

# Attendance Management System Using Face Recognition

By- **Hemant Bansal**  
**Sophomore, CSE**  
**IIT Jodhpur**

Mentored by- **Naveen Luhach**

---

## Introduction

- A python based attendance management application that uses facial recognition.
- Marks attendance, along with in-time.
- Graphical and tabular representation of attendance data.
- Features of registering students, adding photos, training data etc.
- Filter attendance by day or student.

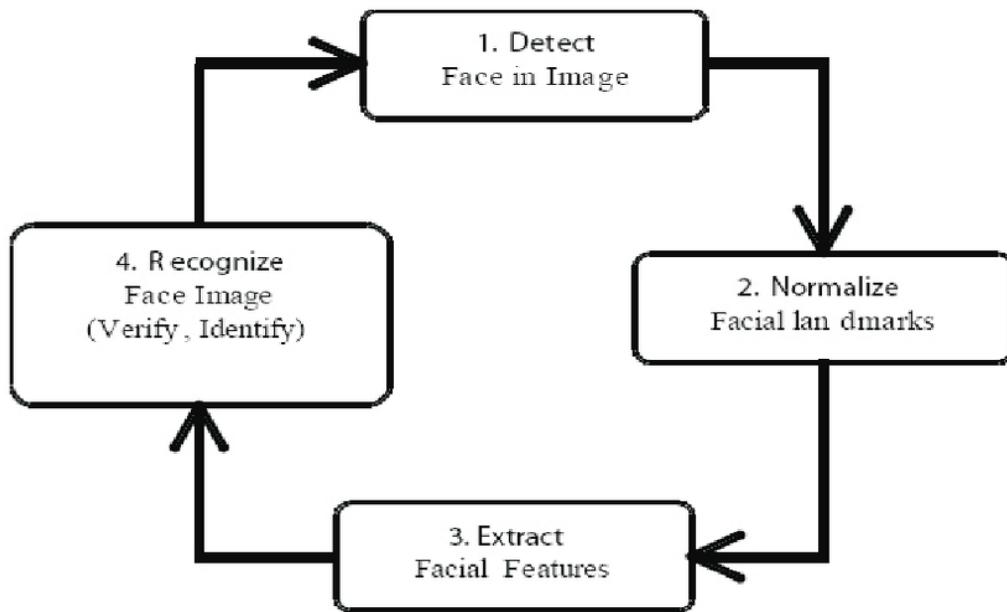
## Purpose and Description of Project

This project aims to automate the traditional attendance system where the attendance is marked manually. It also enables an organization to maintain its records like in-time and attendance digitally. Digitalization of the system would also help in better visualization of the data using graphs to display the no. of students present today and last week attendance and current week. Its added features serve as an efficient upgrade and replacement over the traditional attendance system.

## Methodology

The face recognition system analyses video feed frame by frame for detection of faces. Then a predictor is used to identify the facial landmarks in the faces detected using a predefined template. Using this template, the faces are aligned to increase the accuracy of the model. Now the unique embeddings of these aligned faces are generated. These embeddings are biometrics of the face and hence unique. These embeddings are classified using the classifier. This classifier is trained on the images collected from the users beforehand to ensure the smooth workflow of the program.

---



## Significance of the Project

This project serves as a foundation for future projects based on facial detection and recognition. The report covers the libraries incorporated in this project for testing and optimization of machine learning algorithms. It also compares between algorithms with similar functionality. This project also covers web development and database management for a user-friendly UI.

## Technology and Tools used

- **Python** - Programming language.
- **OpenCV** - image processing.
- **SQLite3**- Database Management.
- **Dlib** - Library used for Facial alignment, HOG face detector, CNN Face detector.
- **face\_recognition** library by Adam Geitgey - which wraps around dlib's facial recognition functionality, making it easier to work with.
- **Django** - Backend web development
- **HTML, CSS, Bootstrap** - front end development
- **Matplotlib, Seaborn, Numpy, Pandas** - data handling and visualisation.
- **Database- SQLite3**- Well integrated with Django's ORM

**IDE-** Visual Studio code

---

# **Functional Requirements**

## **1.1 Manage Registration and Login**

### **1.1.1 Register new student**

Description: Admin can register new

Input: Student Details

Output: success message displaying the user has been created.

### **1.1.2 Log-In to the system**

I created different pages for admin login and student login.

Input: User credentials

Output: If the credentials are correct, user will be redirected to the dashboard of the system

Exception Flow: If the entered credentials are incorrect then the user will be redirected to the login page again displaying an error message.

## **1.2 Manage Attendance Details**

### **1.2.1 Mark your attendance-in**

Input: User will scan his/her face using the external web camera.

Output: system will identify the user uniquely and will mark his/her in-time to the database. The same success message will be transmitted to the user.

### **1.2.2 View my attendance report**

Description: Student may often need to see his / her attendance record throughout the month or year. Using this feature one can see his / her attendance record till the date.

Input: User selection

Output: Statistical analytics of the particular student who is currently logged into the system will be displayed.

---

### **1.2.3 View student's attendance report**

Description: This feature is for admin. Admin can monitor the availability of each student till the date. i.e., how many students are present today out of total students etc. can be monitored.

Input: user selection

Output: Attendance record of each student including how many students are present today out of total along with the availability graph.

## **1.3 Manage Student Details**

### **1.3.1 Add photo of the student**

Description: Admin only can access this feature. Admin can add a photo of an student during the registration process.

Input: Username of an student

Output: Success message record has been added.

Process: System will process an image and will generate necessary system data to identify each student uniquely.

### **1.3.2 Train the system**

Input: user selection

Output: system will process all the available image records of the students and will generate necessary system data to identify each student uniquely.

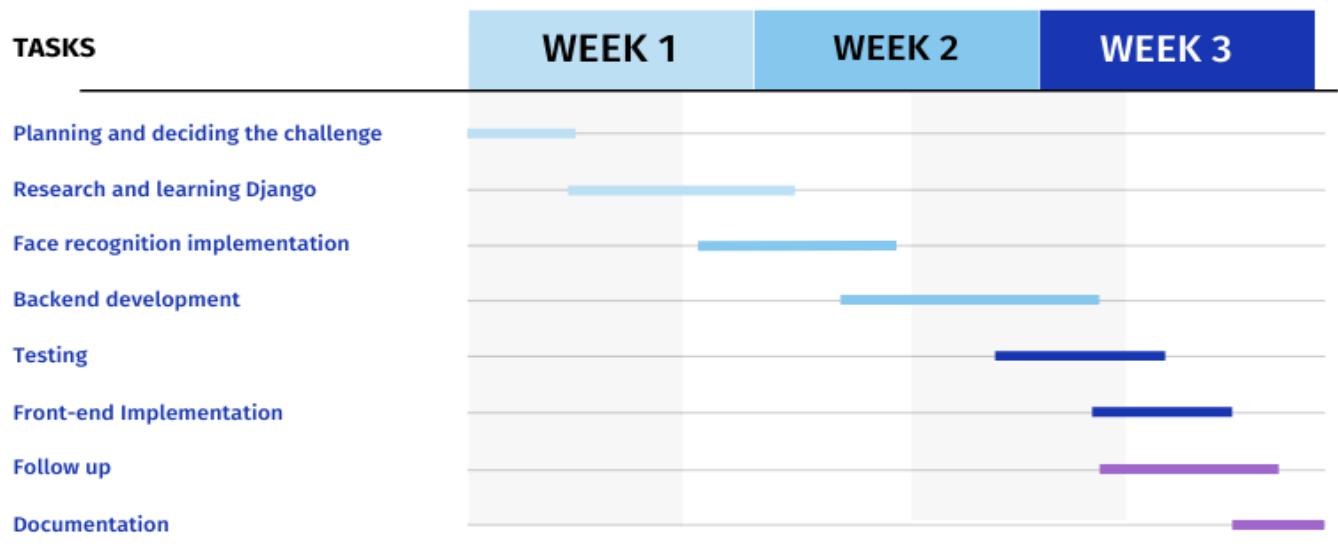
---

## Diagrams while planning-

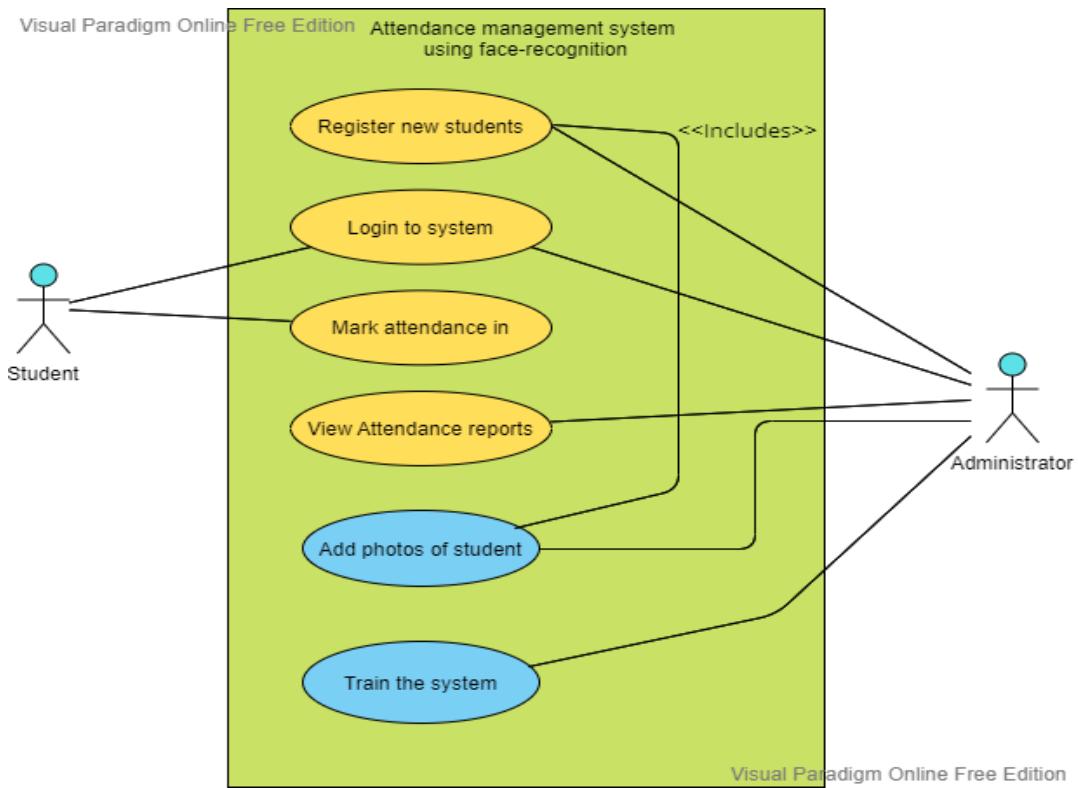
### Gantt Chart

#### Microsoft Engage Project

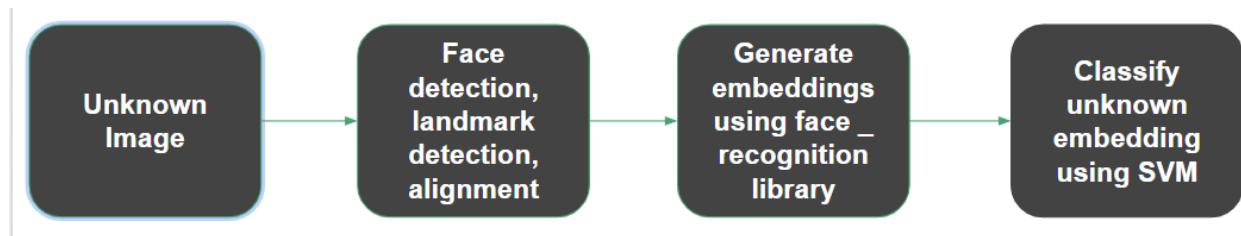
#### GANTT CHART



## Use case Diagram



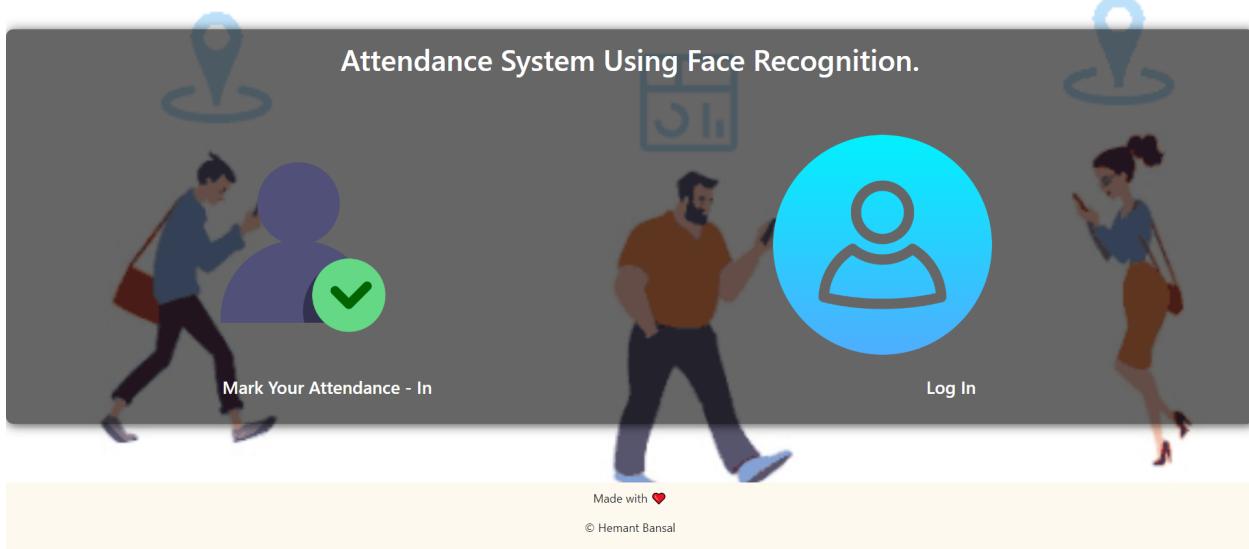
## Face Recognition



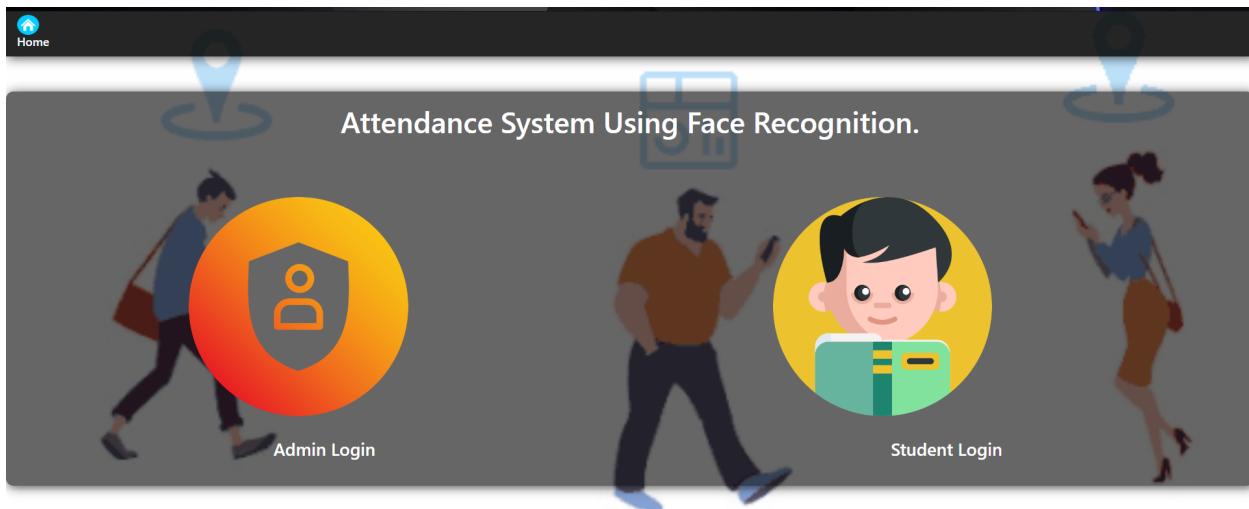
---

## Screenshots-

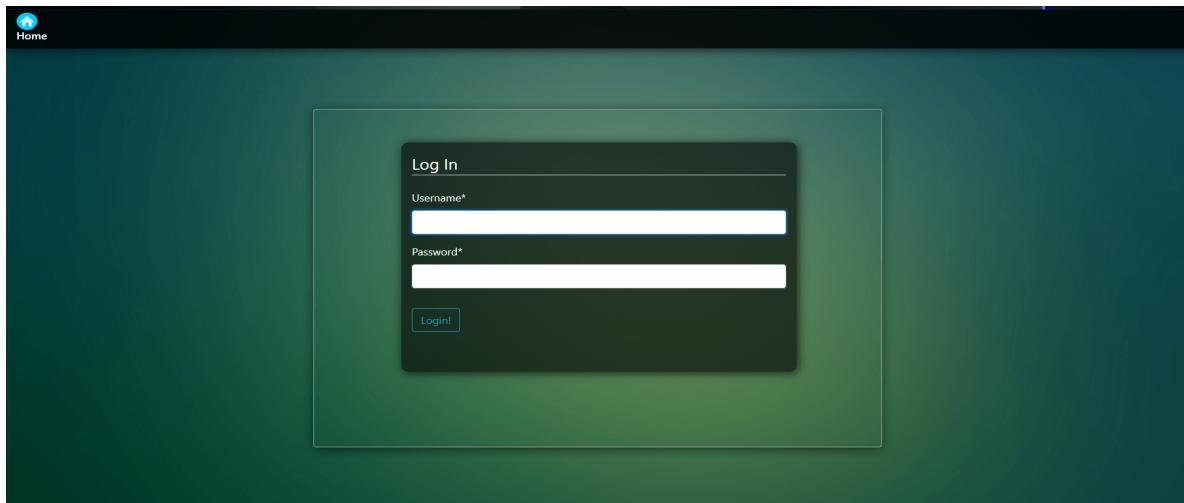
### Home



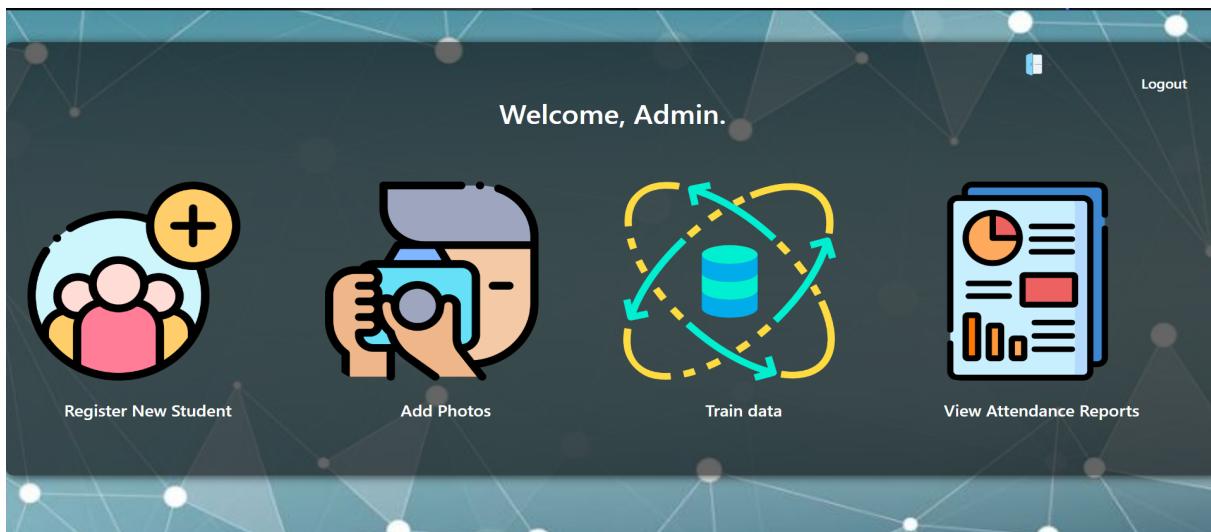
### Login



## Admin Login Page



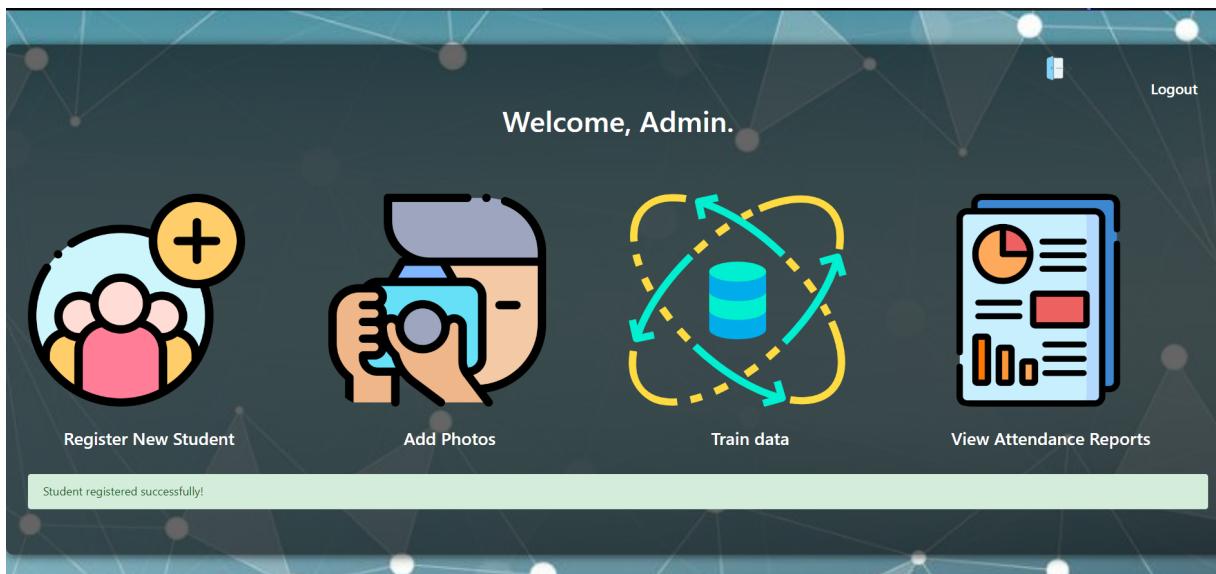
## Admin Dashboard



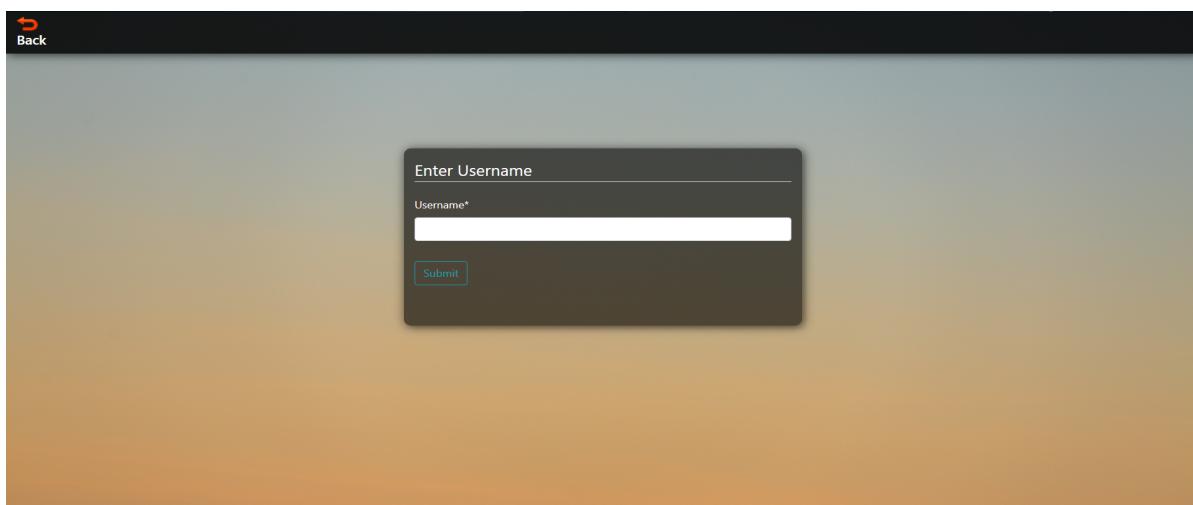
## Register new student

A screenshot of the "Register New Student" form. The form is titled "Register New Student" and contains fields for "Username\*", "Password\*", "Password confirmation\*", and a verification note. It includes a "Back" button on the left and a "Register" button at the bottom.

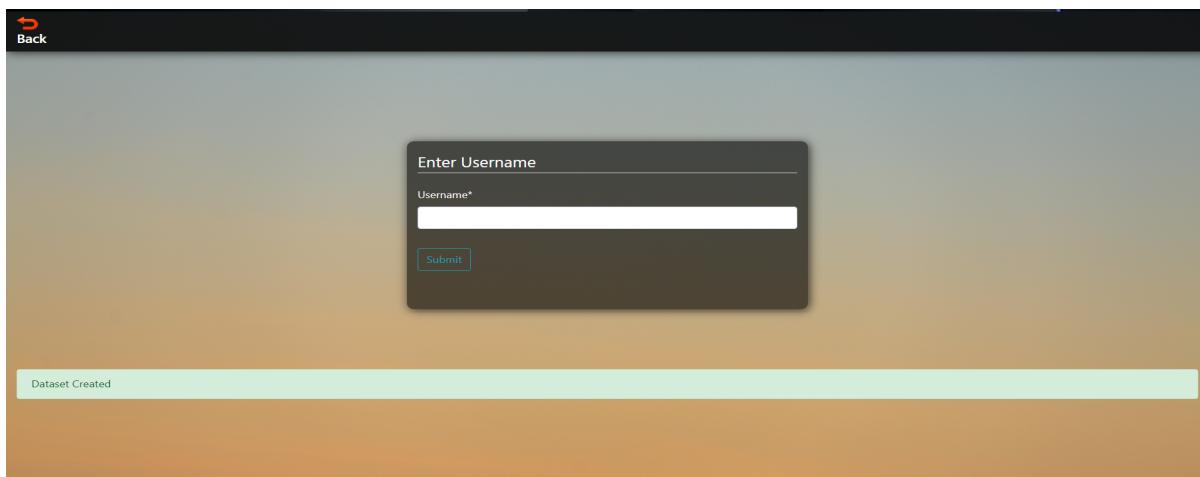
**Student Registered successfully- Back to Home**



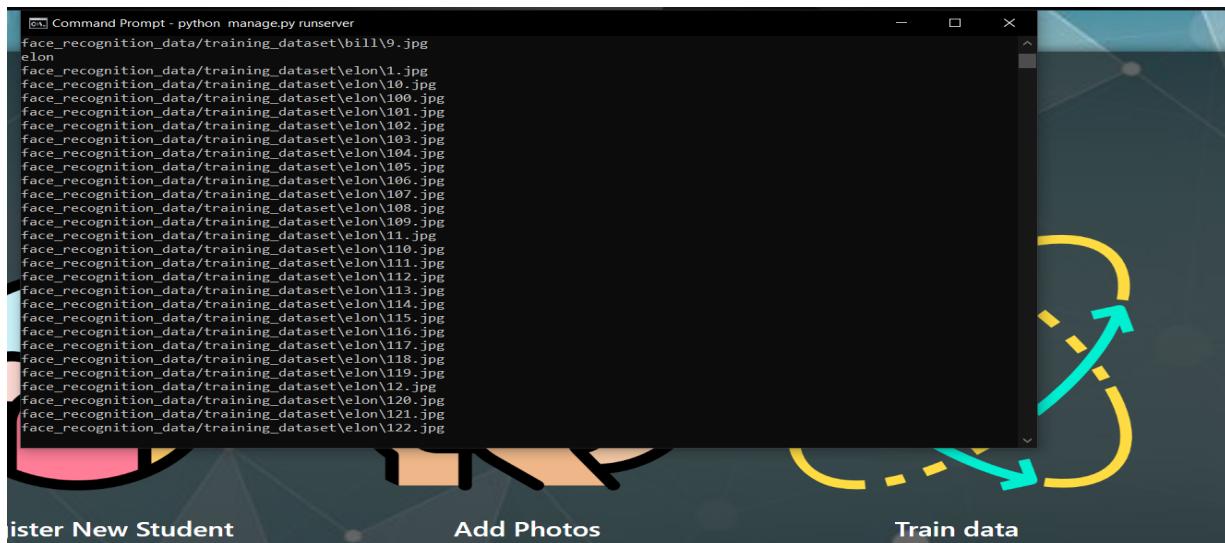
### Add photos



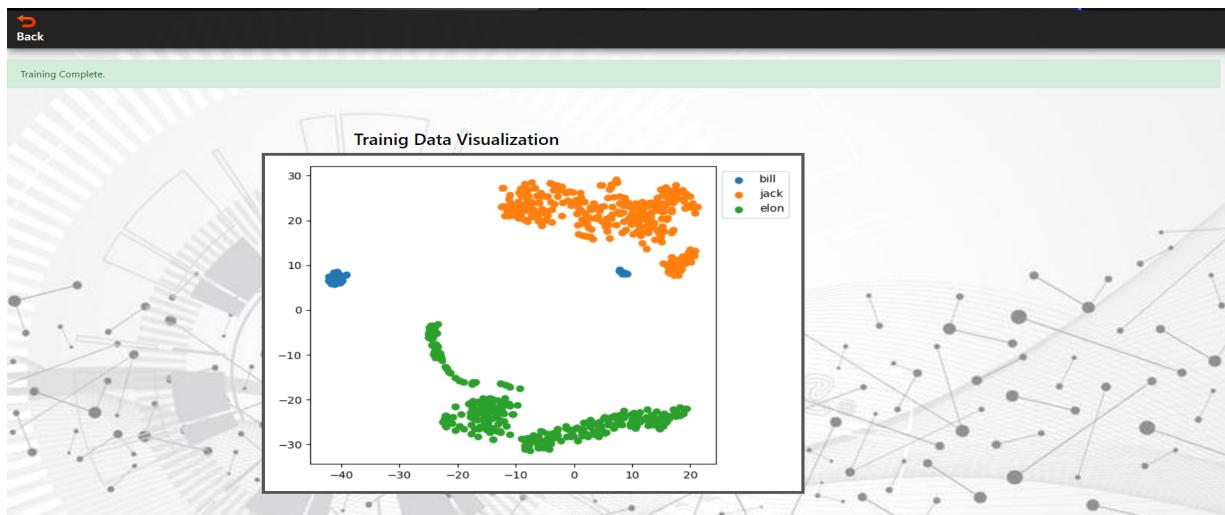
**Photos added successfully**



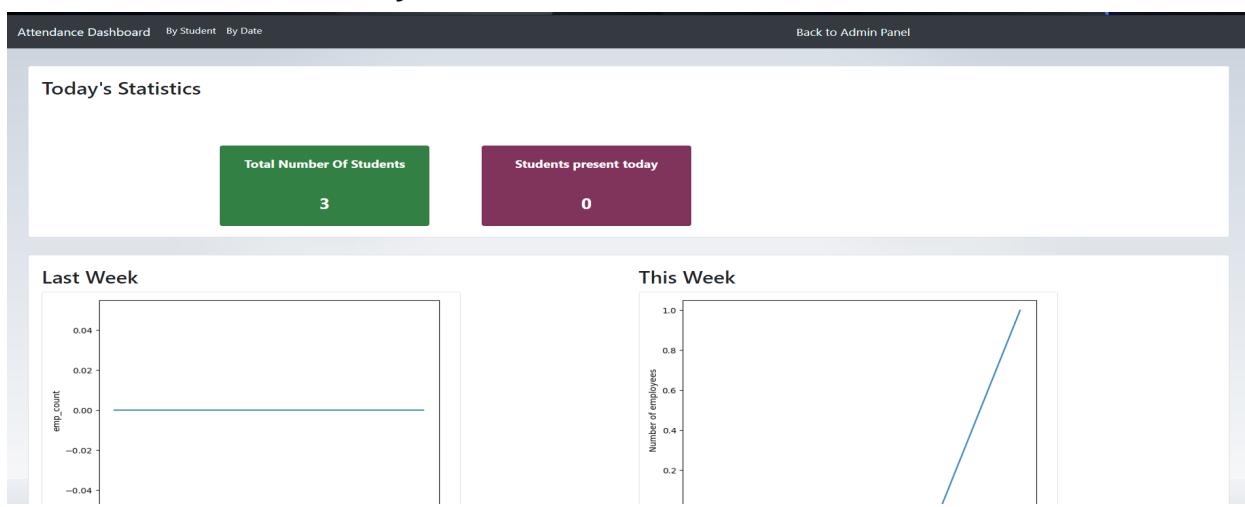
## Training Model (Approx. 300 Images / Student)



## System training completed- Clustering graph



## View Attendance records by Admin



## Attendance filtered by students

The screenshot shows the 'Attendance Dashboard' interface. At the top, there are navigation links: 'Attendance Dashboard', 'By Student', 'By Date', and 'Back to Admin Panel'. Below this is a form titled 'Enter Username And Duration'. It includes fields for 'Username\*' (containing 'elon'), 'Date from\*' (set to January 1, 2022), 'Date to\*' (set to January 1, 2023), and a 'Submit' button. A table below displays attendance data:

| Date         | Student | Present | Time in                  |
|--------------|---------|---------|--------------------------|
| May 27, 2022 | elon    | P       | May 27, 2022, 11:32 a.m. |

## Attendance filtered by dates

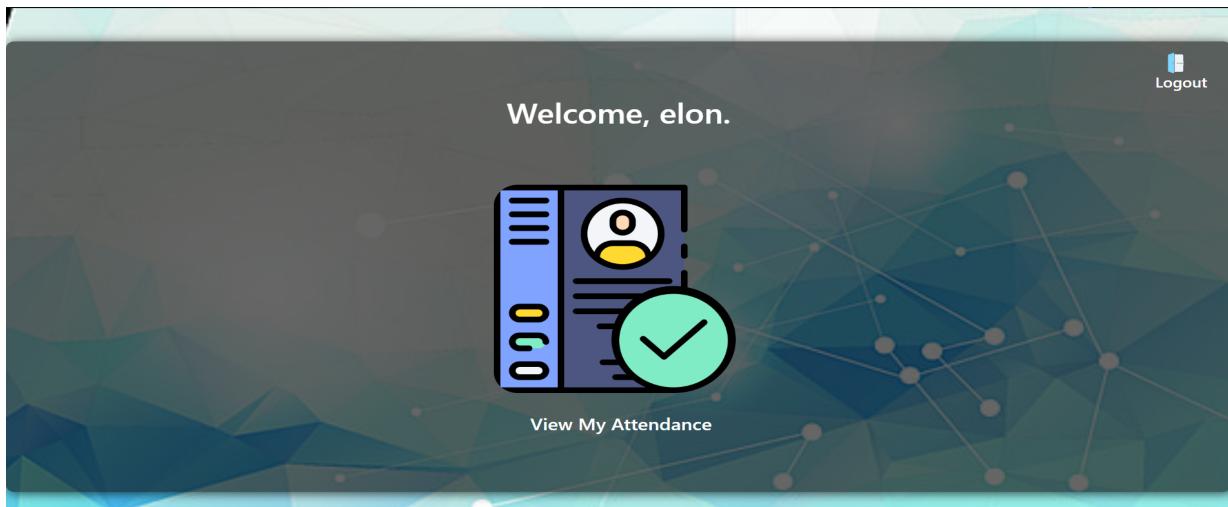
The screenshot shows the 'Attendance Dashboard' interface. At the top, there are navigation links: 'Attendance Dashboard', 'By Employee', 'By Date', and 'Back to Admin Panel'. Below this is a form titled 'Select Date'. It includes a dropdown menu for 'Date\*' (set to May 27, 2022) and a 'Submit' button. A table below displays attendance data:

| Date         | Student | Present | Time in                  |
|--------------|---------|---------|--------------------------|
| May 27, 2022 | elon    | P       | May 27, 2022, 11:32 a.m. |
| May 27, 2022 | jack    | A       | -                        |

## Student Login page

The screenshot shows a dark-themed 'Log In' page. At the top left is a 'Home' icon. The main area contains a 'Log In' form with fields for 'Username\*' and 'Password\*', and a 'Login!' button.

## Student Dashboard



## View my attendance\_student

Attendance [Back to Dashboard](#)

Select Duration

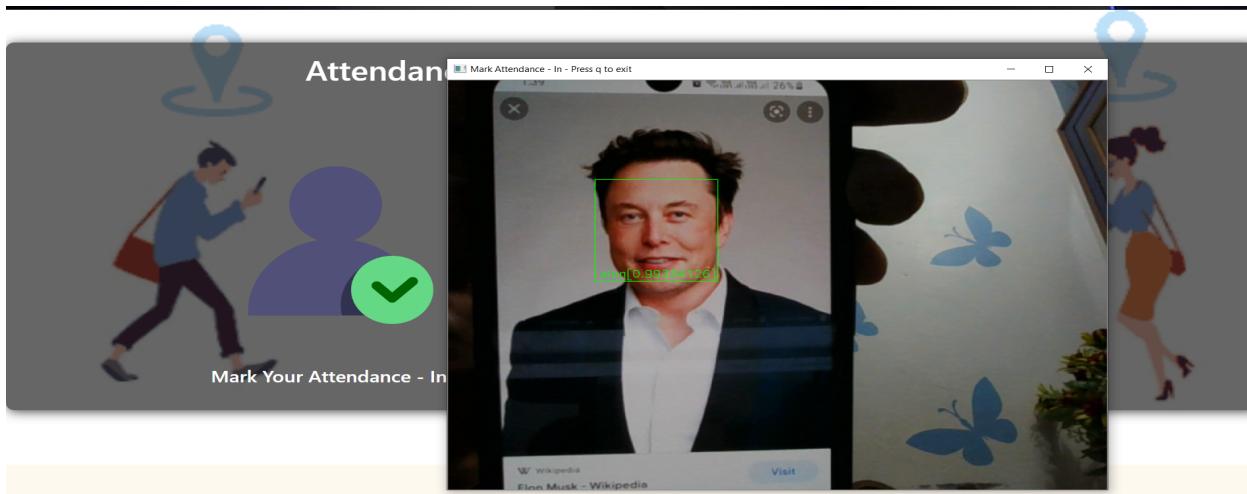
Date from\*  
January  
1  
2022

Date to\*  
January  
1  
2023

[Submit](#)

| Date         | Student | Present | Time in                  |
|--------------|---------|---------|--------------------------|
| May 27, 2022 | elon    | P       | May 27, 2022, 11:32 a.m. |

## Mark my attendance



---

## Conclusion

### **Functionalities implemented successfully:**

- Registration
- Login / Logout
- Manage User Profile
- Update user profile
- View My Attendance
- View Attendance by Date
- View Attendance by Student
- Manage Attendance
- Mark my attendance In
- Add photos
- Add new student
- Train the system
- View Attendance record by date
- View no. of student present today
- View Total number of Students

### **Limitations-**

- Attendance can be marked if the picture of an employee is shown.
- A lot of space required to store 300 training images of each person
- Training takes about 20 seconds for each person, which makes training time very long for a large number of training classes.
- Lighting changes affect performance.

### **Scope of the Project**

Facial recognition is becoming more prominent in our society. It has made major progress in the field of security. It is a very effective tool that can help law enforcers to recognize criminals and software companies are leveraging the technology to help users access the technology.

This technology can be further developed to be used in other avenues such as ATMs, accessing confidential files, or other sensitive materials. This project also covers web development and database management with a user-friendly UI.

---

Using this system any corporate offices, school and organization can replace their traditional way of maintaining attendance of the employees and can also generate their availability(presence) report throughout the month.

**Thank You :)**