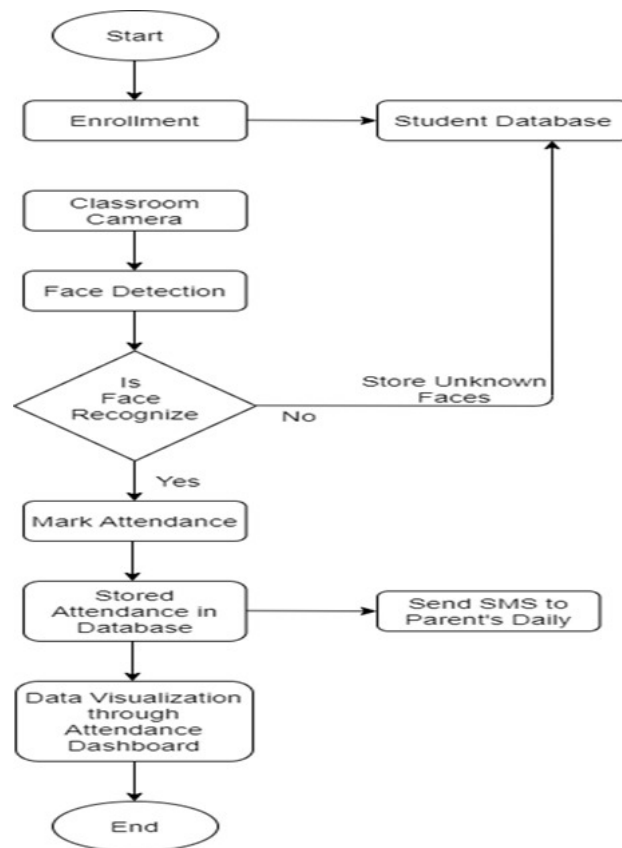


Figure 3: Flow Chart

- Enrollment of students for this system is done with the help of student's database.
- Once student is inside the class the CCTV camera takes a snapshot of the student which will be used for face detection and recognition.
- Face detection and recognition is done with the help of algorithms like HCC (Haar Cascade Classifier) and with tools like OpenCV respectively.
- After student is recognized the attendance gets stored in database and a attendance report gets generated.
- The generated report will then be sent to the respective parents via SMS.
- A dashboard will be also created with the help of Html, css3 and php for database Mongodb, Excel sheet will be used, where parents will be able to visualize student's day to day and overall attendance.
- Data visualization will be done with the help of Python3 scripts, pytorch libraries and tensor-flow tools.

# Design and Implementation

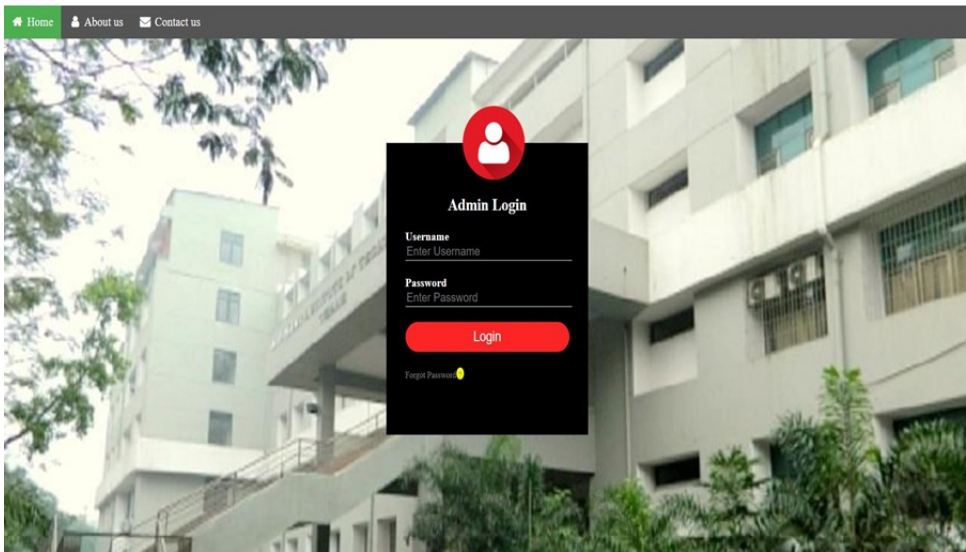


Figure 4: Admin Login

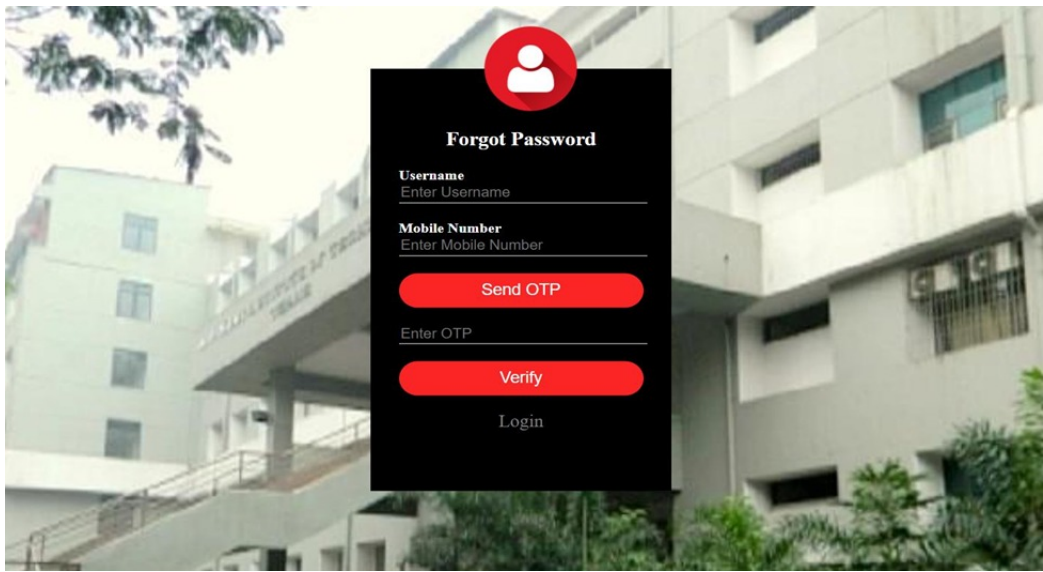


Figure 5: Forgot Password

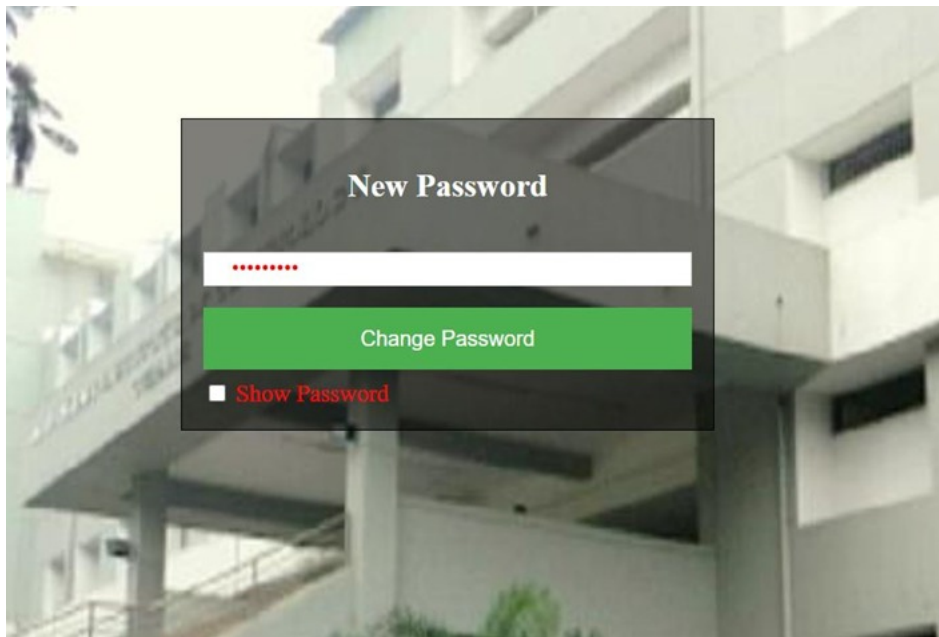


Figure 6: New Password

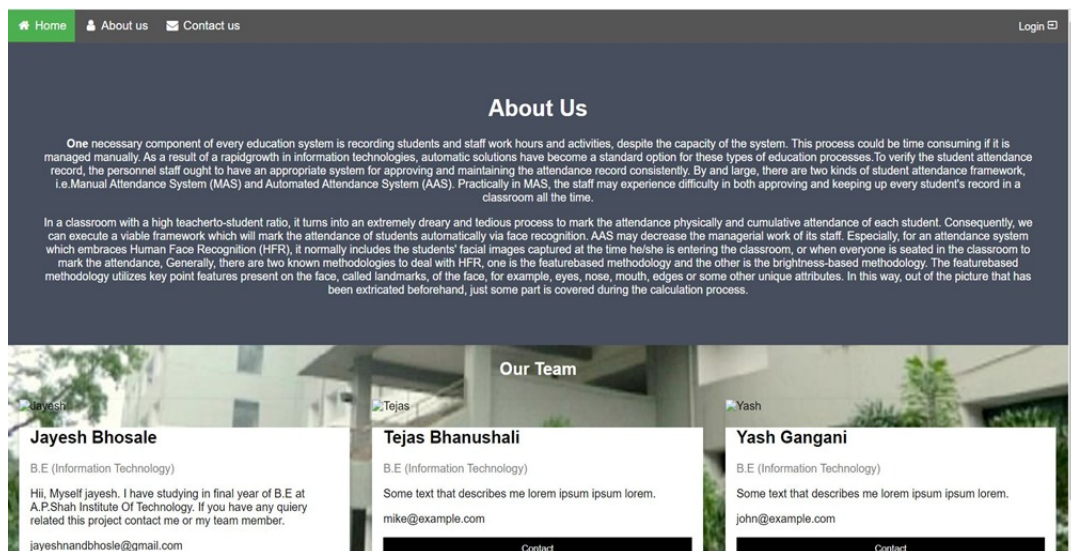


Figure 7: About Us page

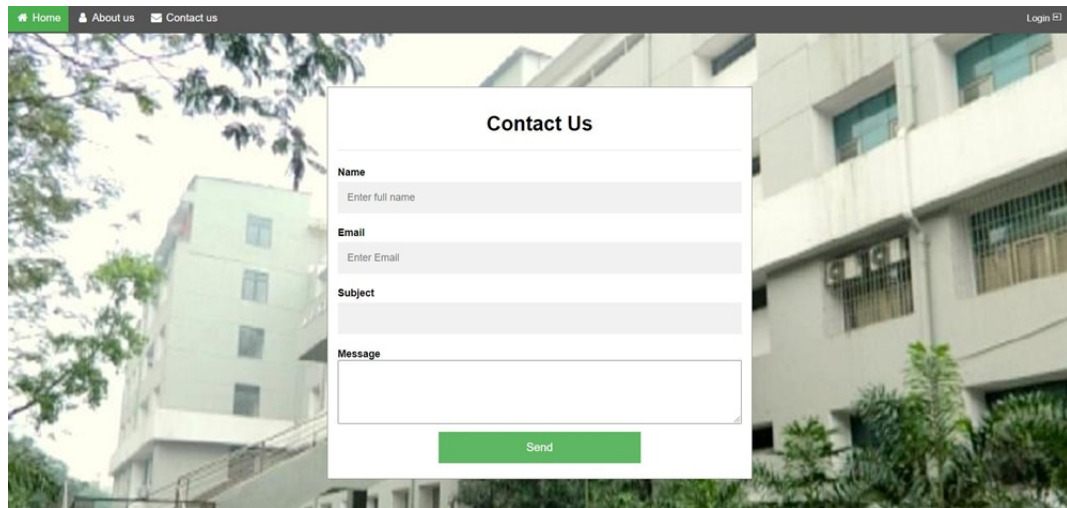


Figure 8: Contact Us page

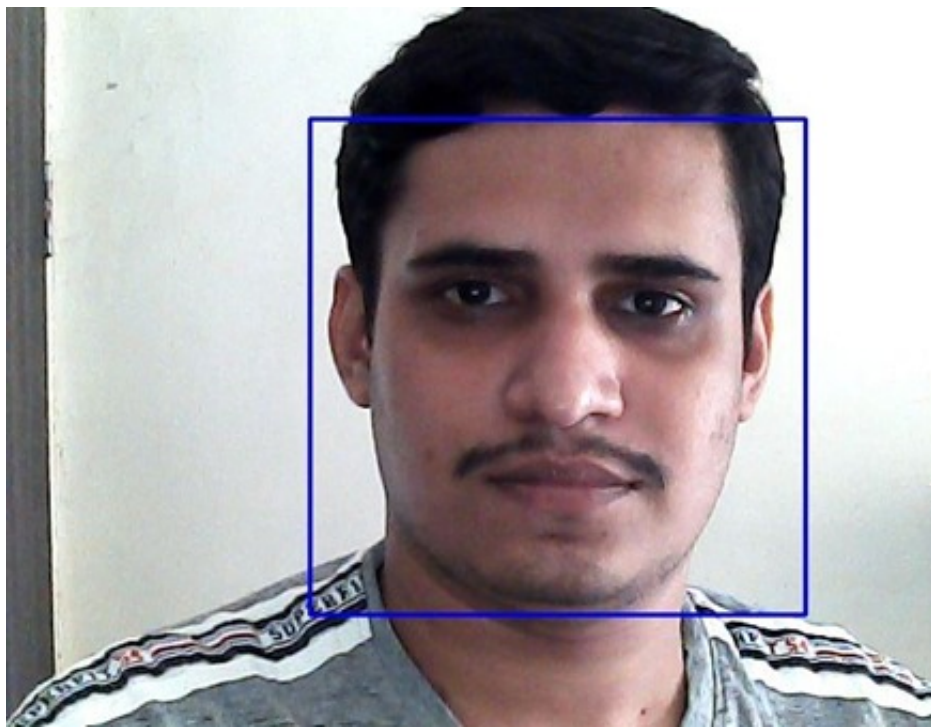


Figure 9: Detect Face



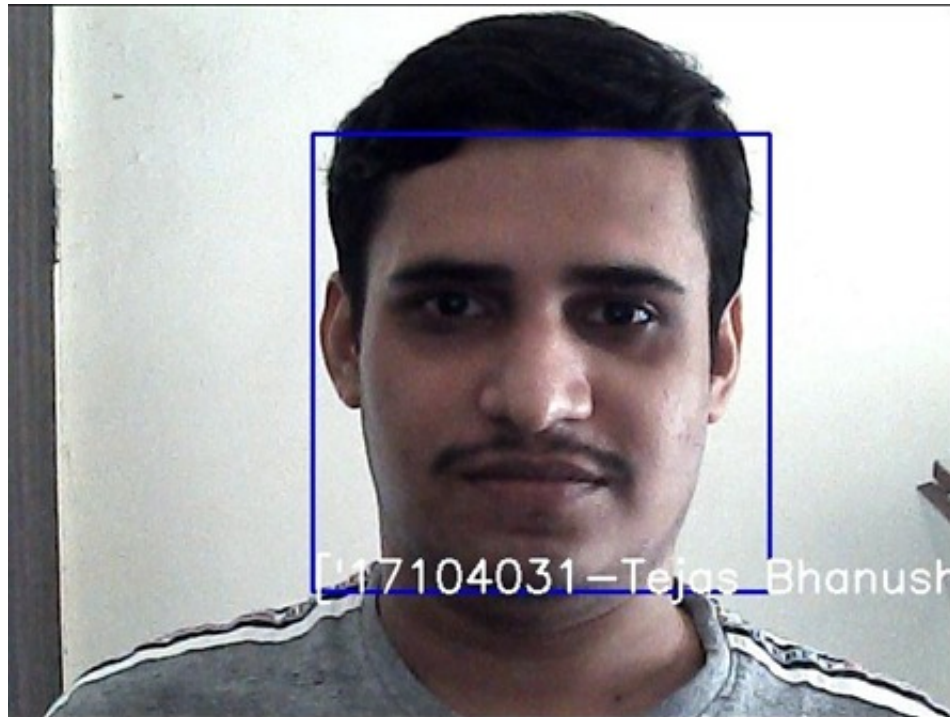


Figure 10: Face Recognized

**Attendance Record**CREATE USERSADD DATALOGOUT

### Student Register

Add Student's Information

Name	<input type="text" value="Tejas Bhanushali"/>	<input type="button" value="Train photo"/> <input type="button" value="Track photo"/>
Moodle ID	<input type="text" value="17104031"/>	

Figure 11: Student Register



## Summary

To record the attendance can be a great burden on the faculties if it is done by manually, and sending report of each student's attendance to respective parents also becomes tedious. Hence we were able to provide some facilities to faculty which can schedule the lectures and also they can view the attendance file generate the report of that attendance. Parents can visualize attendance using the dashboard of their ward. Student also visualize their attendance through dashboard and if student have any query related to attendance they can communicate through dashboard with respected faculty. We also studied how our Face detection and recognition system worked on HCC Algorithm.

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# 1 Publication

6th International Conference for Convergence in Technology (I2CT) "Working on Abstract submission."

<http://ieeepune.i2ct.in/>