MINI PROJECT

(2021-2022)

“FACE RECOGNITION ATTENDANCE SYSTEM”

PROJECT REPORT

Institute of Engineering & Technology

Submitted By –

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Under the Supervision Of -

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Department of Computer Engineering & Applications

Department of Computer Engineering and Applications GLA University, 17 km. Stone NH#2, Mathura-Delhi Road, Chaumuha, Mathura – 281406 U.P (India)

Declaration

I hereby declare that the work which is being presented in the Bachelor of technology. Project **"Face Recognition Attendance System"**, in partial fulfillment of the requirements for the award of the Bachelor of Technology in Computer Science and Engineering and submitted to the Department of Computer Engineering and Applications of GLA University, Mathura, is an authentic record of my own work carried under the supervision of **Mr. Amir Khan**, Technical Trainer, Dept. of **CEA,GLA University**.

The contents of this project report, in full or in parts, have not been submitted to any other Institute or University for the award of any degree.

Sign: Satyam

Name of Candidate: Satyam

University Roll No.:191500730

Department of Computer Engineering and Applications GLA University, 17 km. Stone NH#2, Mathura-Delhi Road, Chaumuha, Mathura – 281406 U.P (India)

Certificate

This is to certify that the project entitled “Face recognition Attendance System”, carried out in Mini Project – I Lab, is a bonafide work by Satyam and is submitted in partial fulfillment of the requirements for the award of the degree Bachelor of Technology (Computer Science & Engineering).

Signature of Supervisor:

Name of Supervisor: Mr. Amir Khan

Date:

Training Certificates

Satyam:

Department of Computer Engineering and Applications GLA University, 17 km. Stone NH#2, Mathura-Delhi Road, Chaumuha, Mathura – 281406 U.P (India)

ACKNOWLEDGEMENT

Presenting the ascribed project paper report in this very simple and official form, I would like to place my deep gratitude to GLA University for providing me the instructor Mr Amir Khan, my technical trainer and supervisor.

He has been helping me since Day 1 in this project. He provided me with the roadmap, the basic guidelines explaining on how to work on the project. He has been conducting regular meeting to check the progress of the project and providing me with the resources related to the project. Without his help, I wouldn't have been able to complete this project.

And at last but not the least i would like to thank my dear parents for helping me to grab this opportunity to get trained and also my colleagues who helped me find resources during the training.

Thanking you

Sign: Satyam

Name of Candidate: Satyam

University Roll No.:191500730

ABSTRACT

In this project, I am creating an application, basically an automatic attendance taking by face recognition which i have named Face Recognition Attendance System. This application will provide us a platform to take attendance automatically by face recognition. The teacher, who are using this application for taking attendance, first time save all the details of student like student course, student id , student roll number , phone number etc . and most important thing is to save the face image samples so that face detector detect the face and compare with face image samples if match than that student will present automatically and after this data will save in database and teacher can see on his portal easily.

The app is suitable in the present scenario as the world is being faster then why not the attendance system . On the profile of the user, one can easily view the attendance status. The app will be completely efficient.

App ecosystem is diversing and is changing people's life all over the world. Furthermore designing solutions for the problems that we may face in future is essential.

CONTENTS

CHAPTER -1

INTRODUTION

1.1 CONTEXT

This machine learning application “FACE RECOGNITION ATTENDANCE SYSTEM” has been submitted in partial fulfilment of the requirements for the award of the degree of Bachelor of Technology in Computer Science and Engineering at GLA University, Mathura supervised by Mr. Amir Khan. This project has been completed approximately three months and has been executed in modules, meetings have been organised to check the progress of the work and for instructions and guidelines.

1.2 MOTIVATION

The main motivation for this project was the slow and inefficient traditional manual attendance system. So, why not make it automated fast and much efficiently. Also, such face detection techniques are in use by the department of criminal investigation where the usage of CCYV footages and detecting the faces from the crime scene and comparing them with criminal database to recognize them. It is also becoming as a feature of daily life in China. Where authorities are using it on the streets, in the subway stations, and at airport.

1.3 OBJECTIVE

Instead of using the conventional methods, this proposed system aims to develop an automated system that records the student's attendance by using facial recognition technology. The main objective of this work is to make the attendance marking and management system efficient, time saving, simple and easy.

1.4 EXISTING SYSTEM

In the Fingerprint based existing attendance system, a portable fingerprint device need to be configured with the students fingerprint earlier. Later either during the lecture hours or before, the student needs to record the fingerprint on the configured device to ensure their attendance for the day. The problem with this approach is that during the lecture time it may distract the attention of the students.

The facial recognition technology can be used in recording the attendance through a high-resolution digital camera that detects and recognizes the faces of the students and the machine compares the recognized face with students' face images stored in the database. Once the face of the student is matched with the stored image, then the attendance is marked in attendance database for further calculation. If the captured image doesn't match with the students' face present in the database then this image is stored as a new image onto the database. In this system, there are possibilities for the camera to not to capture the image properly or it may miss some of the students from capturing.

1.5 SOURCES

For this project I use different sites or YouTube videos

YouTube video link:

https://youtu.be/YX8BzK_LU0E

https://youtu.be/uwJltCOrpEI

https://youtu.be/sz25xxF_AVE

web sites:

https://github.com/kmhmubin/Face-Recognition-Attendance-System

https://medium.com/@rishabh.rk1705/automatic-facial-recognition-based-attendance-system-bea3be8003fe

https://pythonawesome.com/a-face-recognition-attendance-system-with-python/

CHAPTER -2

SOFTWARE REQUIREMENT ANALYSIS

2.1 IMPORTANCE OF ATTENDANCE

With regular attendance for school, students gain academic, personal, and professional benefits. We all know that with regular attendance for school, students learn every day and do not have any backlogs. With no backlogs, they will have to study less.

Importance of attendance is not only for student but also for employee who are working in industry. So it is important for them also.

2.2 PROBLEM STATEMENT

Up to date, attendance system has been taken manually which causing time waste, paper work, besides it is inaccurate. Face recognition technology can be utilized to build an automated attendance system that makes counting and identifying students much easier and convenient. Face occlusions, face scaling, and posture are still important problems in such systems.

2.3 HARWARE AND SOFTWARE REQUIREMENTS

- Language Used: Python
- Database: MySql
- User Interface Design: Graphical user interface
- Processor : intel Pentium processor or other 1GHz or more
- Operating System : window 7 or above , linux, mac os x
- RAM : minimum 128MB RAM or above
- Hardware Devices: minimum 32MB graphic card RAM or above
- Hard disk : space of 500GB or above

2.4 MODULES AND FUNCTIONALITIES

1.Login Page:

This is the first page for login the user and after that user will enter into main page.

2. MAIN PAGE:

This is the main screen where user interact with the app, we can see the name of the application and eight different sections.

3.Student Details

3.Train Data

4.Attendance

5.Face Detector

6.Photos

7.Developer

8.Help Desk

9.Exit

2.Student Details:

After entering on Student Details section. We see the student details like student id, student roll number, mobile number , photo samples etc.

And also we can delete and update student details in this section.

And also we take photo samples as student details.

3.Train Data:

This section train the data which are saved in data folder by using student details section.

4.Attendance:

This section has the attendance data which are saved by student details section data stored in database

5.Face Detector:

This section detect the face image.

6.Photos:

This section have photos sample

7.Developer:

Here it provide developer section who develop this app for enquiry

8.Help Desk:

This section help section if user face any problem this section provide help

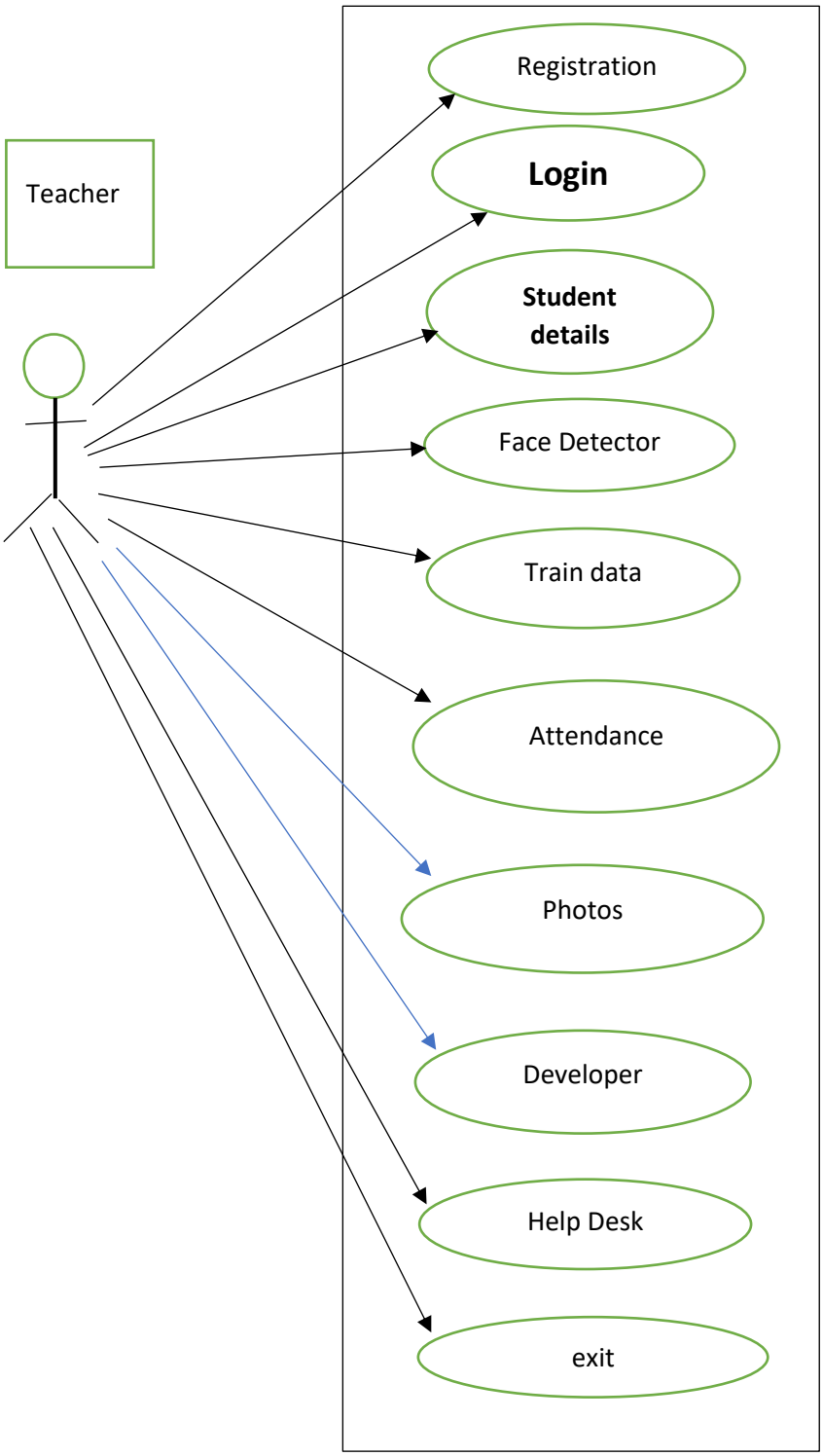
9.Exit:

This section just to exit from main section

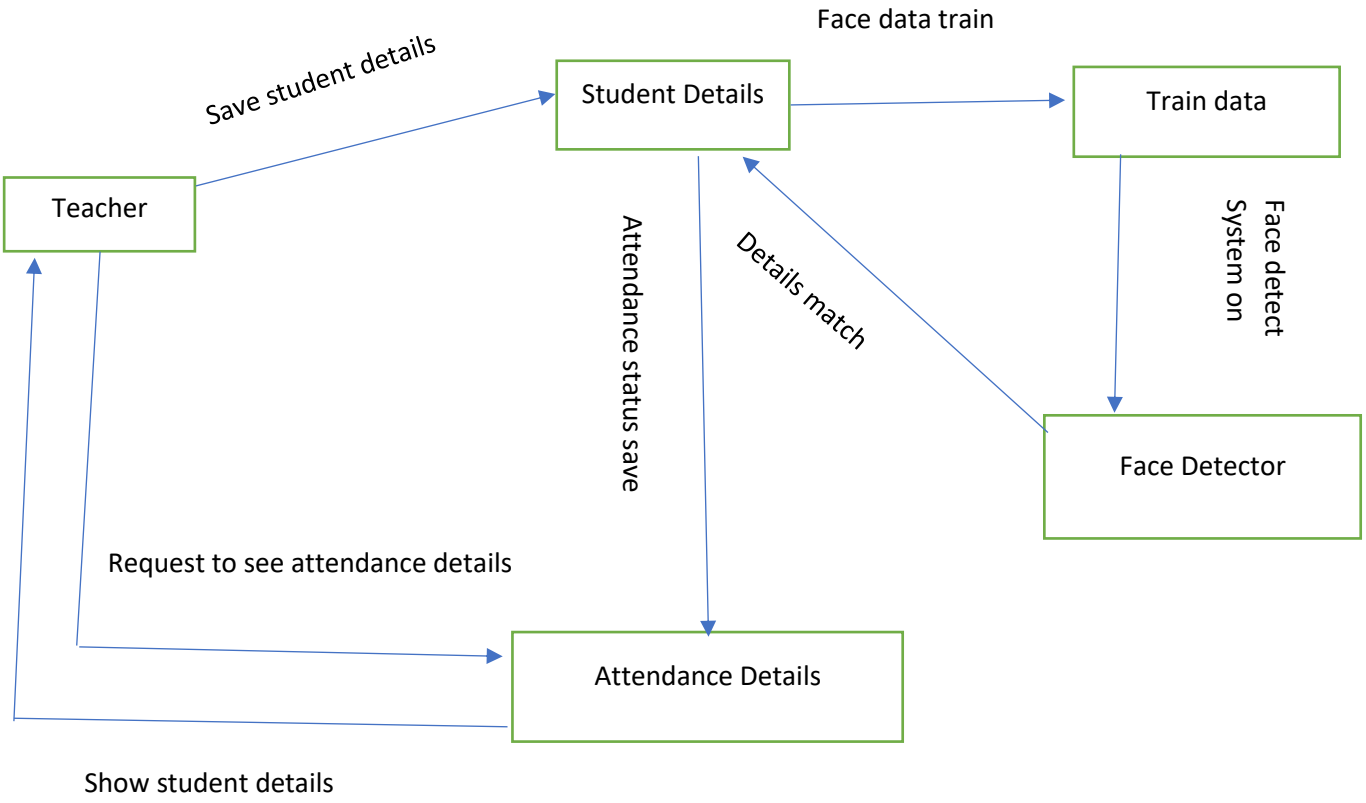
CHAPTEER -3

SOFTWARE DESIGN

3.1 USE CASE DIAGRAM:



3.2 Data Flow Diagram



CHAPTER -4

TECHNOLOGY USED

4.1 OpenCv library in Python

OpenCV is the huge open-source library for the computer vision, machine learning, and image processing and now it plays a major role in real-time operation which is very important in today's systems. By using it, one can process images and videos to identify objects, faces, or even handwriting of a human. When it integrated with various libraries, such as NumPy, python is capable of processing the OpenCV array structure for analysis. To Identify image pattern and its various features we use vector space and perform mathematical operations on these features.

Applications of OpenCV:

- face recognition
- Automated inspection and surveillance
- number of people – count (foot traffic in a mall, etc)
- Vehicle counting on highways along with their speeds
- Interactive art installations
- Anamoly (defect) detection in the manufacturing process (the odd defective products)
- Street view image stitching
- Video/image search and retrieval
- Robot and driver-less car navigation and control
- object recognition
- Medical image analysis
- Movies – 3D structure from motion
- TV Channels advertisement recognition

INSTALLATION OF OpenCv :

If Python is already installed, it will generate a message with the Python version available.

>> pip –version

OpenCV can be directly downloaded and installed with the use of pip

```
>> pip install opencv-python
```

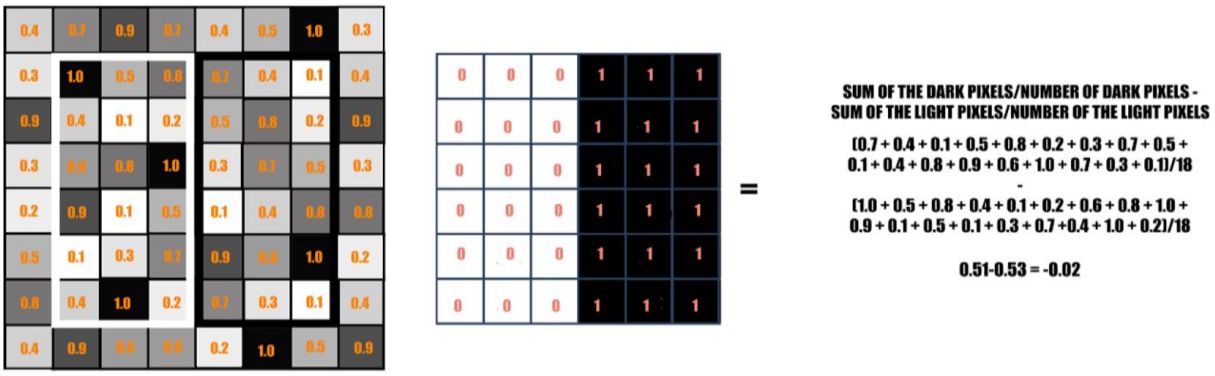
To check if OpenCV is correctly installed, just run the following commands to perform a version check:

```
python
>>>import cv2
>>>print(cv2.__version__)
```

4.2 haarcascade_frontleface Algorithm

It is an Object Detection Algorithm used to identify faces in an image or a real time video. The algorithm uses edge or line detection features proposed by Viola and Jones in their research paper “Rapid Object Detection using a Boosted Cascade of Simple Features” published in 2001. The algorithm is given a lot of positive images consisting of faces, and a lot of negative images not consisting of any face to train on them.

These features on the image makes it easy to find out the edges or the lines in the image, or to pick areas where there is a sudden change in the intensities of the pixels.



A sample calculation of Haar value from a rectangular image section has been shown here. The darker areas in the haar feature are pixels with values 1, and the lighter areas are pixels with values 0. Each of these is responsible for finding out one particular feature in the image. Such as an edge, a line or any structure in the image where there is a sudden change of intensities. For ex. in the image above, the haar feature can detect a vertical edge with darker pixels at its right and lighter pixels at its left.

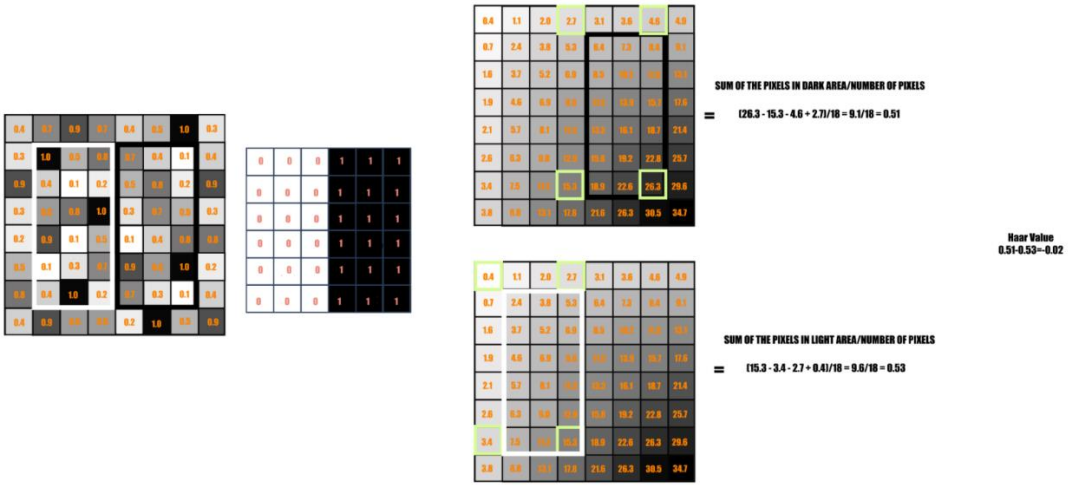
The objective here is to find out *the sum of all the image pixels lying in the darker area of the haar feature* and *the sum of all the image pixels lying in the lighter area of the haar feature*. And then find out their difference. Now if the image has an edge separating dark pixels on the right and light pixels on the left, then the haar value will be closer to 1. That means, we say that there is an edge detected if the haar value is closer to 1. In the example above, there is no edge as the haar value is far from 1.

This is just one representation of a particular haar feature separating a vertical edge. Now there are other haar features as well, which will detect edges in other directions and any other image structures. To detect an edge anywhere in the image, the haar feature needs to traverse the whole image.

The haar feature continuously traverses from the top left of the image to the bottom right to search for the particular feature. This is just a representation of the whole concept of the haar feature traversal. In its actual work, the haar feature would traverse pixel by pixel in the image. Also all possible sizes of the haar features will be applied.

Depending on the feature each one is looking for, these are broadly classified into three categories. The first set of *two rectangle features* are responsible for finding out the edges in a horizontal or in a vertical direction (as shown above). The second set of *three rectangle features* are responsible for finding out if there is a lighter region surrounded by darker regions on either side or vice-versa. The third set of *four rectangle features* are responsible for finding out change of pixel intensities across diagonals.

Now, the haar features traversal on an image would involve a lot of mathematical calculations. As we can see for a single rectangle on either side, it involves 18 pixel value additions (for a rectangle enclosing 18 pixels). Imagine doing this for the whole image with all sizes of the haar features. This would be a hectic operation even for a high performance machine.



4.3 Tools and Languages

1.Python:

Python is a widely used high-level programming language first launched in 1991.

Since then, Python has been gaining popularity and is considered as one of the most popular and flexible server-side programming languages.

Python installation process

Step 1: Select Version of Python to Install

The installation procedure involves downloading the official Python .exe installer and running it on your system.

The version you need depends on what you want to do in Python. For example, if you are working on a project coded in Python version 2.6, you probably need that version. If you are starting a project from scratch, you have the freedom to choose.

Step 2: Download Python Executable Installer

1. Open your web browser and navigate to the Downloads for Windows section of the official Python website.

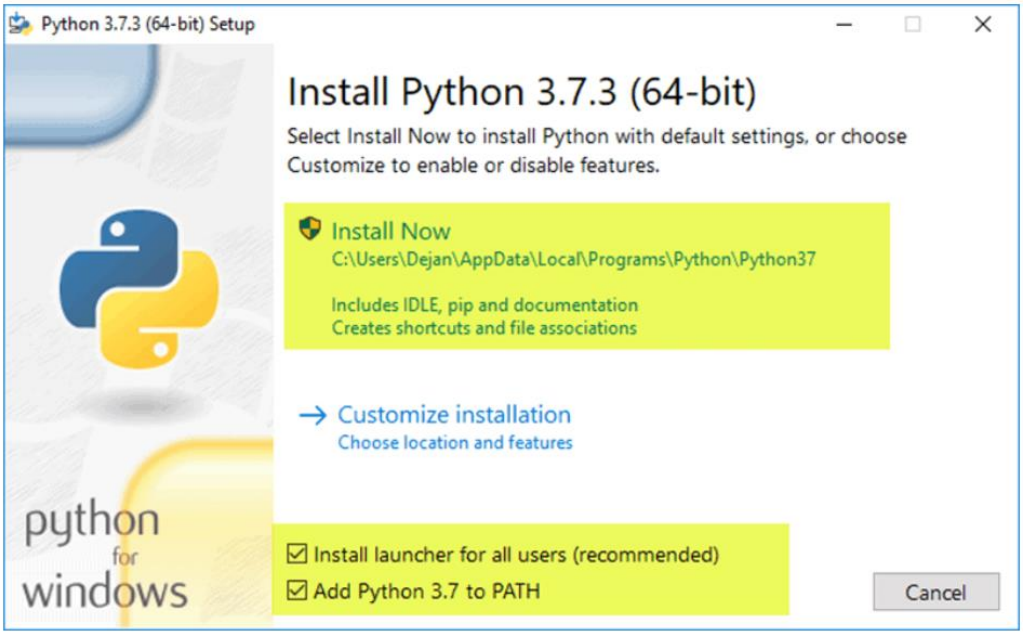
2. Search for your desired version of Python. At the time of publishing this article, the latest Python 3 release is version 3.7.3, while the latest Python 2 release is version 2.7.16.
3. Select a link to download either the **Windows x86-64 executable installer** or **Windows x86 executable installer**. The download is approximately 25MB.

Step 3: Run Executable Installer

1. Run the **Python Installer** once downloaded. (In this example, we have downloaded Python 3.7.3.)

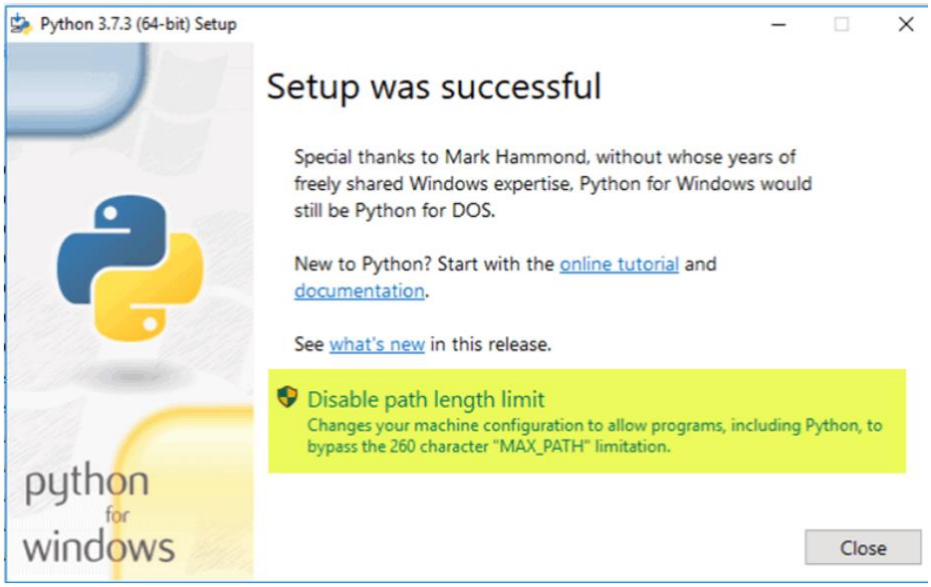
2. Make sure you select the **Install launcher for all users** and **Add Python 3.7 to PATH** checkboxes. The latter places the interpreter in the execution path. For older versions of Python that do not support the **Add Python to Path** checkbox, see Step 6.

3. Select **Install Now** – the recommended installation options.



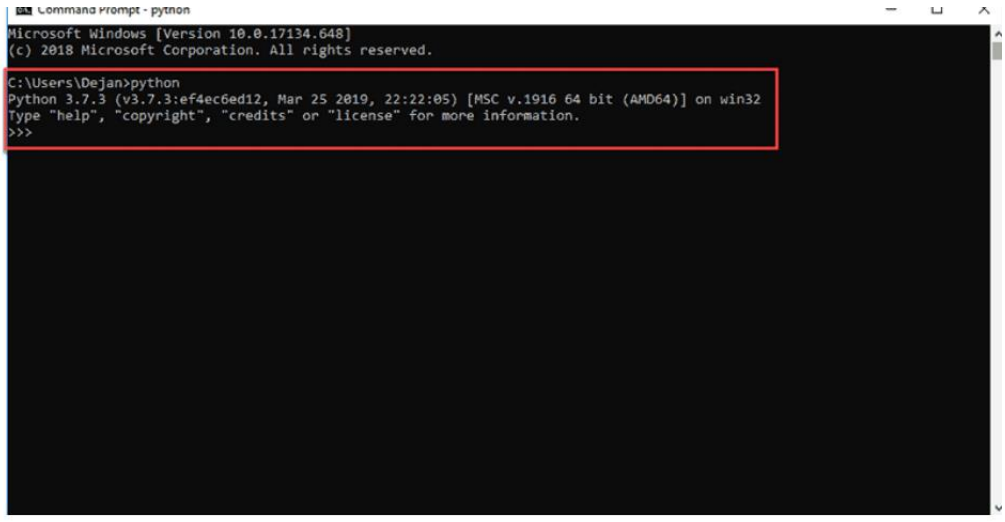
For all recent versions of Python, the recommended installation options include **Pip** and **IDLE**. Older versions might not include such additional features.

4. The next dialog will prompt you to select whether to **Disable path length limit**. Choosing this option will allow Python to bypass the 260-character MAX_PATH limit. Effectively, it will enable Python to use long path names.



Step 4: Verify Python Was Installed On Windows

1. Navigate to the directory in which Python was installed on the system. In our case, it is **C:\Users*Username*\AppData\Local\Programs\Python\Python37** since we have installed the latest version.
2. Double-click **python.exe**.
3. The output should be similar to what you can see below:



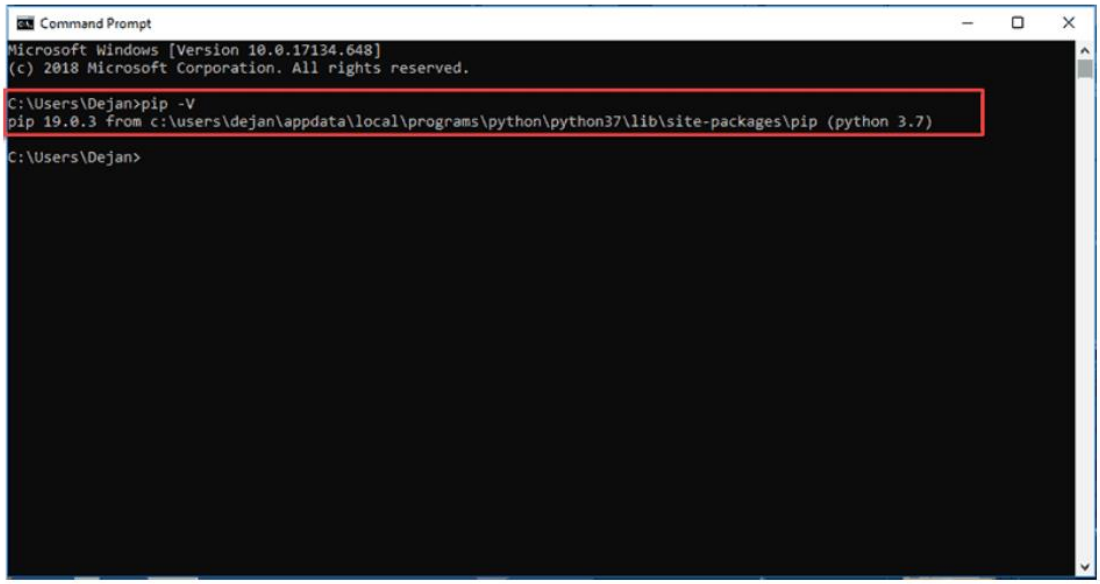
Step 5: Verify Pip Was Installed

If you opted to install an older version of Python, it is possible that it did not come with Pip preinstalled. Pip is a powerful package management system for Python software packages. Thus, make sure that you have it installed.

We recommend using Pip for most Python packages, especially when working in virtual environments.

To verify whether Pip was installed:

1. Open the **Start** menu and type "**cmd.**"
2. Select the **Command Prompt** application.
3. Enter `pip -v` in the console. If Pip was installed successfully, you should see the following output:



2.MySql workbench

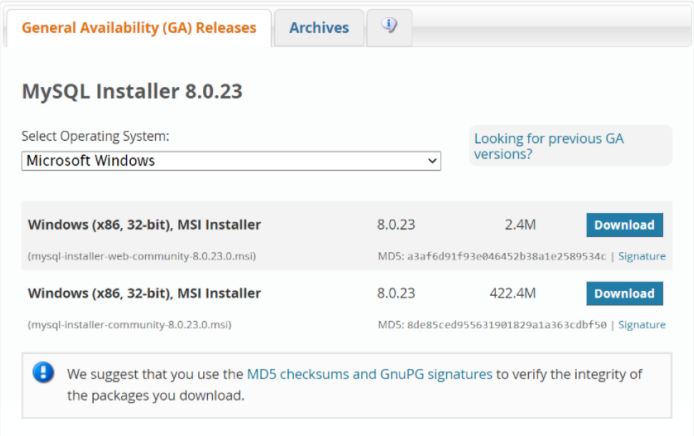
MySQL is a publicly accessible Relational Database Management System (RDBMS) that uses Structured Query language (SQL) to interact with databases. MySQL stores data in the form of tables that can be modified using Structured Query Language. Its adaptability with different computing systems like Windows, Linux, macOS, and Ubuntu has made it an easy-going RDBMS software option.

MySQL Workbench is a unified software used to add functionality and ease to SQL development work. MySQL Workbench provides data modeling, SQL development, and various administration tools for configuration. It also offers a graphical interface to work with the databases in a structured way.

Installation steps of MySql Workbench

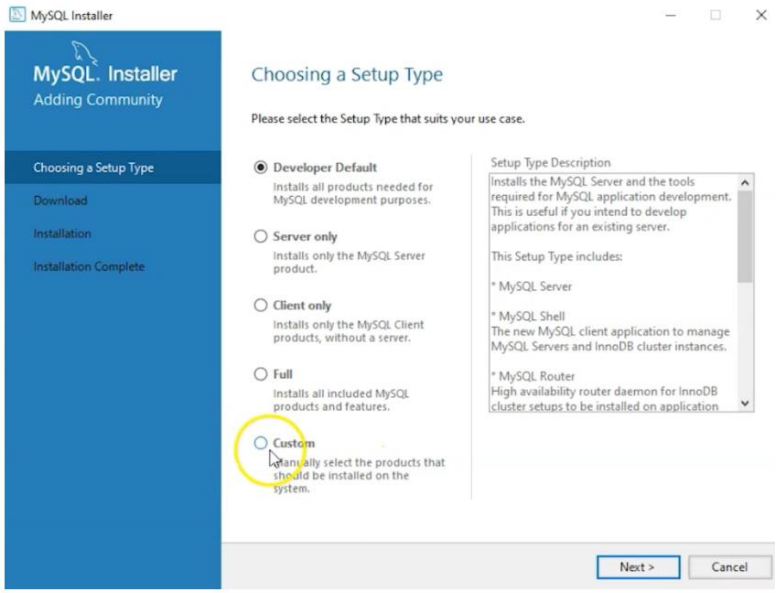
- Open the MySQL website on a browser. Click on the following link: MySQL Downloads.
- Select the Downloads option.
- Select MySQL Installer for Windows.

4. Choose the desired installer and click on download.



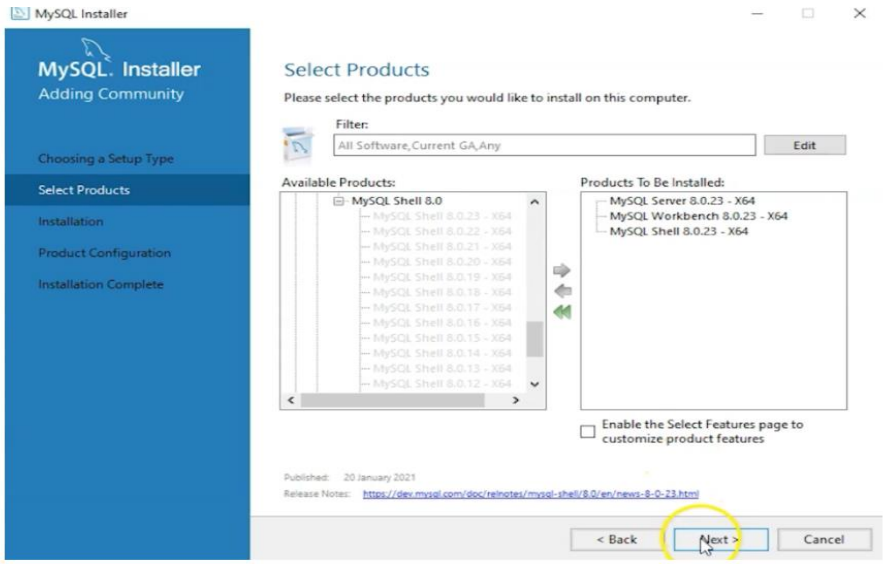
5.After the download, open the installer.

.6.It will ask for permission; when it does, click Yes. The installer will then open. Now, it will ask to choose the setup type. Here, select Custom.



7.Click on Next. With this, you will install MySQL server, MySQL Workbench, and MySQL shell.

8. Open MySQL Servers, select the server you want to install, and move it to the Products/Features to be installed window section. Now, expand Applications, choose MySQL Workbench and MySQL shell. Move both of them to ‘Products/Features to be installed’.



9. Click on the Next button. Now, click on the Execute button to download and install the MySQL server, MySQL Workbench, and the MySQL shell.

10. Once the product is ready to configure, click on Next. Under Type and Networking, go with the default settings and select Next.

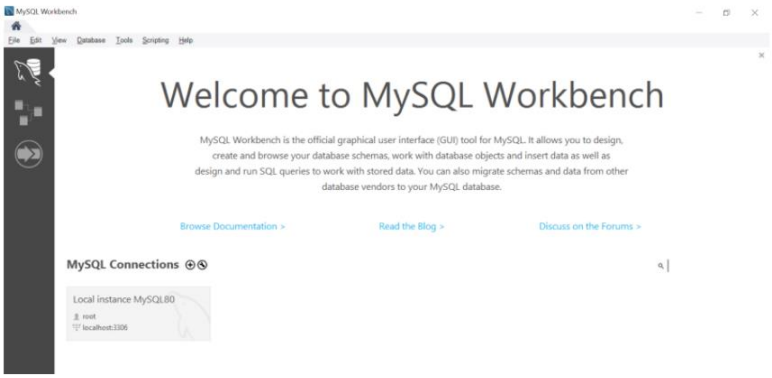
11. For authentication, use the recommended strong password encryption.

12. Set your MySQL Root password and click on next.

13. Go for the default windows service settings and under apply configuration, click on execute. Once the configuration is complete, click on finish.

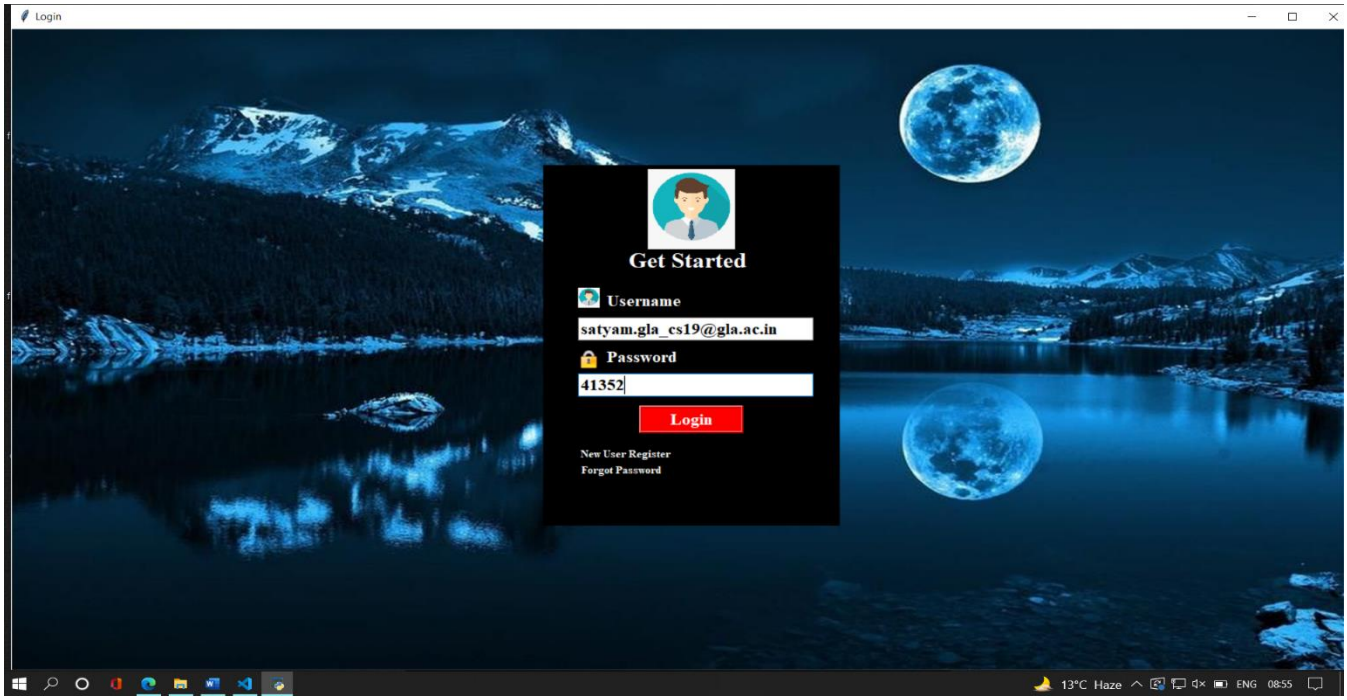
14. Complete the installation. This will now launch the MySQL Workbench and the MySQL Shell.

Once MySQL Workbench is installed, select the Local instance and enter the password.



CHAPTER-5
Face Recognition Attendance System running Screen Shots

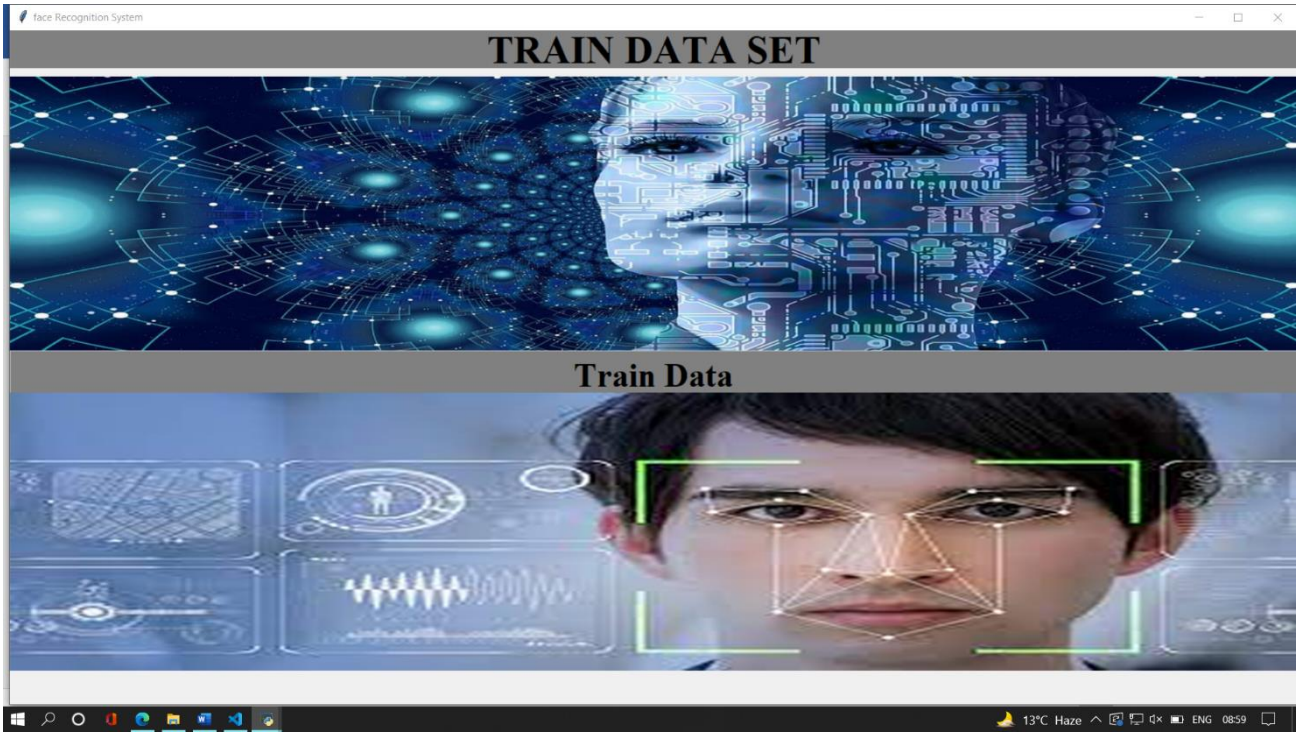
1. Login Page


Login
Get Started
Username
satyam.gla_cs19@gla.ac.in
Password
41352
Login
New User Register
Forgot Password
13°C Haze
ENG
08:55

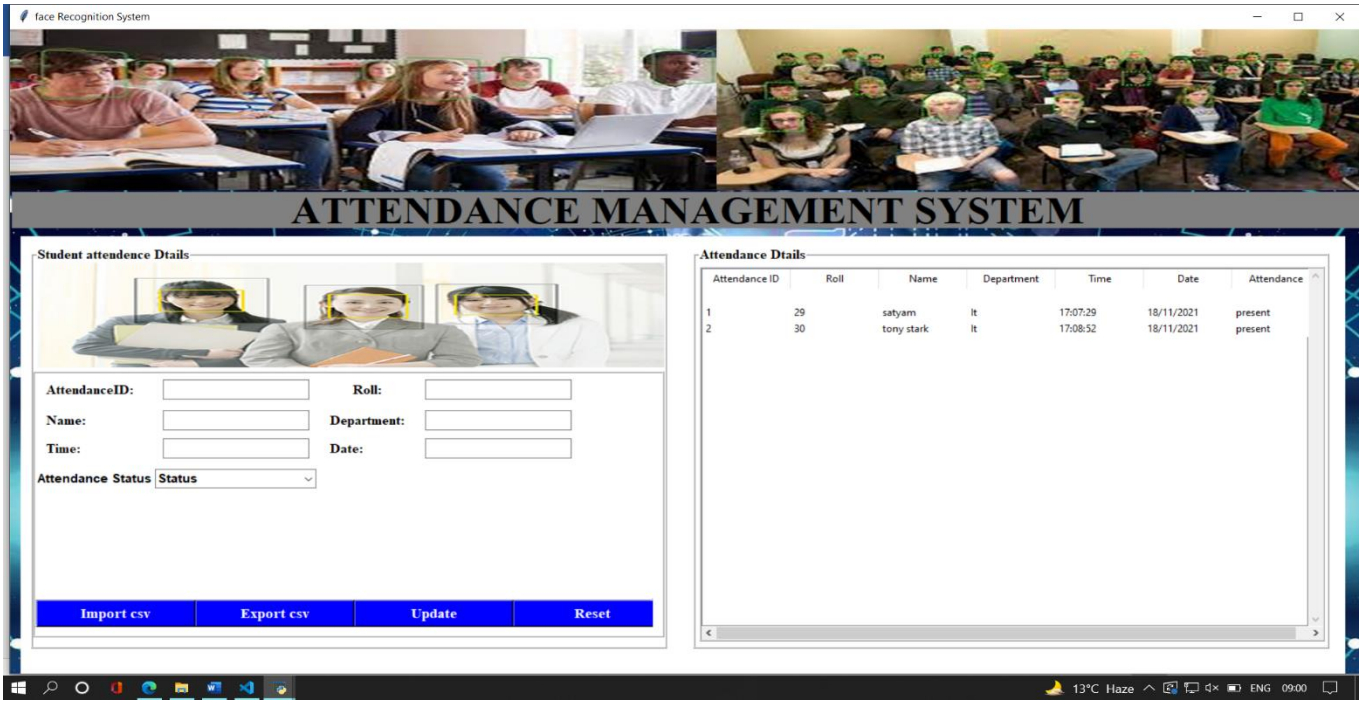
2.Main Page


face Recognition System
08:55:31 AM
FACE RECOGNITION ATTENDANCE SYSTEM SOFTWARE
STUDENT DETAILS
FACE DETECTOR
ATTENDANCE
HELP DESK
TRAIN DATA
PHOTOS
DEVELOPER
EXIT
HELP
EXIT
13°C Haze
ENG
08:55

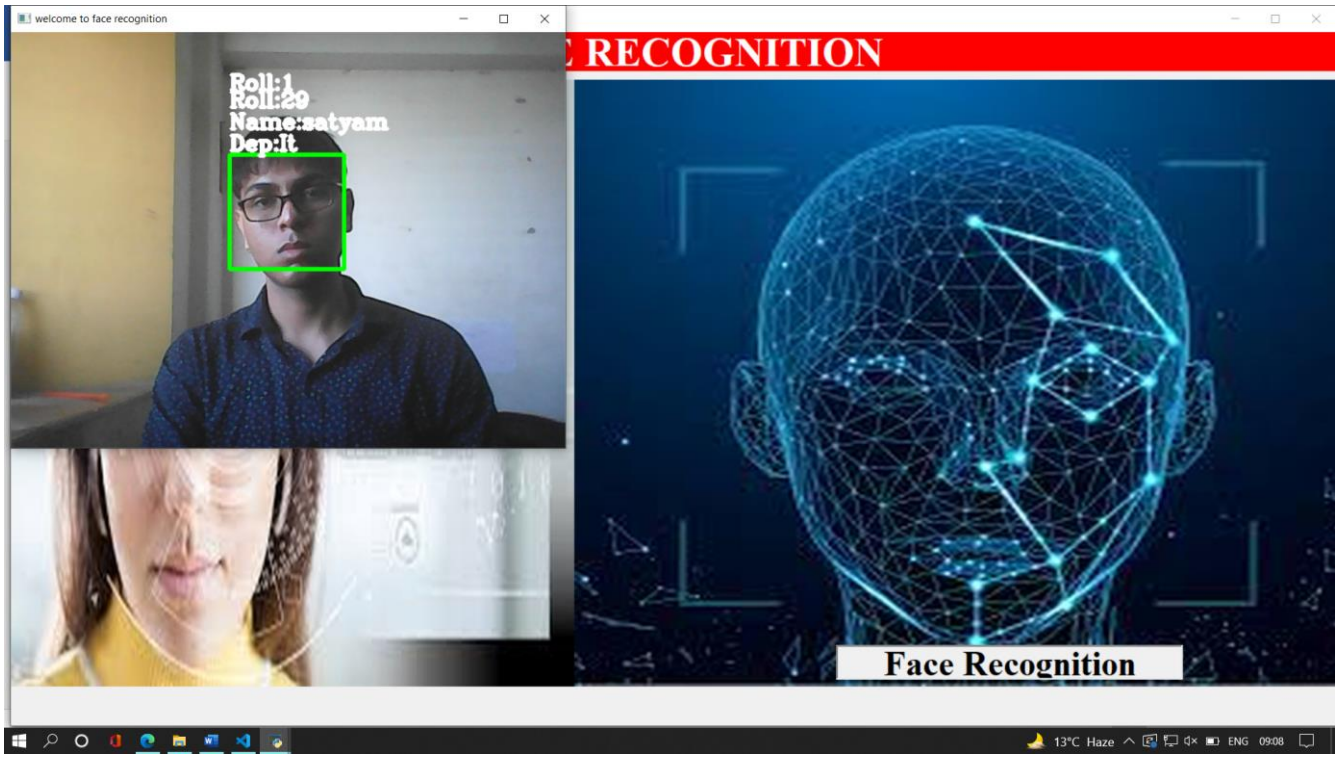
3.Train Data



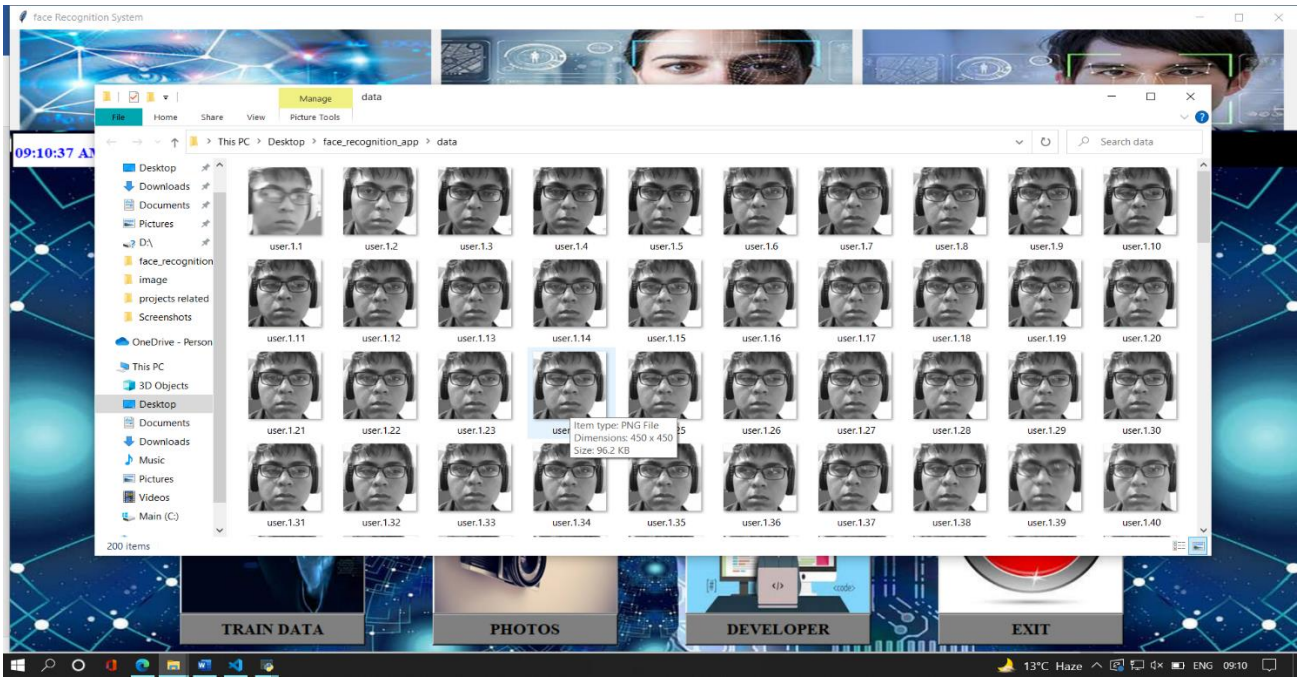
4.Attendance



5.Face Detection



6.photos.



7.dveloper

8.Help Desk

Chapter-6

Conclusion

There may be various types of lighting conditions, seating arrangements and environments in various classrooms. Most of these conditions have been tested on the system and system has shown 100% accuracy for most of the cases. There may also exist students portraying various facial expressions, varying hair styles, beard, spectacles etc. All of these cases are considered and tested to obtain a high level of accuracy and efficiency. Thus, it can be concluded from the above discussion that a reliable, secure, fast and an efficient system has been developed replacing a manual and unreliable system. This system can be implemented for better results regarding the management of attendance and leaves. The system will save time, reduce the amount of work the administration has to do and will replace the stationery material with electronic apparatus and reduces the amount of human resource required for the purpose. Hence a system with expected results has been developed but there is still some room for improvement

Scope for future work

1.Currently, the system has reached the accuracy level up to 70% for partial and dense images. It can further be improved to obtain higher accuracy levels.

2. Further, 2 or more IP cameras can be employed and each image can be processed separately. The results of these can be merged to obtain better results and accuracy in denser classrooms.