"AI BASED ATTENDANCE REGISTRATION SYSTEM"

A

Project Report

submitted

in partial fulfillment

for the award of the Degree of

Bachelor of Technology

in Department of Information Technology

Project Mentor:
Mrs. Shalini Singhal
Associate Professor

Submitted By :
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Department of Information Technology
Swami Keshvanand Institute of Technology, M & G, Jaipur
Rajasthan Technical University, Kota

Session 2022-2023

Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur

Department of Information Technology

CERTIFICATE

This is to certify that **Mr. Akshaj Agarwal**, a student of B.Tech (Information Technology) VIII semester has submitted his Project Report entitled **"AI based Attendance Registration System"** under my guidance.

Mentor

Mrs. Shalini Singhal

Associate Professor

Signature.....

Coordinator

Mrs. Sanju Choudhary

Associate Professor

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Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur

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CERTIFICATE

This is to certify that **Mr. Aman Jain**, a student of B.Tech (Information Technology) VIII semester has submitted his Project Report entitled **"AI based Attendance Registration System"** under my guidance.

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CERTIFICATE

This is to certify that **Mr. Bhavya Mathur**, a student of B.Tech (Information Technology) VIII semester has submitted his Project Report entitled **"AI Based Attendance Registration System"** under my guidance.

Mentor

Mrs. Shalini Singhal

Associate Professor

Signature.....

Coordinator

Mrs. Sanju Choudhary

Associate Professor

Signature.....

DECLARATION

We hereby declare that the report of the project entitled "AI based Attendance Registration 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 Mrs. Shalini Singhal (Dept. of Information Technology) and coordination of Mrs. 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 **Signature**

Akshaj Agarwal (19ESKIT005)

Aman Jain (19ESKIT007)

Aman Porwal (19ESKIT008)

Bhavya Mathur (19ESKIT021)

Acknowledgement

A project of such a vast coverage cannot be realized without help from numerous sources and people in the organization.We take this opportunity to express our gratitude to all those who have been helping us in making this project successful.

We are highly indebted to our faculty mentor Mrs. Shalini Singhal .She has been a guide, motivator source of inspiration for us to carry out the necessary proceedings for the project to be completed successfully. We also thank our project coordinator Mrs. Sanju Choudhary for her co-operation, encouragement, valuable suggestions and critical remarks that galvanized our efforts in the right direction.

We would also like to convey our sincere thanks to Prof. Dr. Anil Choudhary, HOD, Department of Information Technology, for facilitating, motivating and supporting us during each phase of development of the project.Also, we pay our sincere gratitude to all the Faculty Members of Swami Keshvanand Institute of Technology, Management and Gramothan, Jaipur and all our Colleagues for their co-operation and support.

Last but not least we would like to thank all those who have directly or indirectly helped and cooperated in accomplishing this project.

Team Members:

Akshaj Agarwal (19ESKIT005)

Aman Jain (19ESKIT007)

Aman Porwal (19ESKIT008)

Bhavya Mathur (19ESKIT021)

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Chapter 1
Introduction

1.1 Problem Statement and Objective

The academic achievement of many students has declined due to the lack of parental involvement and time constraints. Parents often find it difficult to come to school and stay updated on their children's progress. Headmasters and teachers face challenges during the start of each academic year, such as the distribution process for courses and classes. Another issue they encounter is the complexity of entering grades for students at the end of the year. Additionally, there is a lack of communication between headmasters, teachers, parents, and students after school, which negatively impacts the educational process.

The objective of this project is to develop an AI-based attendance registration system that addresses these challenges and facilitates various school activities. The specific goals of the system include:

- Building a responsive website to manage different school activities.
- Tracking students' grades and providing access to parents.
- Streamlining the distribution process of courses and classes for teachers.
- Simplifying the grades entry process for students by teachers.

1.2 Literature Survey /Market Survey/Investigation and Analysis

Extensive research and analysis have been conducted to understand the challenges faced by students, parents, headmasters, and teachers in the education system. The

decline in academic achievement due to lack of parental involvement and communication issues has been identified as a key problem. This project aims to address these issues through the development of an AI-based attendance registration system.

1.3 Introduction to Project

The quality of school education plays a crucial role in shaping the future citizens of a country. A good school should stimulate students' interest, curiosity, and provide necessary facilities for headmasters, teachers, and parents to achieve better and easier educational methods for students.

1.4 Proposed Logic / Algorithm / Business Plan / Solution / Device

In order to improve the educational process and address the challenges mentioned earlier, a responsive website will be developed as a major tool for managing school activities. The website will enable students to track their grades, communicate with headmasters and teachers, and stay updated with school news and announcements. Headmasters will have full control over the system and can manage parents, teachers, and students along with their respective subjects. Teachers can enter and edit students' grades, as well as communicate directly with students and parents. Parents will have access to their children's grades and can communicate with teachers and headmasters.

The project will be implemented using the following technologies:

- HTML: Page layout design
- CSS: Styling and design
- JavaScript: Validation tasks and animations
- Python: Business logic implementation
- Flask: Web framework for development

1.5 Scope of the Project

The scope of this project is to provide an easy-to-use system for students and parents to access and track grades. However, certain obstacles may hinder the achievement of project goals. These obstacles include resistance from teachers and headmasters due to their limited knowledge of technology or their preference for traditional paper-based methods. Some parents may also resist the system due to similar reasons. Efforts will be made to address these concerns and ensure widespread acceptance and adoption of the system.

Chapter 2
Software Requirement Specification

2.1 Overall Description

This chapter provides an overview of the AI based registratin system and its features for management, teachers, students, and parents. It also reviews related works in the field of organization information management.

AI based registratin is a comprehensive organization information management solution that addresses the need for efficient data management in organizations. It offers various functionalities to improve communication, simplify administrative tasks, and optimize the use of organization resources. The system is web-based and serves students, teachers, headmasters, and parents. To remain competitive, organization needs a simple solution that can run individual function, connect their entire operation, use the web as a key communication tool and simplify day to day operational responsibilities, giving staff more time with stu-dents. AI based registratin automates various scheduling activities of organization and optimizes the use of premium resources. Concerned authorities can now easily and seamlessly use the system to create timetables, otherwise a time consuming and tedious task.

2.1.1 Product Perspective

2.1.1.1 System Interfaces

AI based registration is a web based system that serving Students, Teach-ers, Headmasters and Parents, the main idea of our system is to allow the students to be up to date with the organization activities and with their grades, and the same thing for their parents in addition to be in touch permanently with the teachers and the headmaster for any complaint, recommendation or anything that related to their students. And for teachers it consider as an easy way to manage their job's day, to be in touch

with students and to enter their grades or anything they want to send it or view it to the students. And for the headmasters, they have a full control of the system, and like the teachers, it will be a great tool to manage their days and plans for the organization, also they will be in a permanent connection with all the other users which will be a wonderful virtual educational social community that definitely will improve the student's performance and education, and make the organization for them really as they second's home.

2.1.1.2 User Interfaces

There is a main home page where a user can be registered through their face and the name has to be entered. The data will stored in the database locally with their name identified in the database. The data then has to be identified by the model while placing attendance on the main home page.

- Register
- Place Attendance

2.1.1.3 Hardware Interfaces

This is a web application works on any modern browser

2.1.1.4 Software Interfaces

We can configure this project on following operating system.

- Windows : This project can easily be configured on windows operating system. For running this project on Windows system, you will have to install
- Python 3.8, PIP, Flask.
- Linux : We can run this project also on all versions of Linux operating system

2.1.1.5 Communications Interfaces

The communication architecture must follow the client-server model. Communication between the client and server should utilize a REST-compliant web service and must be served over HTTP . The client-server communication must be stateless.

2.1.1.6 Memory Constraints

- Memory: 4 GB RAM.
- Graphics: 4GB GRAPHICS
- Storage: 3 GB available space.

2.1.1.7 Operations

None

2.1.1.8 Project Functions

AI Registration is a complete tool for information management solution. Today's registration systems need to manage more information than ever before. Without a solid internal infrastructure for people to share data, critical information can be lost, or worse leading to a host of problems that can effect the image and endurance. To remain competitive, we need a simple solution that can run individual function, connect their entire operation, use the web as a key communication tool and simplify day to day operational responsibilities, giving people more time with other stuff. AI Registration automates various scheduling activities and optimizes the use of premium resources. Concerned authorities can now easily and seamlessly use the system to create data, otherwise a time consuming and tedious task.

AI attendance Registration for Management

- Single points organization management software- Manage multiple campuses.
- Enable internet front-end for the Organisation.
- Connect with Employees and other stakeholders effectively
- Build and Manage community of Employee, Director, Staff
- Manages all administrative records with zero redundancy- Achieve best possible
- Resource optimization

2.1.1.9 User Characteristics

The system have a friendly user interface and the system very inter-active

2.1.1.10 Assumption and Dependencies

User needs to put correct data or else it will behave abnormally

Chapter 3
System Design Specification

3.1 System Architecture

The AI-based Attendance Registration System is a web-based application designed to serve students, teachers, and headmasters. The main objective of the system is to enable students to stay updated with school activities, grades, and facilitate communication between all stakeholders. The system will provide a platform for teachers to manage their tasks, enter grades, and interact with students and parents. Headmasters will have full control over the system, allowing them to manage the school and stay connected with all users. The system aims to create a virtual educational community that enhances student performance and fosters a sense of belonging. Before developing the website or mobile app, it is essential to visualize the layout, design, and features to be incorporated. This includes considering user interactions, page design, and system performance. The requirements are the necessary attributes that add value and utility to the system. These requirements are divided into functional and non-functional requirements. Functional requirements are user-visible features initiated by stakeholders, such as generating reports, login functionality, and signup. Non-functional requirements describe how the system will perform, including security, reliability, and maintainability are the necessary attributes in the system, a statement that identifies a capability, characteristic or quality factor of the system in order to have value and utility to the users. Once the requirements are set de-velopers can initiate the other technical work including system design, development, testing, implementation, and operation. For any system, there are functional and non–functional requirements to be considered while determining the requirements of the system. The functional re-quirements are user "visible" features that are typically initiated by stakeholders of the system, such as generate report, login, and signup. On the other hand, nonfunctional requirements are requirements that describe how

the system will do what it is supposed to do, for example, security, reliability and maintainability.

3.2 Module Decomposition Description

Admin

- Create, edit and delete student account.- Create, edit and delete teacher account.
- Create, edit and delete parent account.
- Post tasks or any updates for users (Teacher, Student, and Parent).
- Store, edit, delete, calculate and print student's grade.
- Add Classes and Subject and connect them with the subject's teacher.

User

- Enter Student's grades per Subject.
- Contact with students and parents.
- Post tasks or any updates for users (Admin, Student, and Parent).

3.3 High Level Design Diagrams

3.3.1 Use Case Diagram

This part contains the analysis of the functional and non-functional requirements using use case diagrams, and use-cases details.

1. Admin

The functions that Admin can do after login, as shown in fig

- Add Teacher include (Modify/Delete).
- Add Student include (Modify/Delete).

- Add Parent include (Modify/Delete).
- Add Class include (Modify/Delete).

2. Student

The functions that Student can do after login, function as shown in fig

- View Personal Information.
- View Courses Marks.
- View Personal Details.
- Contact with user and Admin

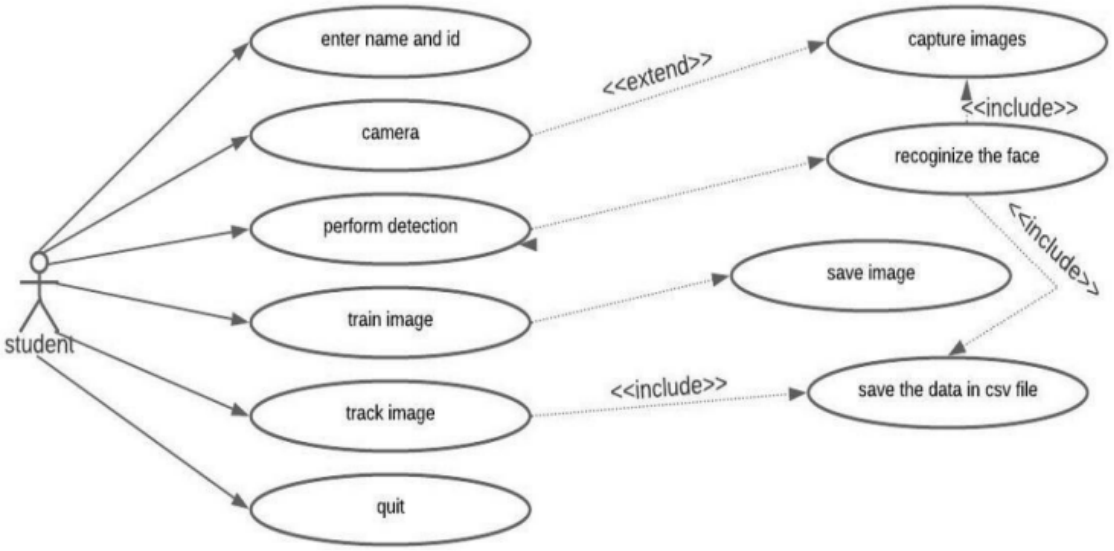


Figure 3.1: Use Case diagram

3.3.2 Activity Diagram

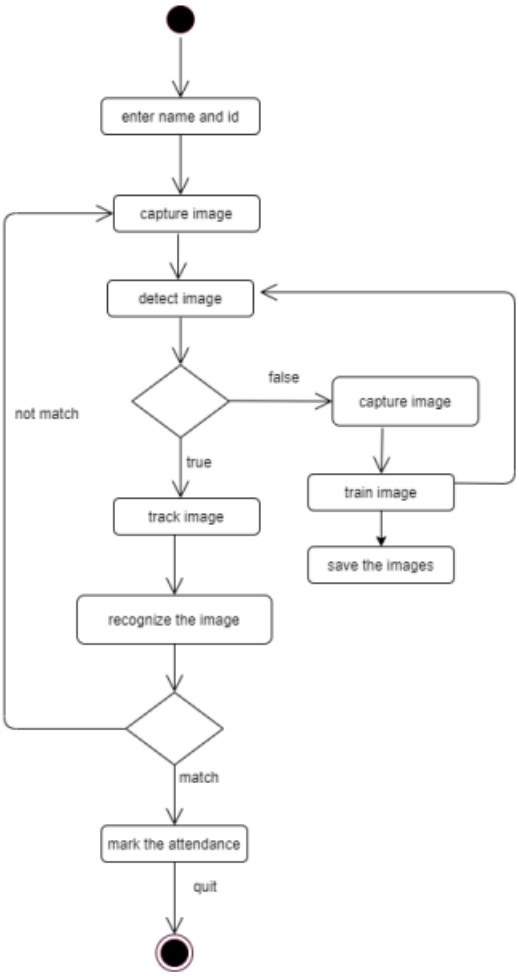


Figure 3.2: Activity Diagram

3.3.3 Class Diagram

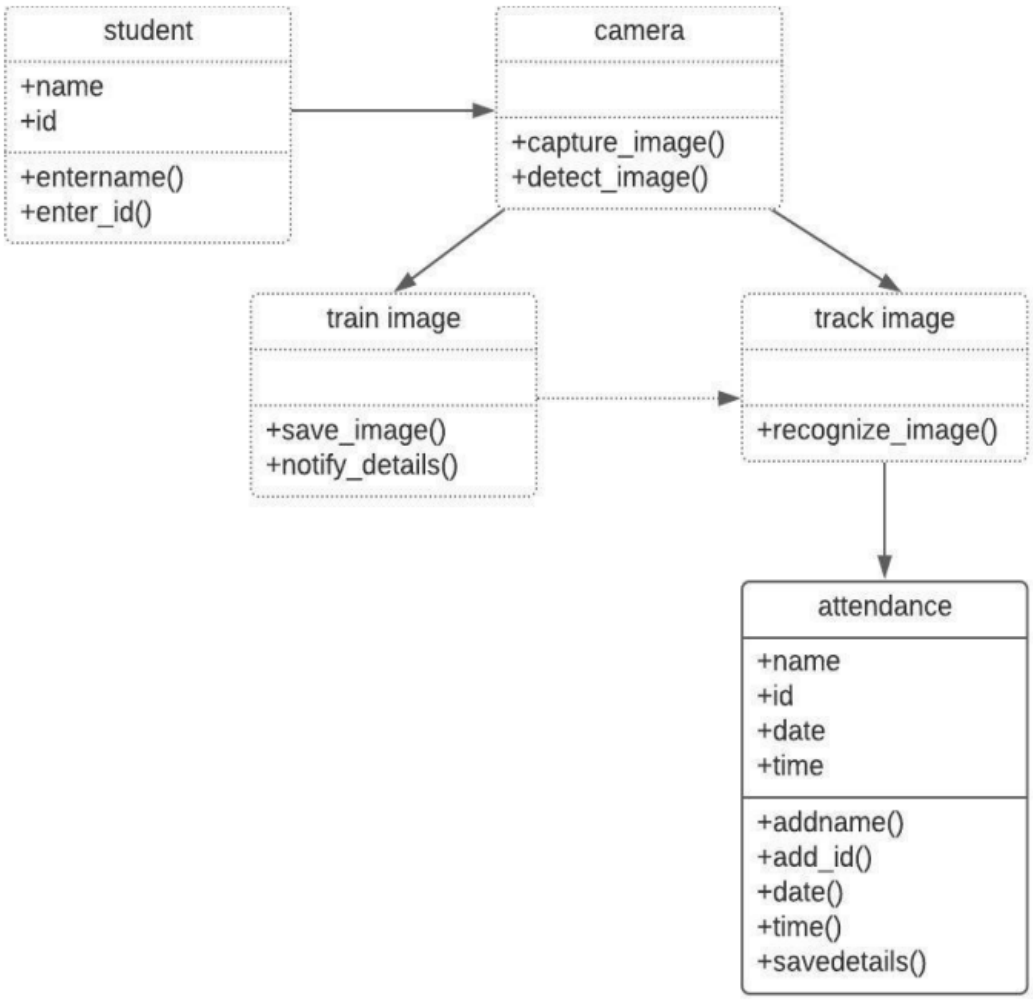


Figure 3.3: Class Diagram

3.3.4 Sequence Diagram

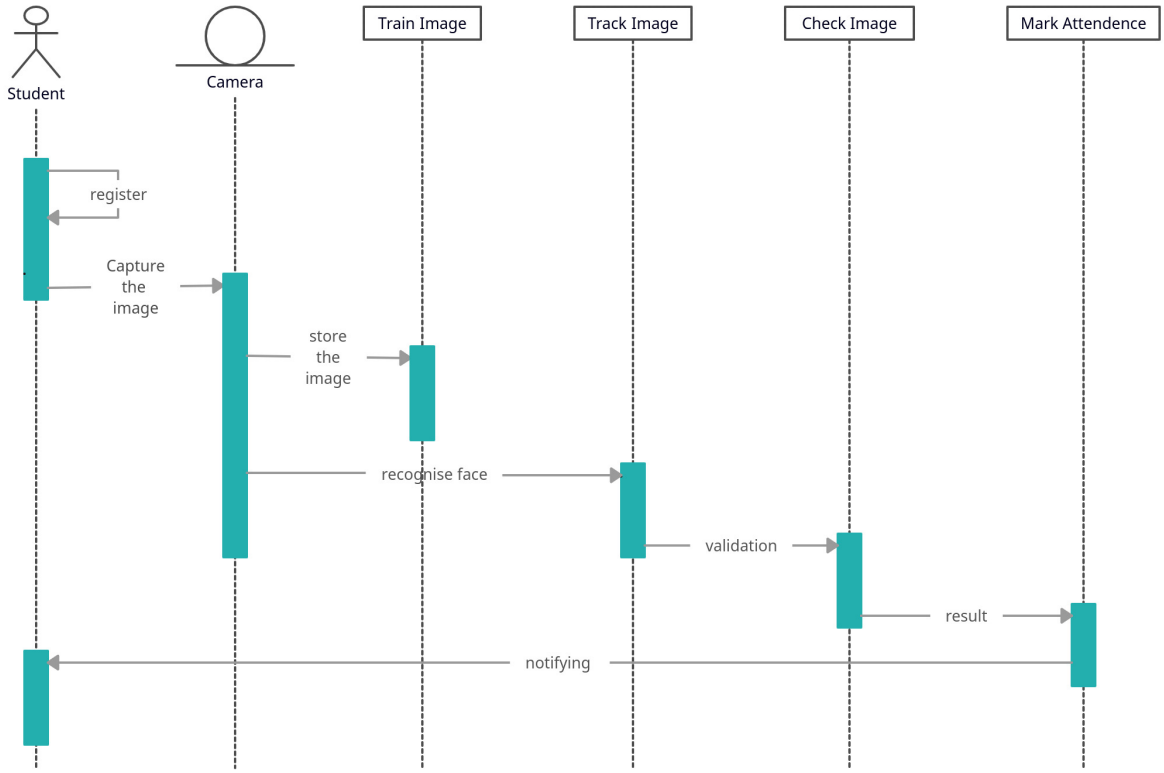


Figure 3.4: Sequence Diagram

3.3.5 Data flow Diagram

Figure 3.5: Data flow Diagram

3.3.6 Entity Relationship Diagram

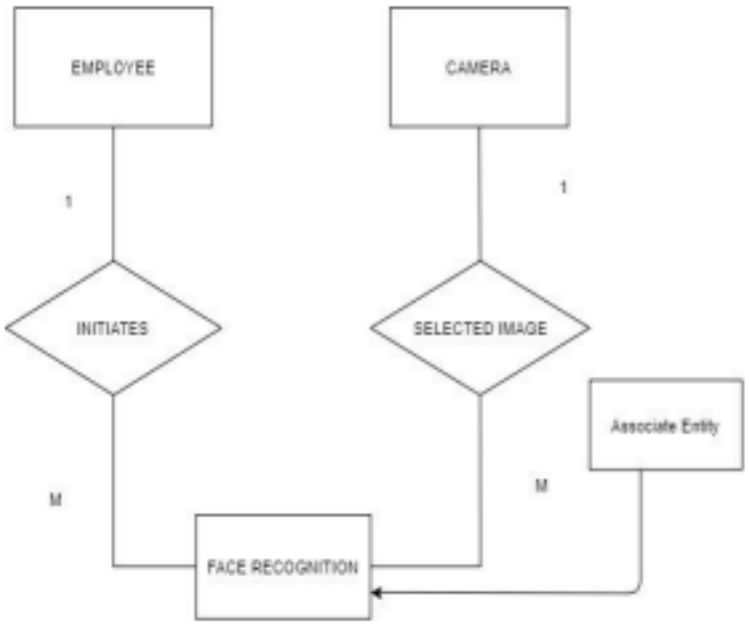


Figure 3.6: Entity Relationship Diagram

Chapter 4

Methodology and Team

4.1 Introduction to Waterfall Framework

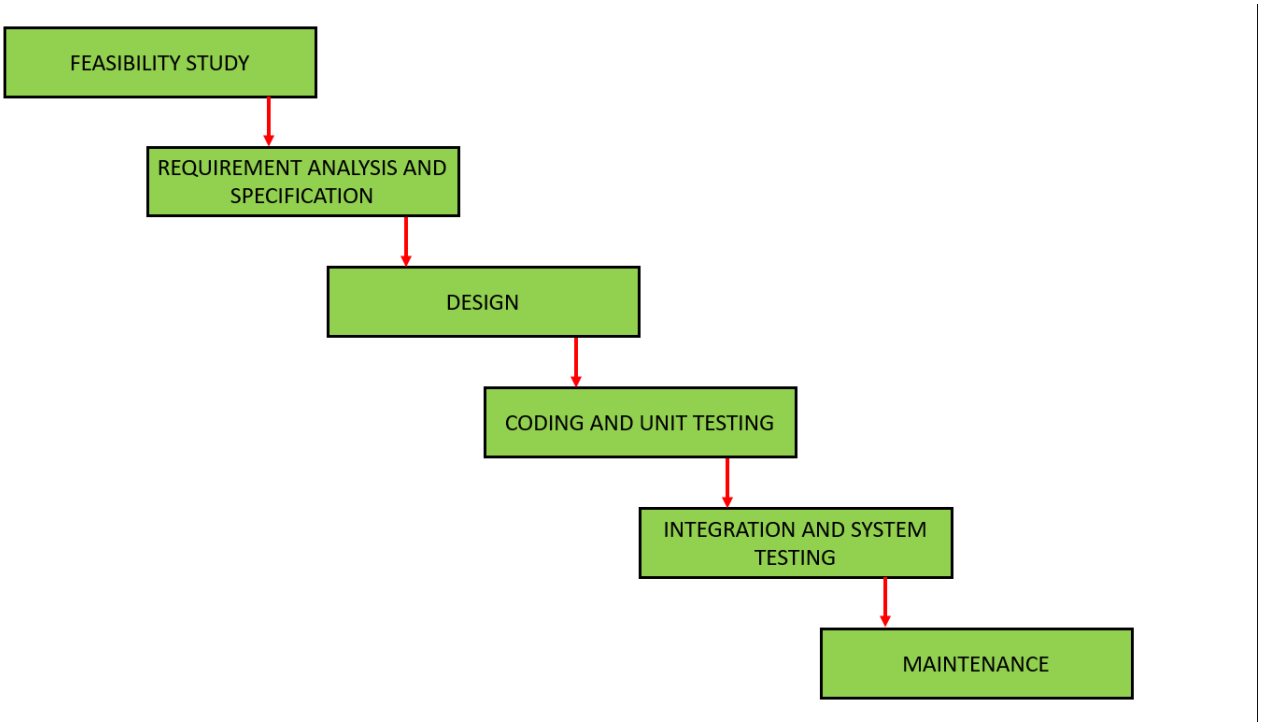


Figure 4.1: WaterFall model

The Waterfall Model was first Process Model to be introduced. It is also referred to as a linear-sequential life cycle model. It is very simple to understand and use. In a waterfall model, each phase must be completed before the next phase can begin and there is no overlapping in the phases. The waterfall Model illustrates the software development process in a linear sequential flow; hence it is also referred to as a linear-sequential life cycle model. This means that any phase in the development process begins only if the previous phase is complete. In waterfall model phases do not overlap. In ”The Waterfall” approach, the whole process of software development is divided into separate phases. In Waterfall model, typically, the outcome of one phase acts as an input for the next phase sequentially. Following is a

diagrammatic representation of different phases of waterfall model.

The sequential phases in Waterfall model are-

1. **Requirement Gathering and analysis:** All possible requirements of the system to be developed are captured in this phase and documented in a requirement specification doc.
2. **System Design:** The requirement specifications from first phase are studied in this phase and system design is prepared. System Design helps in specifying hardware and system requirements and also helps in defining overall system architecture.
3. **Implementation:** With inputs from system design, the system is first developed in small programs called units, which are integrated in the next phase. Each unit is developed and tested for its functionality which is referred to as Unit Testing.
4. **Integration and Testing:** All the units developed in the implementation phase are integrated into a system after testing of each unit. Post integration the entire system is tested for any faults and failures.
5. **Deployment of system:** All the units developed in the implementation phase are integrated into a system after testing of each unit. Post integration the entire system is tested for any faults and failures.
6. **Maintenance:** All the units developed in the implementation phase are integrated into a system after testing of each unit. Post integration the entire system is tested for any faults and failures.

All these phases are cascaded to each other in which progress is seen as flowing steadily downwards (like a waterfall) through the phases. The next phase is started only after the defined set of goals are achieved for previous phase and it is signed off, so the name ”Waterfall Model”. In this model phases do not overlap.

Waterfall Model Pros & Cons

Advantage The advantage of waterfall development is that it allows for departmentalization and control. A schedule can be set with deadlines for each stage of development and a product can proceed through the development process model phases one by one. Development moves from concept, through design, implementation, testing, installation, troubleshooting, and ends up at operation and maintenance. Each phase of development proceeds in strict order.

Disadvantage The disadvantage of waterfall development is that it does not allow for much reflection or revision. Once an application is in the testing stage, it is very difficult to go back and change something that was not well-documented or thought upon in the concept stage.

4.2 Team Members, Roles & Responsibilities

1. **Akshaj Agarwal (19ESKIT005)** - Developed Front-End components, Created login, registration and Documentation.
2. **Aman Jain (19ESKIT007)** - Developed Front-End components, Created login, registration and Documentation.
3. **Aman Porwal (19ESKIT008)** - Design Back-End part, registration of user, marking attendance, routes, maintaining records and Documentation.
4. **Bhavya Mathur (19ESKIT021)** - Design Back-End part, registration of user, marking attendance, routes, maintaining records and Documentation.

Chapter 5
Centering System Testing

The designed system has been testing through following test parameters.

5.1 Functionality Testing

In testing the functionality of the web sites the following features were tested:

1. Links
   (a) Internal Links: All internal links of the website were checked by clicking each link individually and providing the appropriate input to reach the other links within.
   (b) External Links: Till now no external links are provided on our website but for future enhancement we will provide the links to the candidate's actual profile available online and link up with the elections updates online etc.
   (c) Broken Links : Broken links are those links which so not divert the page to specific page or any page at all. By testing the links on our website, there was no link found on clicking which we did not find any page.
2. Forms
   (a) Error message for wrong input : Error messages have been displayed as and when we enter the wrong details (eg. Dates), and when we do not enter any details in the mandatory fields. For example: when we enter wrong password we get error message for acknowledging us that we have entered it wrong and when we do not enter the username and/or password we get the messages displaying the respective errors.
   (b) Optional and Mandatory fields : All the mandatory fields have been marked with a red asterisk (*) and apart from that there is a display of error messages when we do not enter the mandatory fields. For example: As the first

name is a compulsory field in all our forms so when we do not enter that in our form and submit the form we get an error message asking for us to enter details in that particular field.

3. Database Testing is done on the database connectivity.

5.2 Performance Testing

Performance Testing is a software testing process used for testing the speed, response time, stability, reliability, scalability, and resource usage of a software application under a particular workload. The main purpose of performance testing is to identify and eliminate the performance bottlenecks in the software application. It is a subset of performance engineering and is also known as "Perf Testing" giving each rule a weigh, and then evaluate the score of each rule for the website

1. Functionality Testing : All functions in the application, database connection, forms used to enter data for submission, editing, get-ting or deleting information from users were tested. Developers performed the test of the website. Some functionality requirements were tested during the test

2. Security Testing : Security was tested by pasting internal URL directly into browser address bar without login. SQL injection SQL MAP tool was used to test all pages in website. Also when the user (Admin, Teacher) need to edit marks or information to other user if he edit the id in URL the system will redirect to logout page or home page. if the user try edit the id number to access to other user information or other hacking.

3. Database Testing : Data consistency is very important. Data integrity and errors while editing, deleting, modifying the forms or do any DB related functionality were checked.

4. Speed : Determines whether the application responds quickly

5. Scalability : Determines the maximum user load the software application can handle.

6. Stability : Determines if the application is stable under varying loads

5.3 Usability Testing

Usability testing is a technique used in user-centered interaction design to evaluate a product by testing it on users. This can be seen as an irreplaceable usability practice, since it gives direct input on how real users use the system.

Chapter 6

Test Execution Summary

Execution Test Summary Report is an overall view of Testing Process from start to end. Test Plan comes at the starting of project while Test Summary Report comes at the end of the testing process. This report is given to the client for his understanding purpose. The Test Summary Report contents are :

1. Test Case Planned
2. Test Case Executed
3. Test Cases Passed
4. Test Cases Failed

S.No	Test Case Planned	Test Case Executed	Test Case Passed	Test Case Failed
1	80	75	70	5

Table 6.1: Table to Test Cases Pass vs Fail

Chapter 7

Project Screen Shots

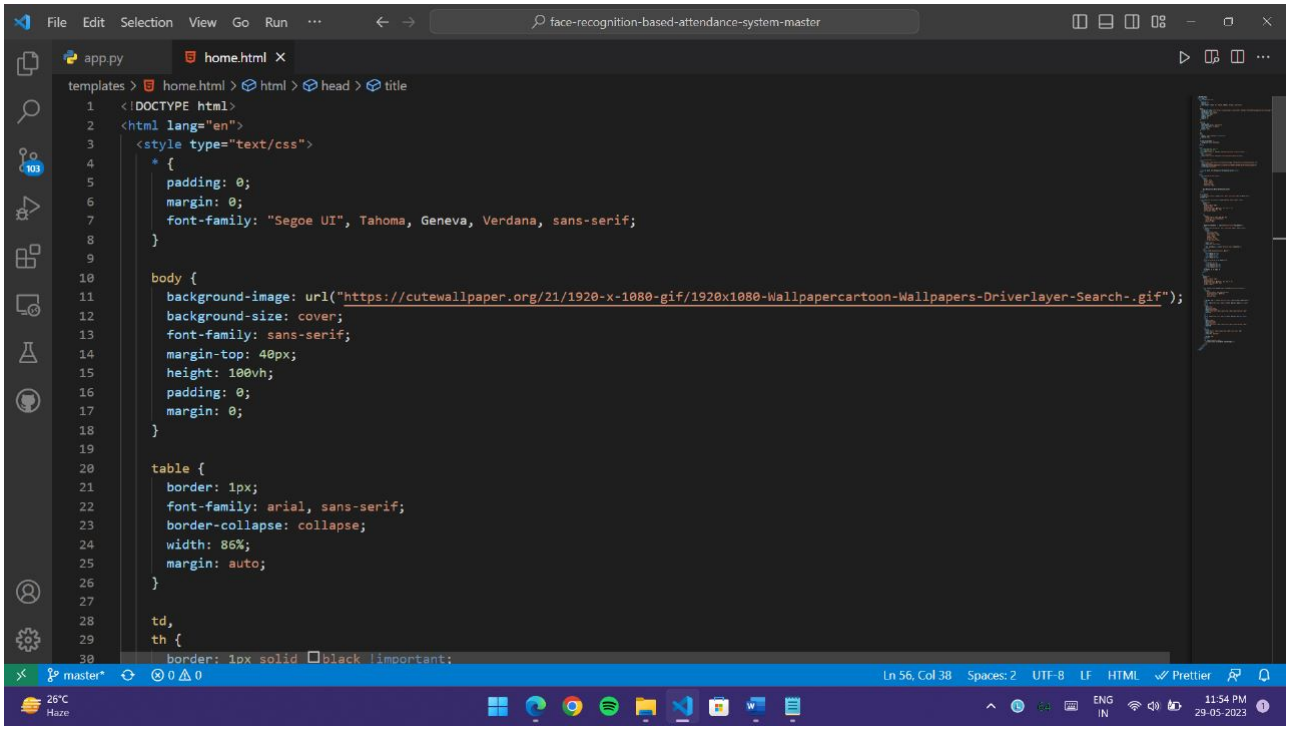


Figure 7.1: Main HTML

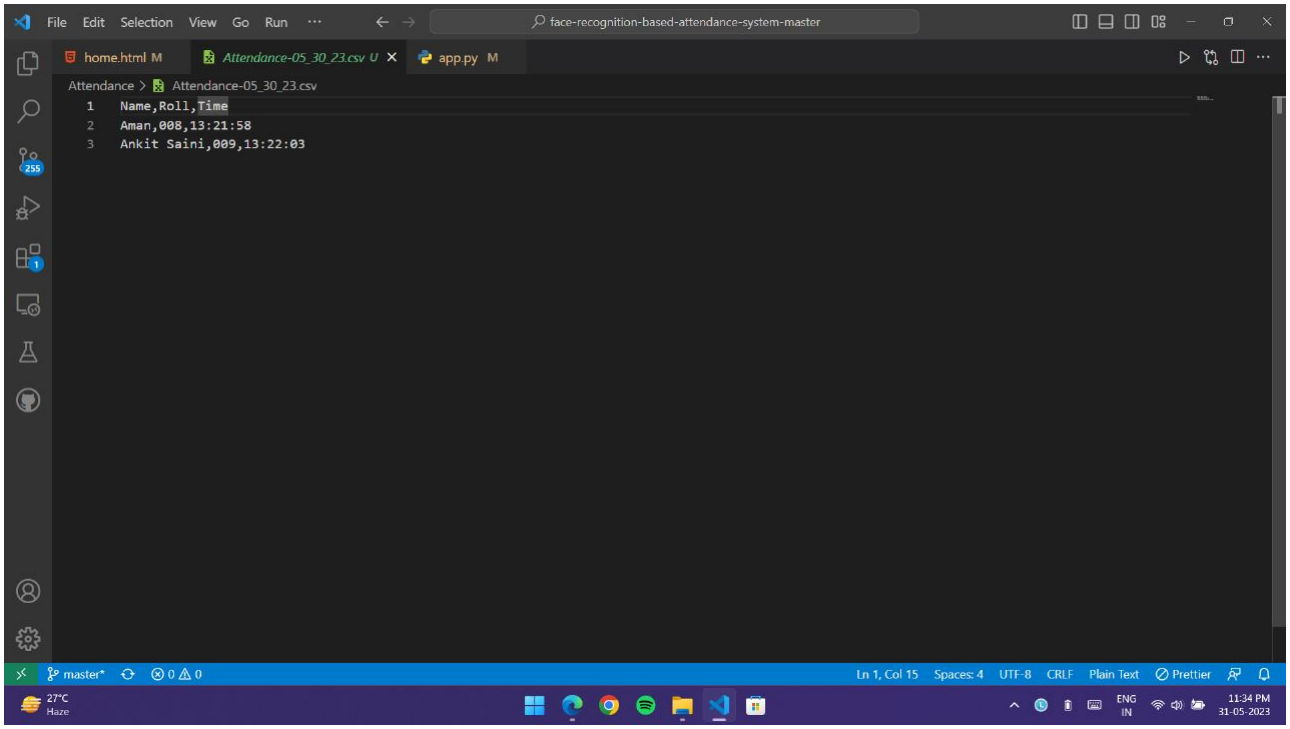


Figure 7.2: Attendance CSV

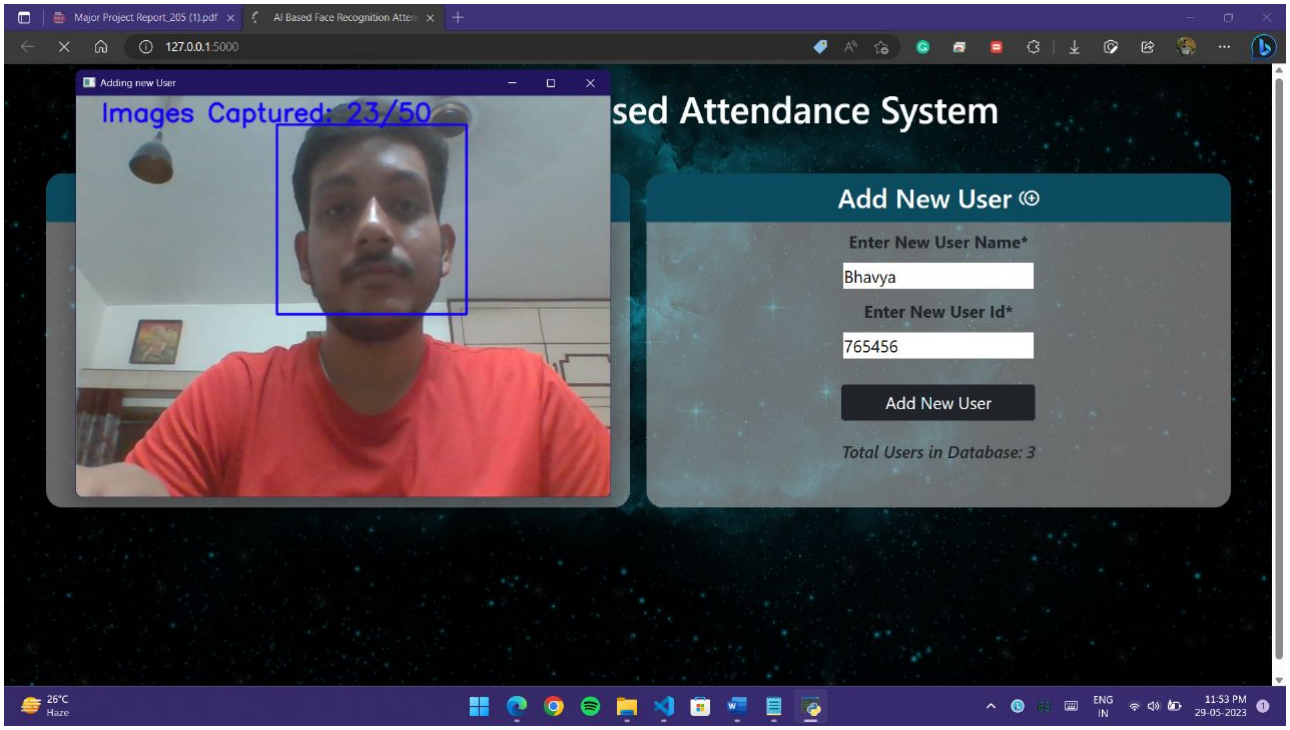


Figure 7.3: Registering User

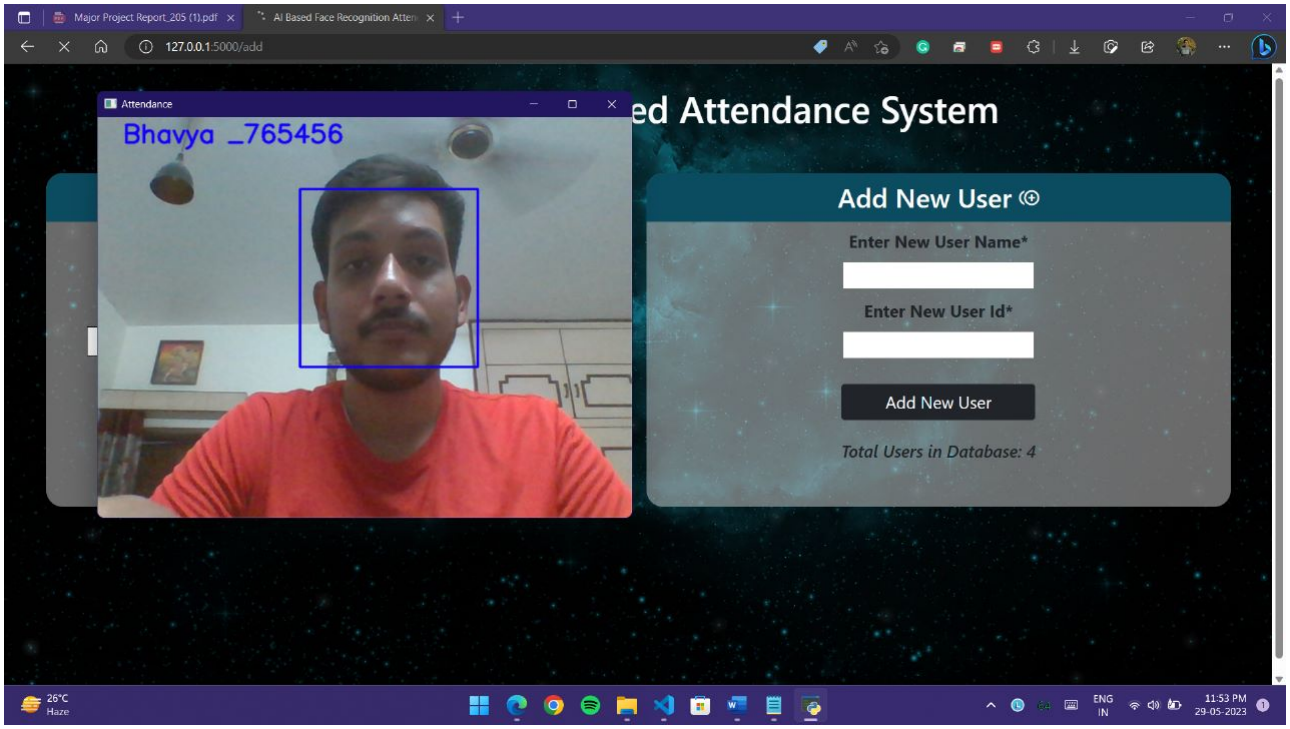


Figure 7.4: AI taking Attendance

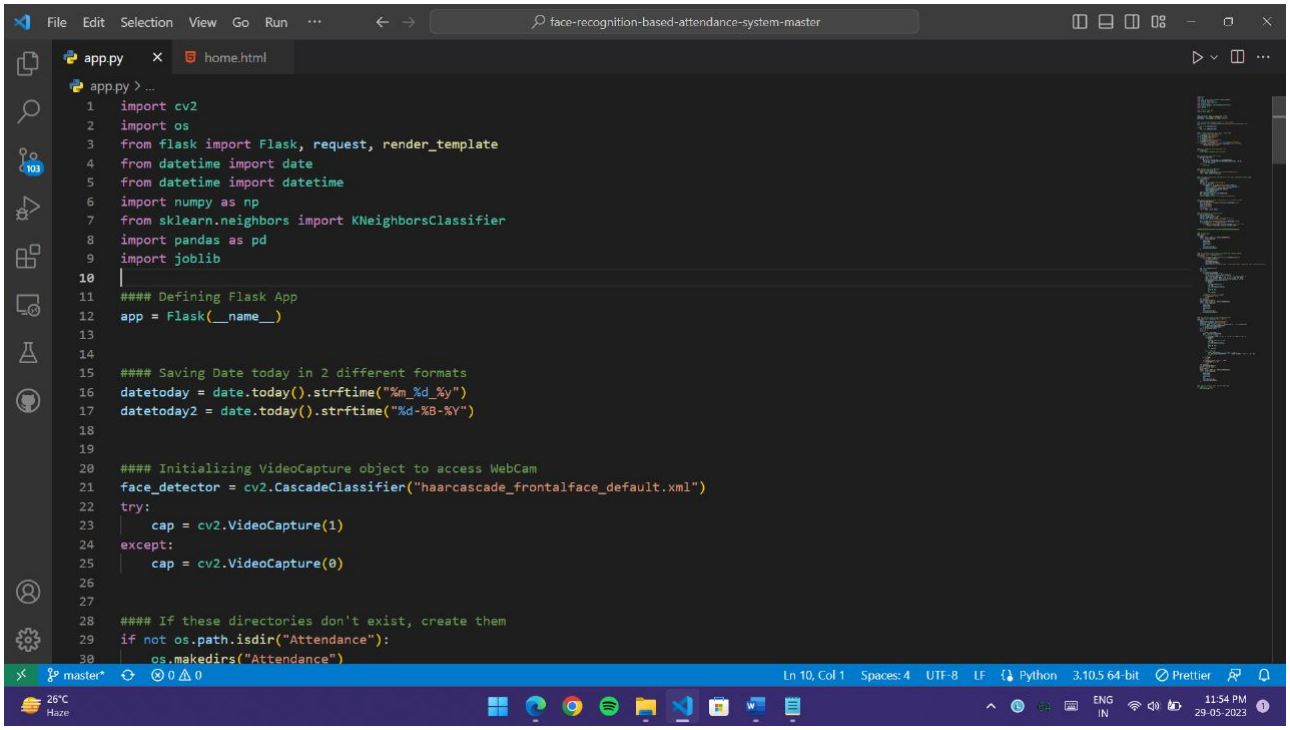


Figure 7.5: Main server file

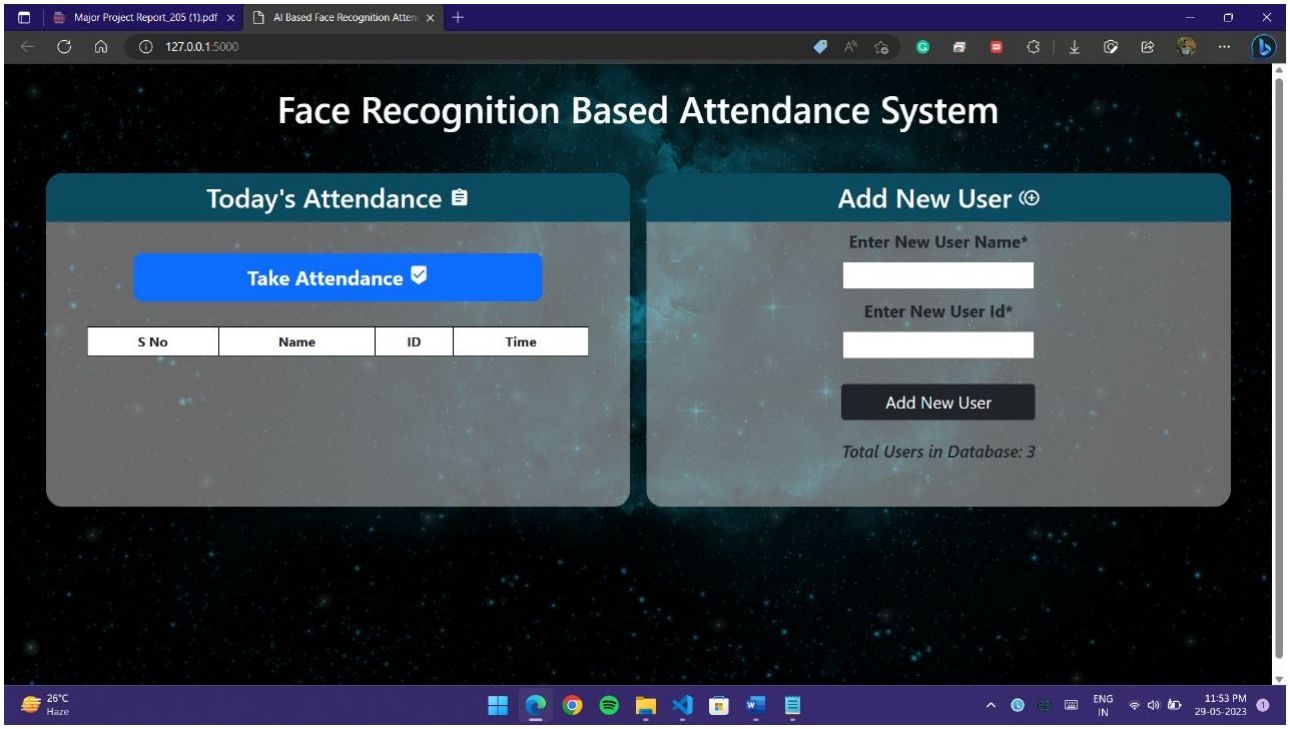


Figure 7.6: User Interface before attendance

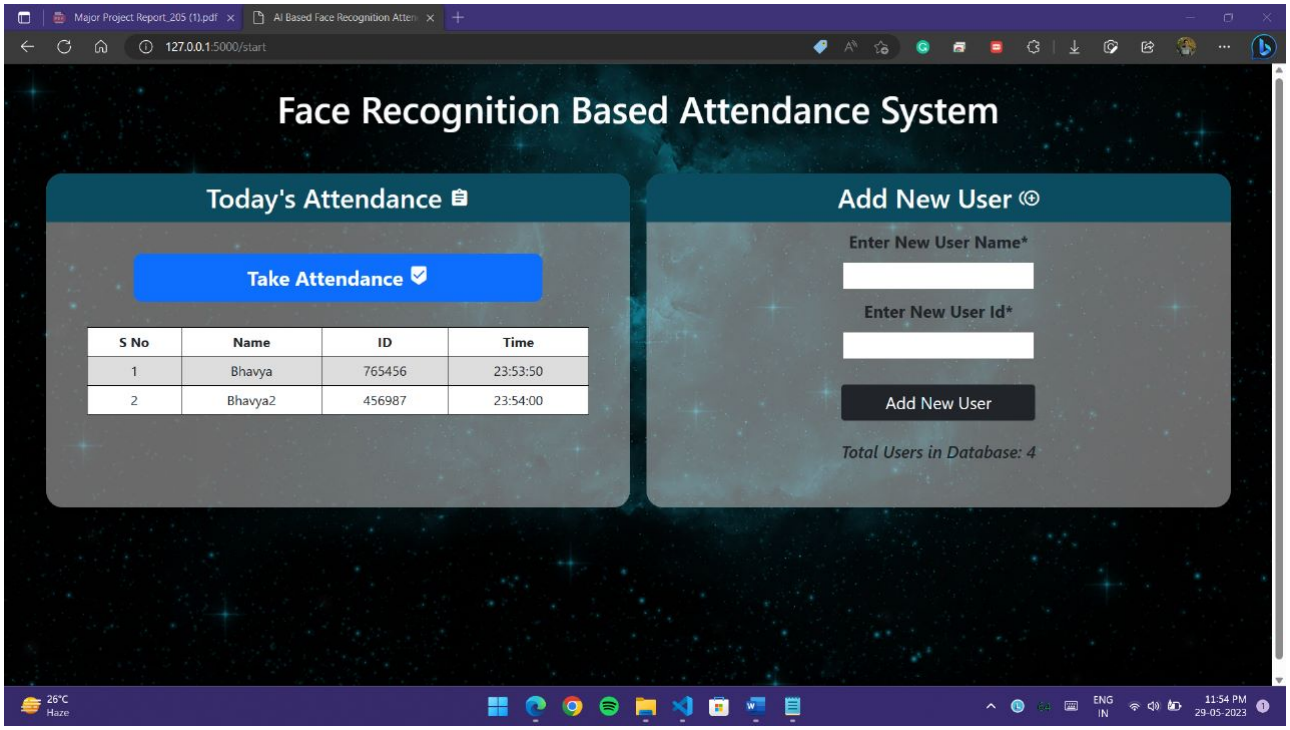
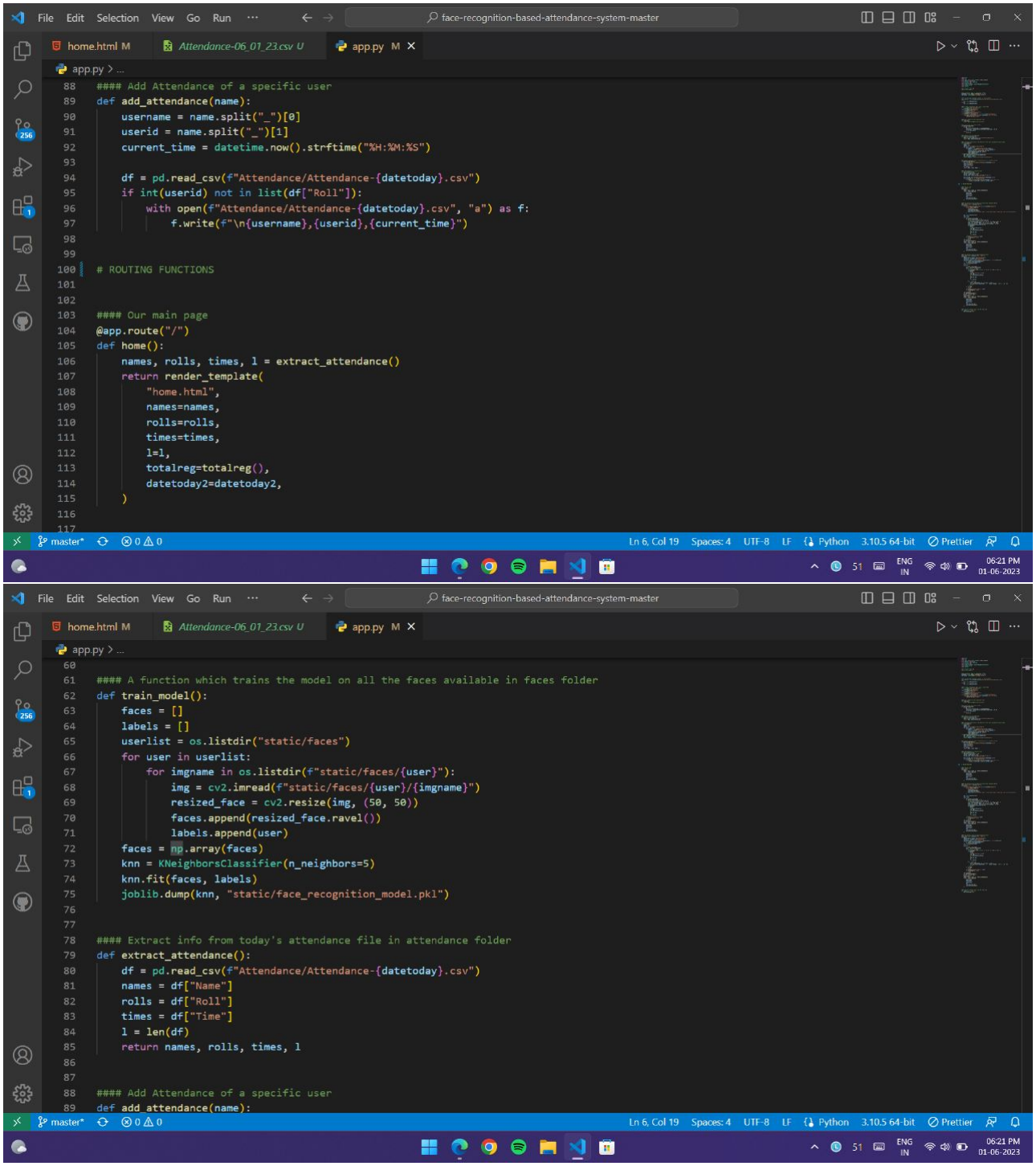


Figure 7.7: User Interface after attendance



```python
#### Add Attendance of a specific user
def add_attendance(name):
    username = name.split("_")[0]
    userid = name.split("_")[1]
    current_time = datetime.now().strftime("%H:%M:%S")

    df = pd.read_csv(f"Attendance/Attendance-{datetoday}.csv")
    if int(userid) not in list(df["Roll"]):
        with open(f"Attendance/Attendance-{datetoday}.csv", "a") as f:
            f.write(f"\n{username},{userid},{current_time}")


# ROUTING FUNCTIONS


#### Our main page
@app.route("/")
def home():
    names, rolls, times, l = extract_attendance()
    return render_template(
        "home.html",
        names=names,
        rolls=rolls,
        times=times,
        l=l,
        totalreg=totalreg(),
        datetoday2=datetoday2,
    )
```

```python

#### A function which trains the model on all the faces available in faces folder
def train_model():
    faces = []
    labels = []
    userlist = os.listdir("static/faces")
    for user in userlist:
        for imgname in os.listdir(f"static/faces/{user}"):
            img = cv2.imread(f"static/faces/{user}/{imgname}")
            resized_face = cv2.resize(img, (50, 50))
            faces.append(resized_face.ravel())
            labels.append(user)
    faces = np.array(faces)
    knn = KNeighborsClassifier(n_neighbors=5)
    knn.fit(faces, labels)
    joblib.dump(knn, "static/face_recognition_model.pkl")


#### Extract info from today's attendance file in attendance folder
def extract_attendance():
    df = pd.read_csv(f"Attendance/Attendance-{datetoday}.csv")
    names = df["Name"]
    rolls = df["Roll"]
    times = df["Time"]
    l = len(df)
    return names, rolls, times, l


#### Add Attendance of a specific user
def add_attendance(name):
```

Figure 7.8: used functions

Chapter 8
Project Summary and Conclusions

8.1 Conclusion

In recent years, as technological advancements have accelerated, people's expectations regarding quality of life have increased. School managers strive to enhance the performance of their schools, aiming to provide students with the highest level of knowledge and experience. Throughout this project, we have discussed the testing and evaluation phases, including functionality and performance testing. The evaluation involved feedback from school managers, teachers, and students.

Chapter 9
Future Scope

There are several potential future enhancements and features that can be considered for this AI-based Attendance Registration System. These ideas include:

- Online examination capability for students.
- Creation of a question bank for each subject.
- Allowing teachers to contribute questions to the question bank.
- Admin functionality to add new classes.
- Incorporation of a medical examination component to the system, with a dedicated medical supervisor as a new user.

References

[1] *https://www.w3schools.com/js/*

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