

“ADVANCE ATTENDANCE SYSTEM”

A

Project Report

submitted

in partial fulfillment

for the award of the Degree of

Bachelor of Technology

in Department of Information Technology



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DECLARATION

We hereby declare that the report of the project entitled Advance Attendance System is a record of an original work done by us at Swami Keshvanand Institute of Technology, Management and Gramothan, Jaipur under the mentorship of Ms.Richa Rawal (Dept. of Information Technology) and coordination of Ms.Sanju Choudhary (Dept.of Information Technology). This project report has been submitted as the proof of original work for the partial fulfillment of the requirement for the award of the degree of Bachelor of Technology (B.Tech) in the Department of Information Technology. It has not been submitted anywhere else, under any other program to the best of our knowledge and belief.

Team Members

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Chapter 1

Introduction

1.1 Problem Statement and Objective

“Advance Attendance System” is software developed for maintaining the attendance of the student on the daily basis in the college. Taking and tracking student’s attendance manually, causes various problems such as misplacing the sheets, dishonesty in maintaining attendance and wastage of time as well as high chances of error. It is a difficult process, takes time and cause a lot of paper-based work. As a result, in order to solve these problems and avoid errors we suggest to computerize this process by providing a system that record and manage student’s attendance automatically without needing to lecturers’ interference.

1.2 Investigation and Analysis

1. Paper Name/Author - Monica.C, Nithya R., Prarthana M., Sonika S.V., Dr.M. Ramakrishna (The design is expressed in sufficient detail so as to enable all the developers to understand the underlying architecture of Attendance system.)
2. Paper Name/Author - Abdoulrahmaine Mohammad, Mohammad Elmi Hassan, (In this we study it capable of eliminating time wasted during manual collection of attendance and for the educational administration)

1.3 Introduction to Project

The purpose of the attendance monitoring system using face recognition is to ease the attendance process which consumes lot of time and efforts , it is a convenient and easy way for students and teachers. The system will capture the images of the students and using face recognition algorithm mark the attendance in the sheet. This

way the class-teacher will get their attendance marked without actually spending time in traditional attendance marking. The identification process to determine the presence of a person in a room or building is currently one of the routine security activities. Every person who will enter a room or building must go through several authentication processes first, that later these information's can be used to monitor every single activity in the room for a security purpose. Authentication process that is being used to identify the presence of a person in a room or building still vary. The process varies from writing a name and signatures in the attendance list, using an identity card, or using biometric methods authentication as fingerprint or face scanner.

1.4 Proposed Logic / Algorithm / Solution

Automatic Face recognition attendance management using Machine Learning. A real-world student attendance system which recognize face of student and attendance of the respective student will be marked automatically on excel sheet.

1.5 Constraints

The Internet connection is a constraint for the application. Since the application fetches data from the server over the Internet, it is crucial that there is an Internet connection for the application to function. The web portal will be constrained by the capacity of the database. Since the database is shared with the larger system, it may be forced to queue incoming requests and as a result, increase the time it takes to fetch data. The computers must be equipped with web browsers such as Internet explorer. All Python code shall conform to the Python Code Convention standards. The Camera which is detecting the face is working properly.

1.6 Scope of the Project

The scope of the system is to reduce the time of the teacher as well as student which they wasted by doing traditional attendance.

Chapter 2

Software Requirement Specification

2.1 Overall Description

The scope of the system is to reduce the time of the teacher as well as student which they wasted by doing traditional attendance.

2.2 User Classes and Characteristics

Identify the various user classes that you anticipate will use this product. User classes may be differentiated based on frequency of use, subset of product functions used, technical expertise, security or privilege levels, educational level, or experience. Describe the pertinent characteristics of each user class. Certain requirements may pertain only to certain user classes. Distinguish the most important user classes for this product from those who are less important to satisfy.

2.3 Assumptions and Dependencies

This document will provide a general description of our project, including user requirements, product perspective, and overview of requirements, general constraints. In addition, it will also provide the specific requirements and functionality needed for this project such as interface, functional requirements and performance requirement

2.4 Hardware Interfaces

Since the application must run over the internet, the hardware shall require to connect internet to the hardware which is android device for the system.

2.5 Software Interfaces

This system is a Single-user, multi-tasking environment. It enables the user to interact with the server and attain interact with the server to show the animal information also leaves a record in the inbuilt database. It uses Java and android as the front end programming tool and MySQL as the back end application tool.

2.6 Communications Interfaces

The e-store system shall use the HTTP protocol for communication over the internet and for the intranet communication will be through TCP/IP protocol suite.

2.7 User Interfaces

The user interface for the software shall be compatible to any Android version by which user can access to the system. The user interface shall be implemented using any tool or software package like Android Studio, MYSQL etc.

2.8 Functional Requirements

Functional requirements outline what the system should do and support the user activities in performing and completing tasks by using the proposed system. The list below shows the functional requirements of this project : -

1. The system shall allow new users to register and use the platform.
2. The system allows the user to log in by using username and password.
3. The system will encrypt the user passwords.
4. The system will be able to detect a human face from an image.
5. The system will be able to recognize faces based on existing data.
6. The system must be able to identify the students and mark them as attended.

7. The system must be able to update the attendance database based on attended students.
8. The system will send the names of the absent student directly to the lecturer:
9. The system will be able to differentiate between students and teachers.
10. The system will only take attendance of the class based on when activated to do so.

2.9 Non-Functional Requirements

The performance of the system should be optimized based on users' device and related running environment. The response of the system should be reasonable time-based Internet speed and hardware related factors. The system must respond to users' operations depend on the hardware of users' devices and running speed. The system must respond to any actions operated by the user in a visible way.

In the implementation process of this system, Python Programming Language will be the main development language. Since Python is selected to be the main development language, Python Programming Language Code Convention published by Oracle is chosen as a standard for the development process of the system. In the process of the documentation of the system, IEEE standards will be used and UML standards will be used while designing the diagrams

Therefore, scalability must be the number one attribute that a system will have. The system should support Windows operating system as per the minimum specifications requirements. The system should be compatible with the existing intranet infrastructure on the campus where it will be operated. The system should operate with the existing camera feeds on the campus where it will be operated.

2.10 Security

Database has to be reached securely and its data should not be broken. It also should not change except manager updates. Moreover, since our dataset contains

some personal information, security design is important in the web service. Since the images of students are quite sensitive and involve personal privacy, the system aims to use this information in a safe way. The security of the system is separate to information interaction and information storage. The system must set expire session state for the user, for 5-minute inactivity. The system will encrypt the database to avoid data violation of students' images.

2.11 Usability

The scope of the product is widespread. The only requirement is using a website and downloading web applications. Besides, people from every age shall easily use the system. The usability non-functional requirements relate to how easy for users to learn about product's usage, and how effective they are at achieving tasks once they have understood it and how multiple errors they make when they use the product. Here are some aspect describing the usability requirements:

1. Understandability: The system shall be usable, and the interface must be sy to understand.
2. Efficiency: The system should be efficient for everyday use.
3. Learnability: The system shall be easy to learn for both trainees and qualified users of similar systems.

2.12 Product Perspective

To overcome this Scenario, we can design a face recognition-based attendance monitoring system for educational institutions to enhance and upgrade the current attendance system into more efficient and effective as compared to before. The proposed system is a software system which will mark attendance using facial recognition. In this project we used Open CV module integrated with Python which will help the institution to make the attendance process easy and efficient.

2.13 Product Functions

Face recognition is a biometric method of identifying an individual by comparing live capture or digital image data with the stored record for that person. Face recognition attendance system is a marking of attendance based on this technology. Face recognition attendance system makes use of facial recognition technology to identify and verify a person and mark attendance automatically. Face recognition systems have led to the advancement of multimedia information access. Also, implementing network access control via face recognition not only makes it virtually impossible for hackers to steal a user's password but also improves human-computer interaction. This is one of the reasons why facial recognition attendance systems are gaining popularity.

Chapter 3

System Design Specification

3.1 Haar Cascade Algorithm

The core basis for Haar classifier object detection is the Haar-like features. These features, rather than using the intensity values of a pixel, use the change in contrast values between adjacent rectangular groups of pixels. The contrast variances between the pixel groups are used to determine relative light and dark areas. Two or three adjacent groups with a relative contrast variance form a Haar-like feature. Haar-like features as shown in figure are used to detect an image.

Haarfeatures can easily be scaled by increasing or decreasing the size of the pixel group being examined. This allows features to be used to detect objects of various sizes. The cascading of the classifiers allows only the sub-images with the highest probability to be analyzed for all Haar-features that distinguish an object. It also allows one to vary the accuracy of a classifier. One can increase both the false alarm rate and positive hit rate by decreasing the number of stages. The inverse of this is also true.

Viola and Jones were able to achieve a 90 percent accuracy rate for the detection of a human face using only 100 simple features. Detecting human facial features, such as the mouth, eyes, and nose require that Haar classifier cascades first are trained. In order to train the classifiers, this gentle AdaBoost algorithm and Haar feature algorithms must be implemented.

Fortunately, Intel developed an open source library devoted to easing the implementation of computer vision related programs called Open Computer Vision Library (OpenCV). The OpenCV library is designed to be used in conjunction with

applications that pertain to the field of HCI, robotics, biometrics, image processing, and other areas where visualization is important and includes an implementation of Haar classifier detection and training.

Thus with help of this algorithm system will detect the person's face in the video. Face of the person gets Green Square as an indication of detection process. As soon as the face gets detected user can paused the video and enters the data of detected person such as person's name, address, profession, criminal record if any. If the detected person has criminal record then it can be defined as suspect. Check box option is given in the system where user can tick whether the person is suspect or not. This is the working of first module in which sample video is browsed and face is detected.

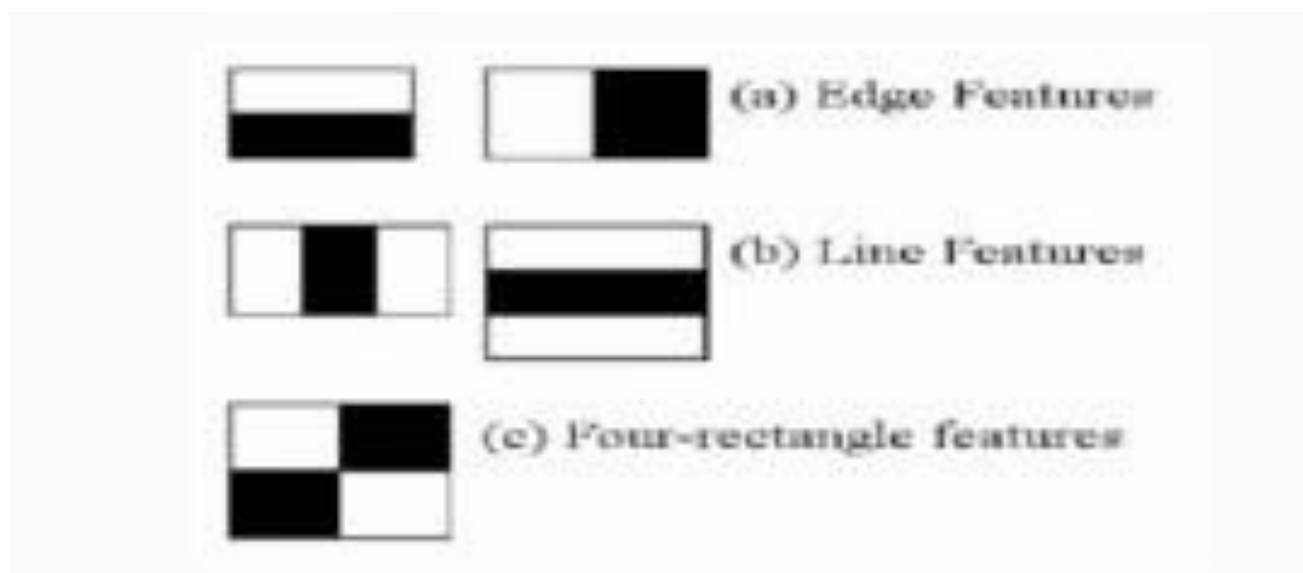


Figure 3.1: Haar Cascade Algorithm

3.2 Local Binary Pattern Histogram (LBPH):

Local Binary Pattern (LBP) is a simple yet very efficient texture operator which labels the pixels of an image by thresholding the neighborhood of each pixel and considers the result as a binary number. The first computational step of the LBPH is to create an intermediate image that describes the original image in a better way, by highlighting the facial characteristics. To do so, the algorithm uses a concept of a sliding window, based on the parameters radius and neighbors.

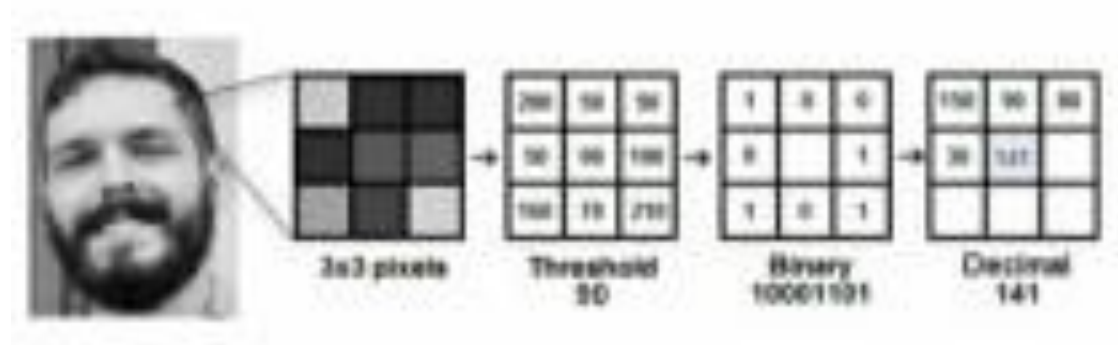


Figure 3.2: Local Binary Pattern Histogram (LBPH):

3.3 Performing the face recognition:

In this step, the algorithm is already trained. Each histogram created is used to represent each image from the training dataset. So, given an input image, we perform the steps again for this new image and creates a histogram which represents the image. So to find the image that matches the input image we just need to compare two histograms and return the image with the closest histogram.

So the algorithm output is the ID from the image with the closest histogram. The algorithm should also return the calculated distance, which can be used as a ‘confidence’ measurement. Note: don’t be fooled about the ‘confidence’ name, as lower confidences are better because it means the distance between the two histograms is closer. We can then use a threshold and the ‘confidence’ to automatically estimate if the algorithm has correctly recognized the image.

3.4 SQL Database

SQL database or relational database is a collection of highly structured tables, wherein each row reflects a data entity, and every column defines a specific information field. Relational databases are built using the structured query language (SQL) to create, store, update, and retrieve data.

SQL database server stores and organizes data in tables. In RDBMS, tables are fundamental database objects logically designed to collect data in rows and columns format. While rows reflect entities, columns define the attributes of each entity. For instance, in a customer data table, each row reflects a record for a specific customer, and each table column contains corresponding customer information, like the customer's name and address.

3.5 Class Diagram

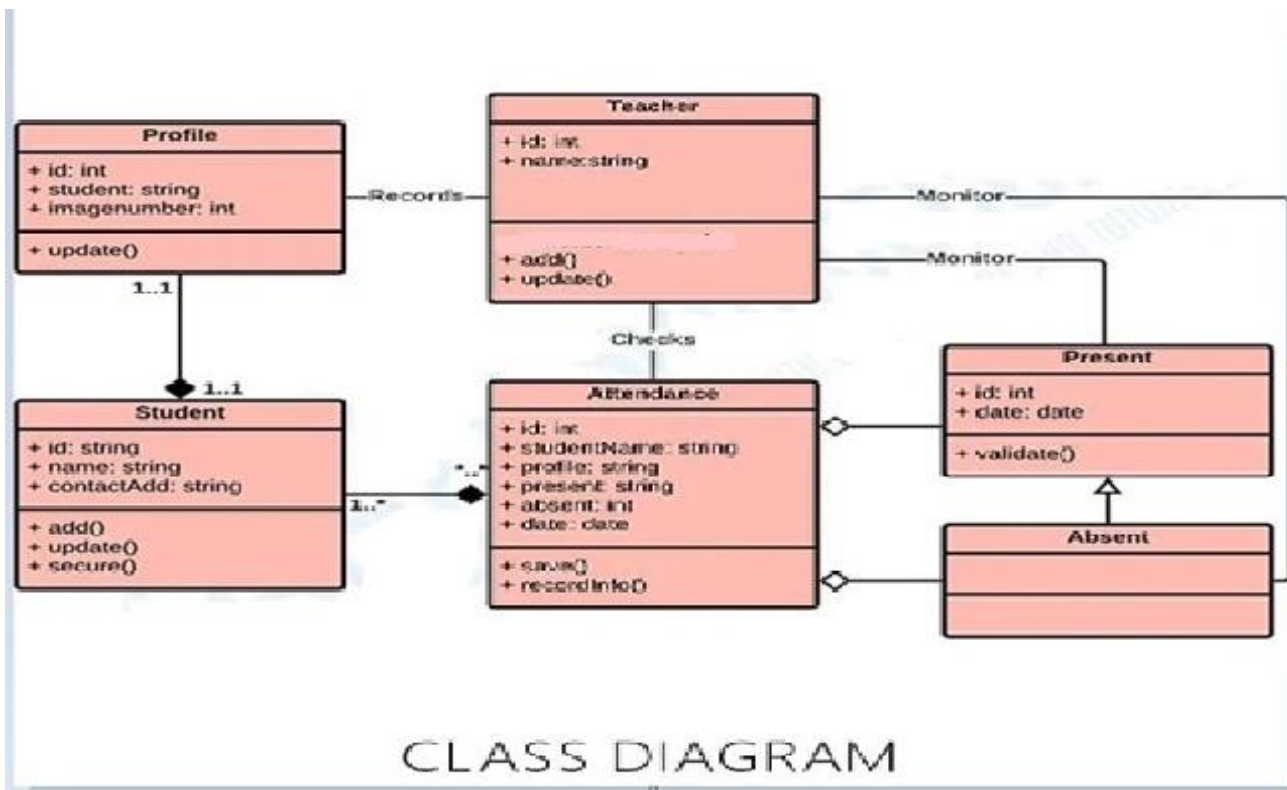


Figure 3.3: Class Diagram

3.6 Activity Diagram

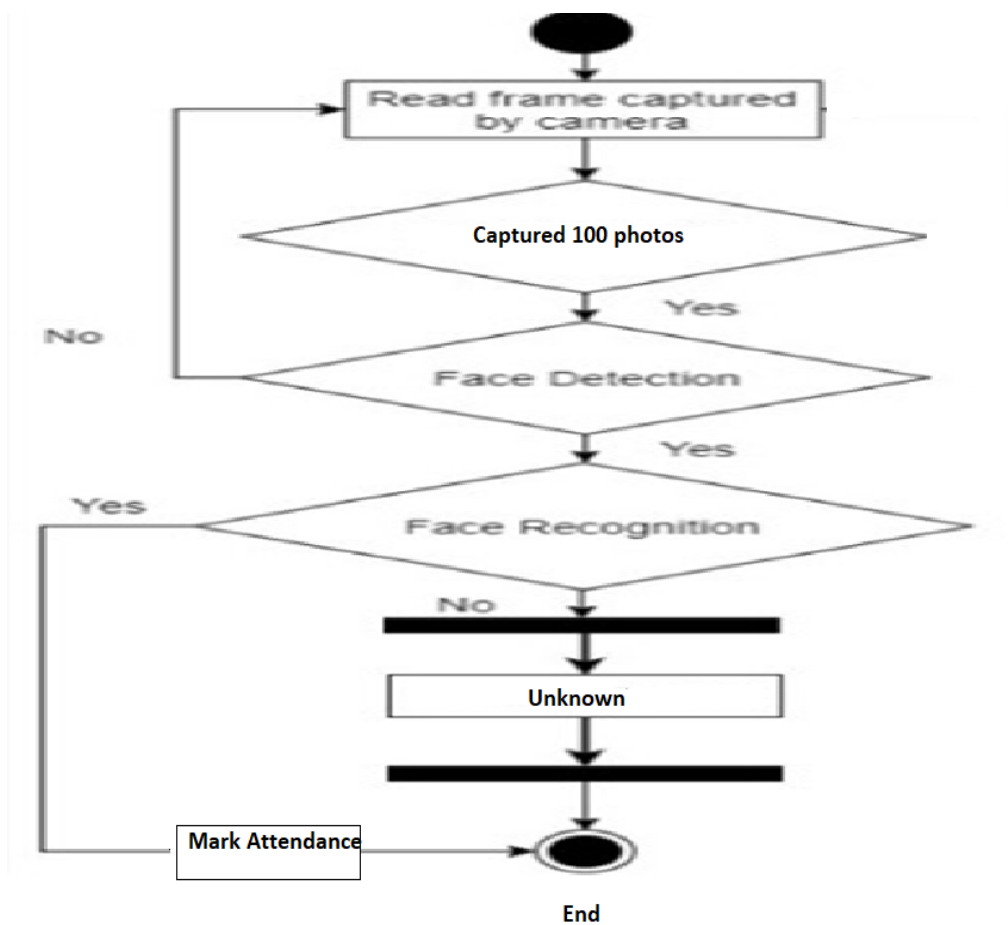


Figure 3.4: Activity Diagram

3.7 State Transition System

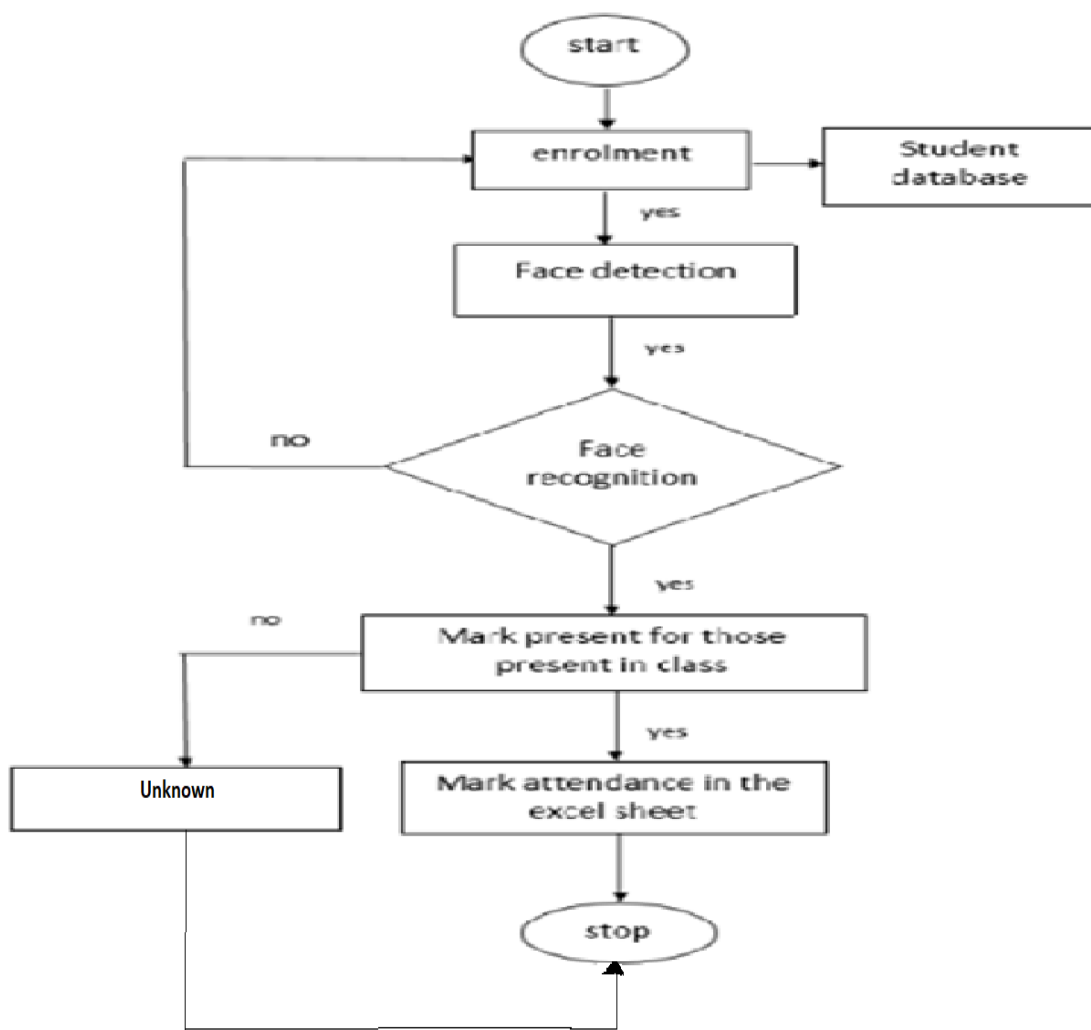


Figure 3.5: State Transition System

3.8 Sequence Diagram

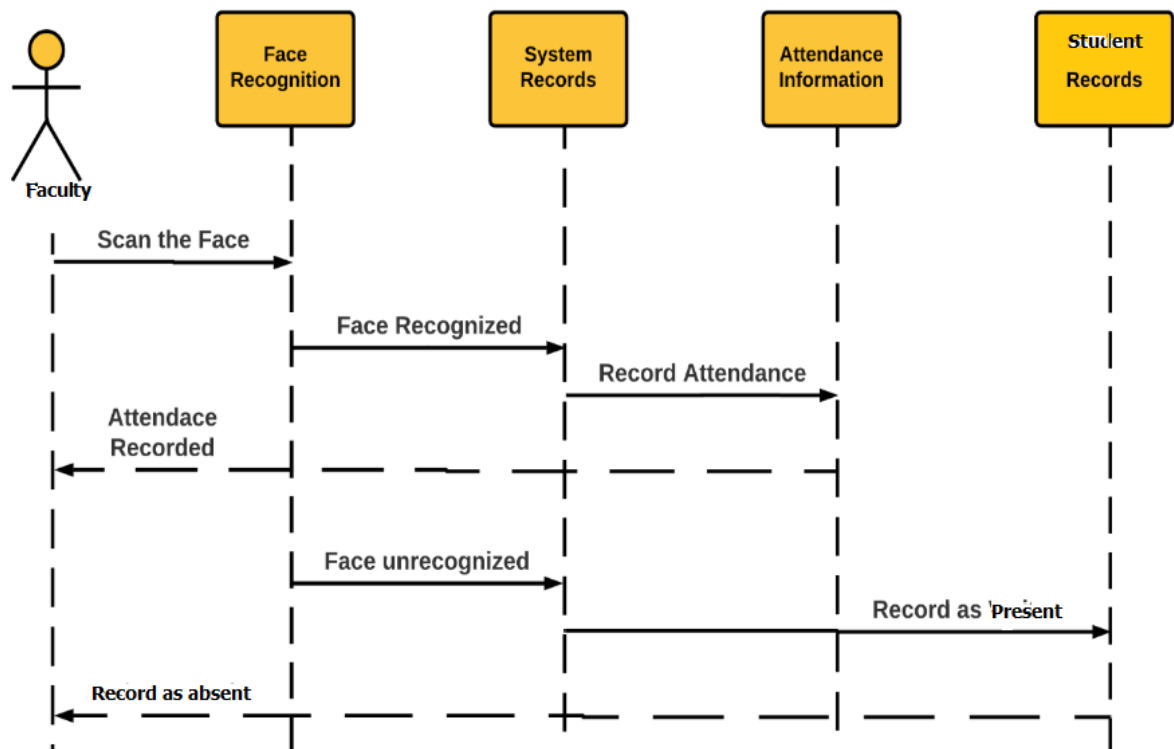


Figure 3.6: Sequence Diagram

3.9 Data Flow Diagram

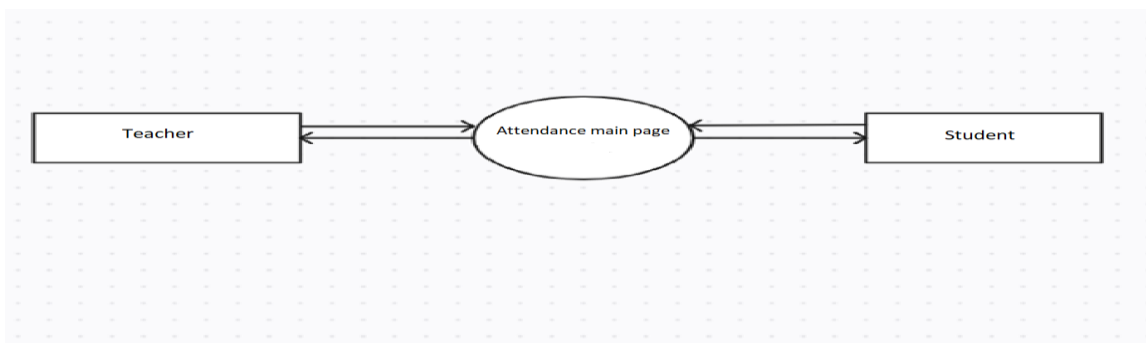


Figure 3.7: Level 0 Data Flow Diagram

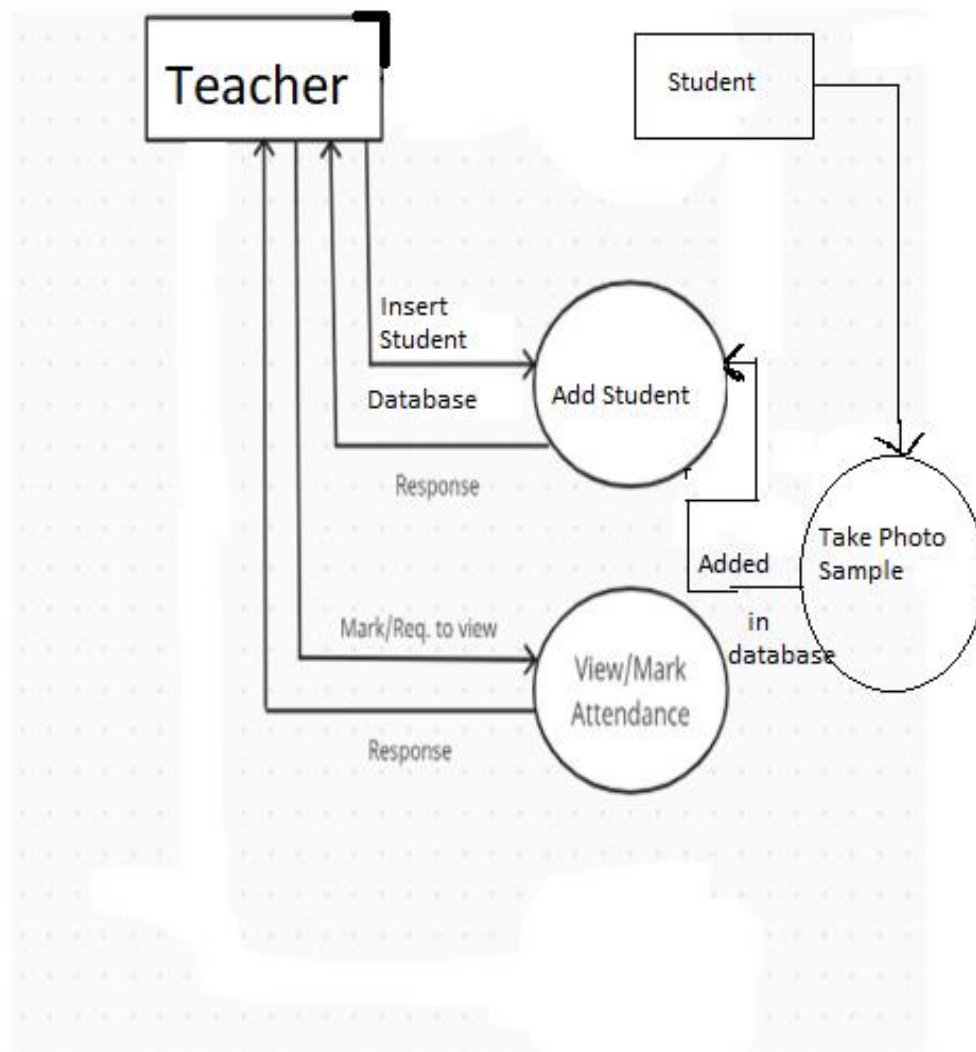


Figure 3.8: Level 1 Data Flow Diagram

Chapter 4

Methodology

Suppose we have a facial image in grayscale.

1. We can get part of this image as a window of 3x3 pixels.
2. It can also be represented as a 3x3 matrix containing the intensity of each pixel (0 255).
3. Then, we need to take the central value of the matrix to be used as the threshold.
4. This value will be used to define the new values from the 8 neighbors. For each neighbor of the central value (threshold), we set a new binary value. We set 1 for values equal or higher than the threshold and 0 for values lower than the threshold.

Chapter 5

Other Specifications

5.1 Advantages

- (a) It is trouble-free to use.
- (b) It is a relatively fast approach to enter attendance.
- (c) Is highly reliable, approximate result from user .
- (d) Best user Interface .
- (e) Can obtain accuracy upto 85 percent.

5.2 Limitations:

- (a) While training there generates nearly 100 of copies of sample image.
- (b) While dealing with high volume of data system required the powerful processor which is more costly

5.3 Applications:

- (a) It is very useful for educational institutes to get attendance easily.
- (b) We can get attendance of students as well as teachers without doing conventional attendance.

Chapter 6

Project Screen Shots



Figure 6.1: Image 1

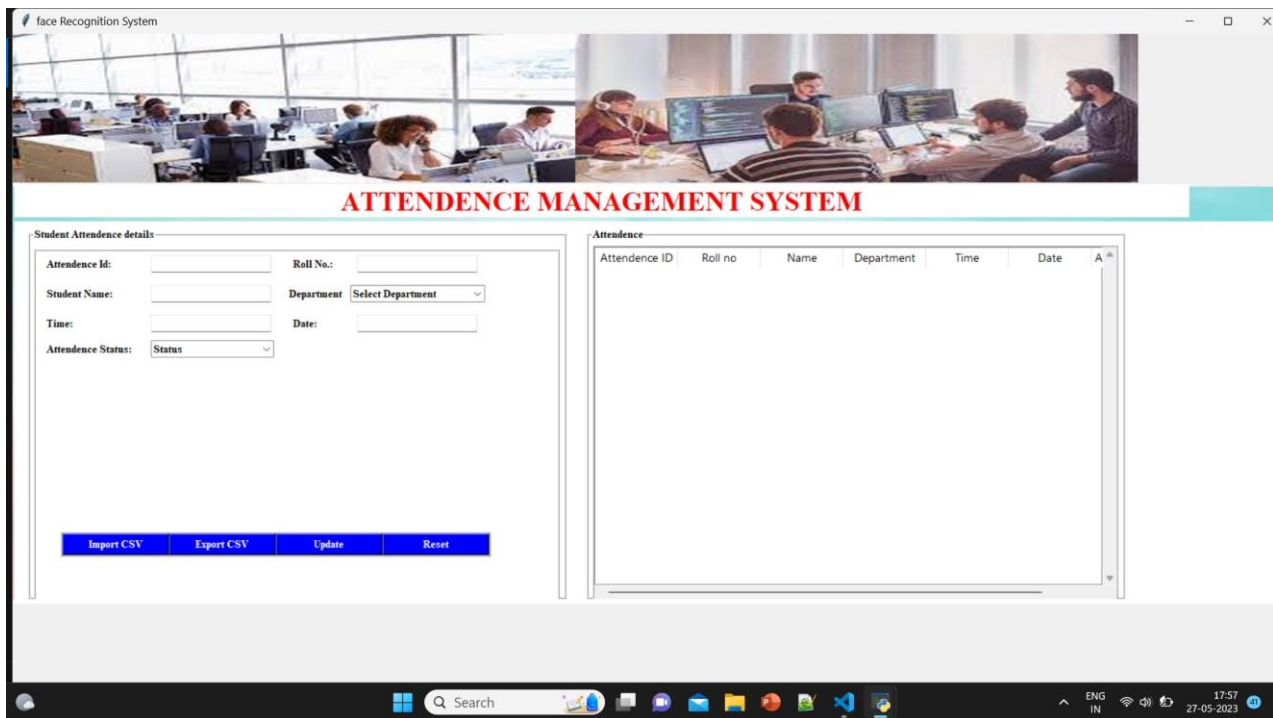


Figure 6.2: Image 2

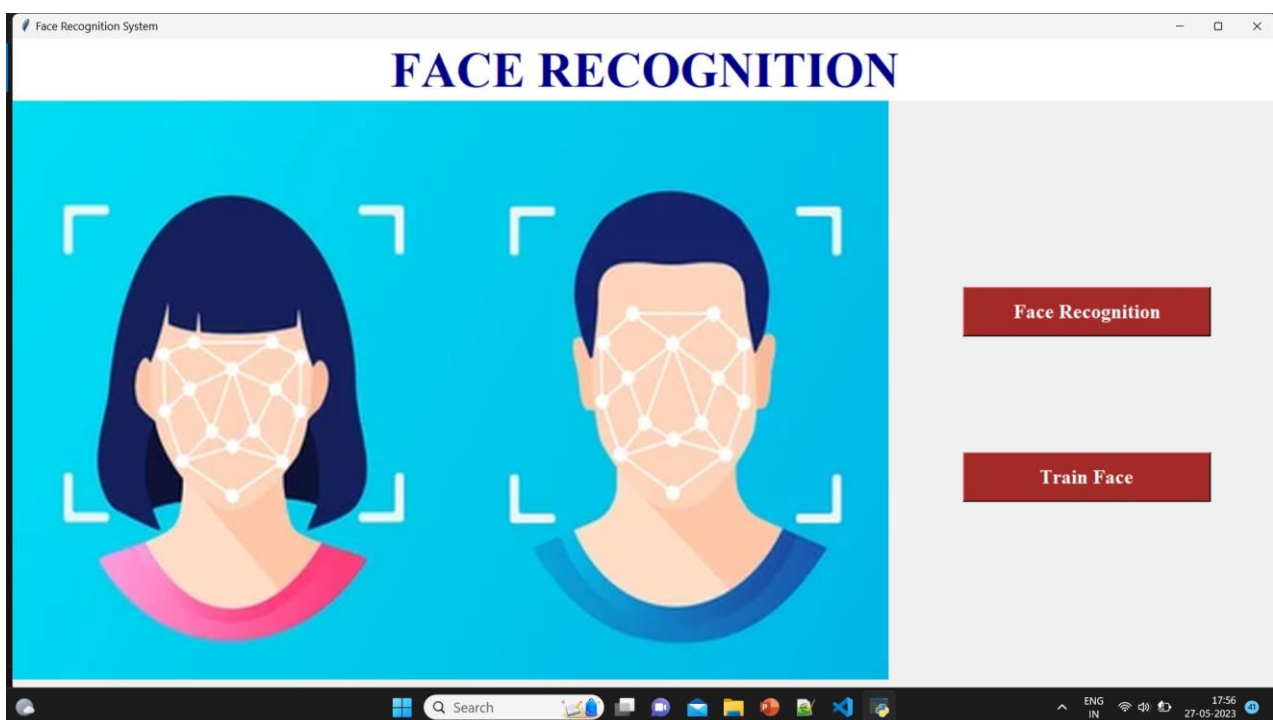


Figure 6.3: Image 3

face Recognition System

Student Registration

Register Yourself

Enter your details

Current course information

Department: Course:

Year: Semester:

Class student information

StudentID: Student Name:

Class Division: Roll No.:


Gender: DOB:

Email: Phone No.:

Address: Teacher Name:

☐ Take photo sample ☐ No photo sample

Student details



STUDENT INFORMATION

Department	Course	Year	Semester	StudentId	Name	Division
IT	AI	2019-20	Semester 1	1	Atishay	A

Figure 6.4: Image 4

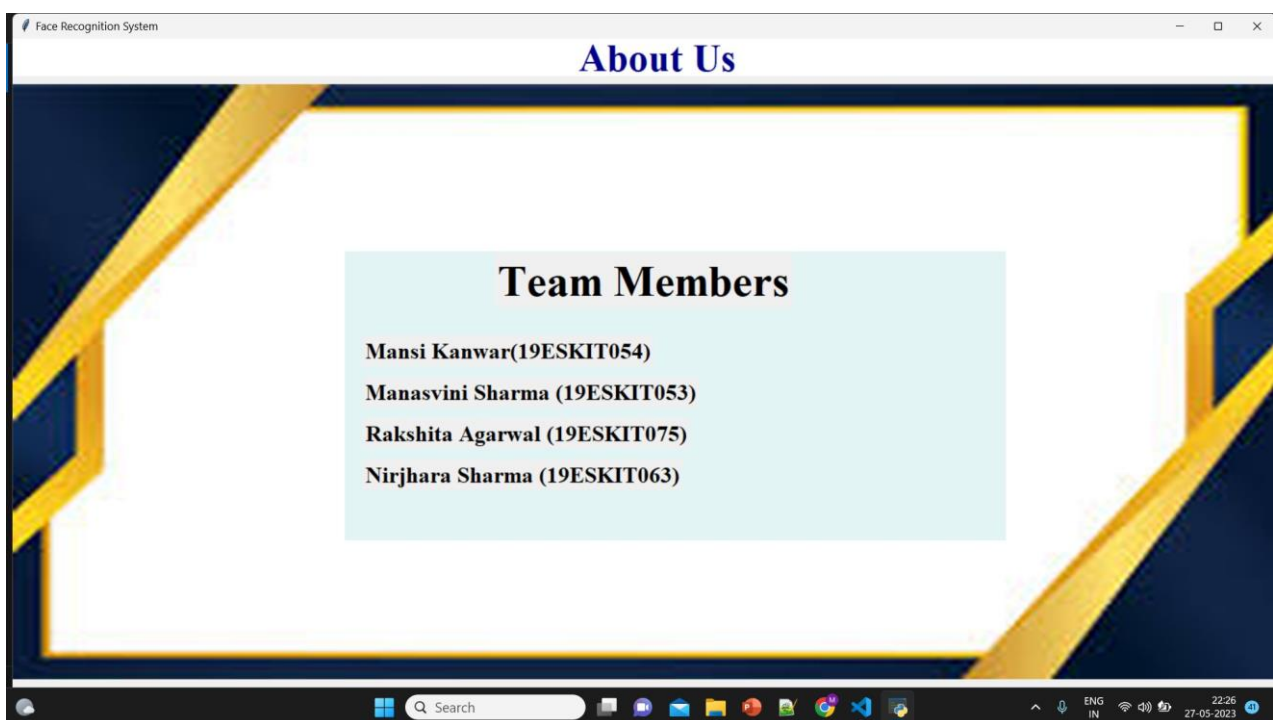


Figure 6.5: Image 5

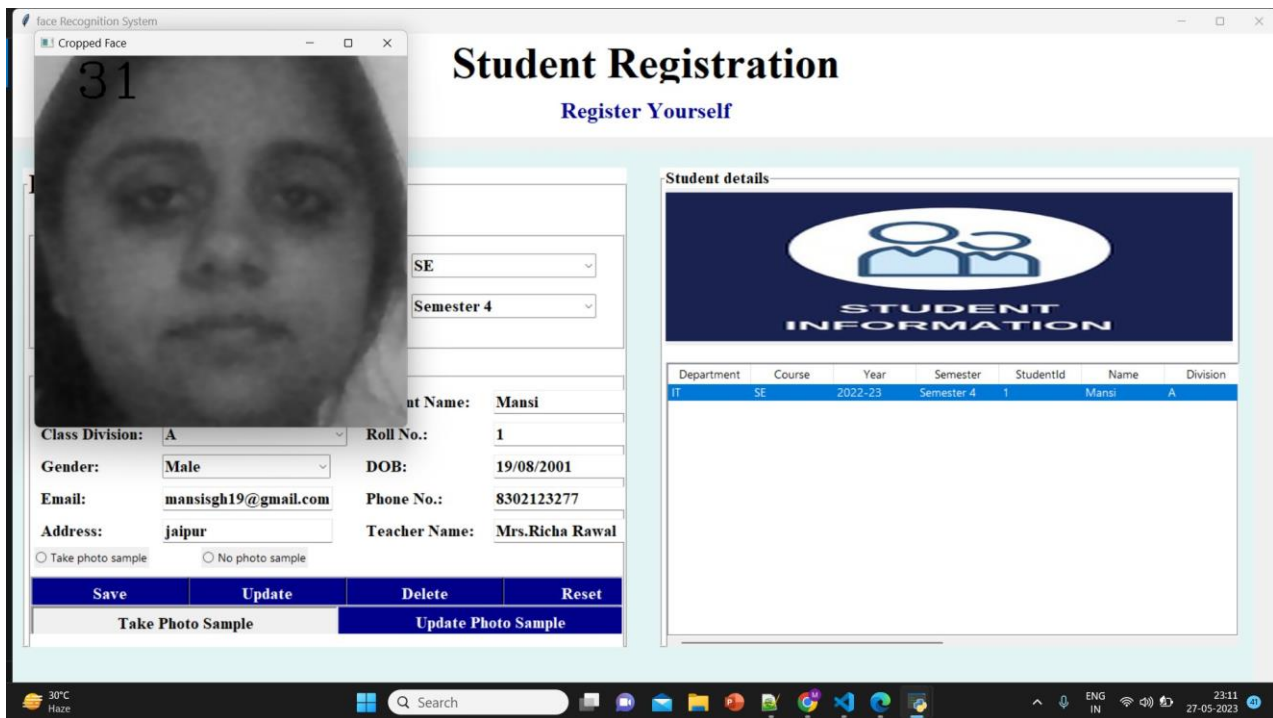


Figure 6.6: Image 6

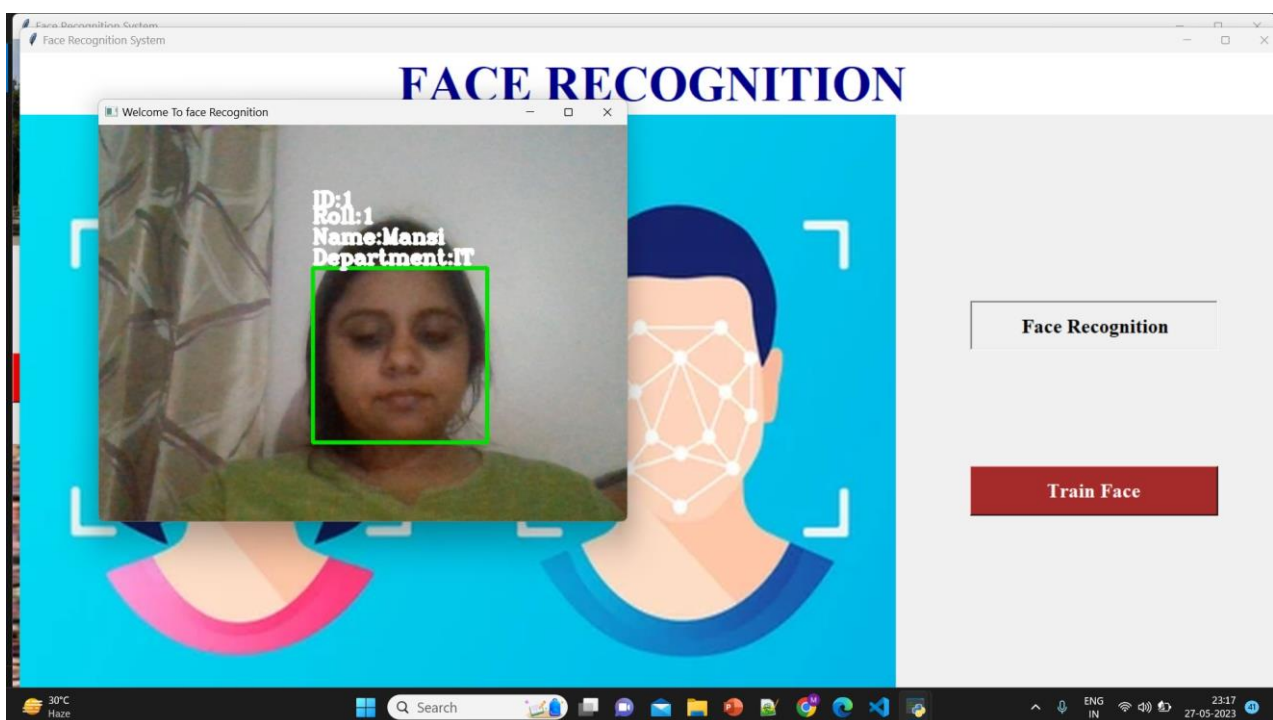


Figure 6.7: Image 7

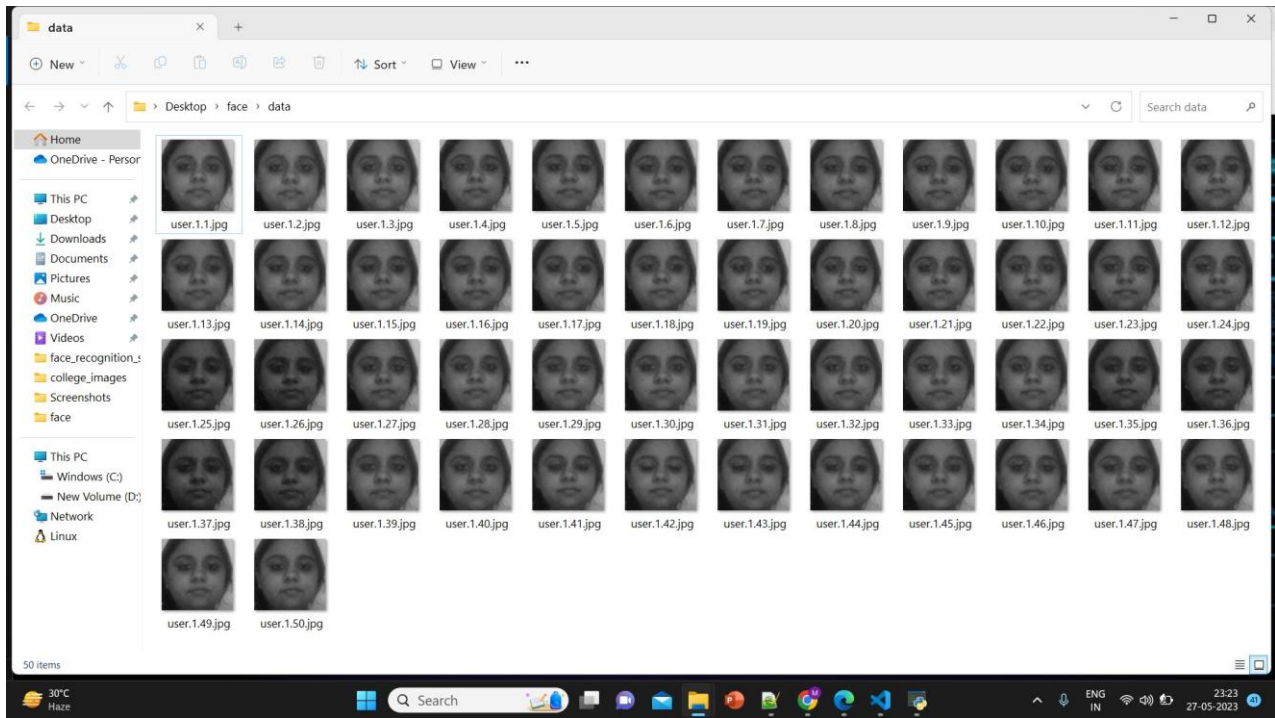


Figure 6.8: Image 8

Chapter 7

Project Conclusion

The Attendance Management System is developed using Machine Learning meets the objectives of the system which it has been developed. The system has reached a steady state where all bugs have been eliminated. The system is operated at a high level of efficiency. The system solves the problem. It was intended to solve as requirement specification. The system can recognize and identify the face well with an accuracy of 85 percentage, at a face distance 40cm from the camera with adequate lighting. Hence it is concluded that the project is efficient in solving the intended problem.

Chapter 8

Future Scope

- Attendance monitoring system will save a lot of time and energy for the both parties students as well as the class teachers. Attendance will be monitored by the face recognition algorithm by recognizing only the face of the students from the rest of the objects and then marking them as present.
- The system will be pre feed with the images of all the students and with the help of this pre feed data the algorithm will detect them who are present and match the features with the already saved images of them present in the database.
- It is very useful for educational institutes to get attendance easily. We can get attendance of students as well as teachers without doing conventional attendance

References

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