

# **A PROJECT REPORT**

**on**

## **“CAMPUS MANAGEMENT SYSTEM”**

**Submitted to  
KIIT Deemed to be University**

**A report submitted in partial fulfillment of the requirement for the award of  
The degree of**

**BACHELOR’S DEGREE IN  
INFORMATION TECHNOLOGY**

**BY**

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**UNDER THE GUIDANCE OF**

**Ipsita Paul**



**SCHOOL OF COMPUTER ENGINEERING**

**KALINGA INSTITUTE OF INDUSTRIAL TECHNOLOGY**

**BHUBANESWAR, ODISHA - 751024**

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## CERTIFICATE

This is to certify that the project entitled  
“CAMPUS MANAGEMENT SYSTEM”  
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is a record of bonafide work carried out by them, in the partial fulfillment of the requirement for the award of Degree of Bachelor of Engineering (Computer Science & Engineering OR Information Technology) at KIIT Deemed to be university, Bhubaneswar. This work will be done during 2022-2023, under our guidance.

Date: 07/ 12 / 2023

Ipsita Paul  
Project Guide

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# ABSTRACT

Attendance management can be a challenging task for teachers, who often have to take attendance of students manually by calling out their names one by one in every class. This process can be time-consuming and prone to errors, especially in large classrooms with a high number of students. Proxy attendance is also a common problem, where students may ask their friends to mark attendance for them, making it difficult for teachers to keep track of who is actually present in the classroom.

To address these challenges, we propose using an intelligent attendance management system that leverages advanced facial recognition technology using machine learning. With this system, students can simply stand in front of a camera, and their faces will be automatically detected and recognized by the software. This process eliminates the need for manual attendance taking and reduces the likelihood of errors or proxy attendance.

The system operates using two primary steps: face detection and face recognition. First, the system detects the presence of a face in the camera's view and identifies the unique facial features of the individual. Then, it matches these features with the pre-existing database of students to determine who is present in the classroom.

This project introduces an innovative web-based Attendance Management System designed to streamline the attendance process for both students and teachers. The system offers a user-friendly interface accessible through a web browser, providing a secure platform for efficient attendance tracking in educational institutions.

This intelligent attendance management system is highly accurate and efficient, reducing the workload for teachers and providing a reliable record of attendance for students. Additionally, the system can be easily integrated with other educational tools, such as learning management systems or grade book software, to create a seamless and comprehensive educational experience. As technology advances, this system can continue to evolve and improve, making attendance management an even more effortless and accurate process for teachers and students alike.

**KEYWORDS-** Attendance System, Facial Recognition Technology, Face Detection, Machine learning,

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## Chapter 1

# Introduction

Attendance management plays a crucial role in any academic institution as it enables educators to monitor student performance and ensure that they are meeting their academic obligations. There are various methods that can be used to manage attendance, including file-based systems and biometric-based systems.

File-based attendance systems are outdated and inefficient. They are known to reduce actual lecture teaching time and make it easy for students to engage in proxy attendance or impersonation attempts. Additionally, they are difficult to manage, especially when dealing with a large student population.

To address these problems, we are developing an intelligent attendance management system that utilizes face recognition technology to mark attendance automatically. This will not only reduce the workload of instructors but also make it easier to manage attendance for a large student population. This project aims to enhance the traditional attendance recording system by leveraging modern technology and a website has been designed to streamline the attendance process for both students and teachers.

The project will consist of several components that will be integrated into one comprehensive application. Each component of the application will play an integral role in ensuring the successful functioning of the system. We believe that our attendance management system will significantly improve the efficiency and effectiveness of academic institutions, thereby benefiting both educators and students alike.



## Chapter 2

# Literature Review

The primary objective is to develop an innovative and sophisticated attendance management system that employs cutting-edge facial recognition technology. The ultimate goal is to address the challenges and limitations of traditional automated attendance systems in various educational institutions and organizations. The proposed approach entails comparing an up-to-date image of a student with a set of deliberately captured images stored in a database, which will be used to verify their real-time attendance. By leveraging advanced facial recognition algorithms, the system can accurately identify students and record their attendance quickly and efficiently. Manual maintenance of attendance records has several drawbacks that impede the effectiveness of this process. Firstly, it takes away valuable classroom time that could otherwise be spent on more productive educational activities. Secondly, manual attendance records are highly vulnerable to proxy attendance and impersonation, leading to inaccurate and unreliable data that compromises the integrity of the attendance tracking system. Therefore, by utilizing a smart attendance management system that incorporates facial recognition technology, educational institutions, and organizations can overcome these hurdles and improve the efficiency and accuracy of their attendance tracking processes.

To resolve this problem of attendance, many attendance management systems have been introduced in recent years. Jain *et al* [3] developed a desktop-based application in which students are given attendance by clicking a checkbox next to their name and then by clicking the register button to mark their presence. In 2013, Bhalla *et al* [4] have proposed a blue-tooth based attendance system. Application software installed in the mobile phone enables the registration of the attendance via Bluetooth connection and transfers the notification to the instructor. Works of [5] propose a system for employee attendance based on the fingerprint. The system compares one fingerprint template with all previously stored in the database. In [6], Joardar *et al* developed an attendance system based on the palm dorsal subcutaneous vein pattern of individuals.

A model as specified by Naveed *et al* [7], is linked with two databases. One is for the faces and the other one is used for marking attendance. The image before the detection and recognition phase, the camera is used to click the face image of the student and perform background and noise removal.

In another implementation of a similar system, Kawaguchi *et al*. [8] proposed a model in which faces and fixed seating positions are matched to images in a database. This is a continuous testing method that uses a streaming video camera to detect student presence in the classroom. They even estimated seating arrangements using various types of calculations. It's a very common architecture implemented with two different cameras, one is used for detecting and the other is used for capturing images. MuthuKalyani *et al*. [9] proposed a different approach for this, using Android devices to perform this task. After the image was captured by the camera, it was subjected to 3D modeling, and canonical techniques were applied to the images for comparison.

The method developed by Marko Arsenovic et al. [10] uses higher feed rates; Convolutional Neural Network Cascade to implement face recognition, and Convolutional Neural Networks for face embedding. CNNs perform best for larger datasets, or put another way, under running case conditions, the main test was applying these strategies to small datasets. The overall accuracy was 95.02% on a small dataset of the first images of worker faces in the current state.

Kruti Goyal et al. [11], is a face recognition model built using different types of algorithms such as AdaBoost, and Haar Cascades. This model uses MATLAB and OpenCV for its implementation. Facial feature extraction is performed as face localization performed using pattern recognition.

Nusrat Mubin Ara et al. [2] have discussed in their article developments in the field of technologies they use, such as facial recognition, normalization, facial recognition, and neural networks. The authors also wrote about the methodology in which face recognition is performed using Oriented Gradient History, face alignment using face recognition tag estimation, feature extraction using convolutional neural network, and finally scale generation. Although his system found some incorrect predictions, achieved more than 95% accuracy. Samuel Lukas et al. [1] integrated the Discrete Wavelet Transform (DWT), Discrete Cosine Transform (DCT), and Radial Basis Function Network (RBFN) detection system in their student attendance system along with their respective mathematical equations. They have illustrated the system design of their proposed framework using a block diagram to show the flow of the process. According to the result of their experiment, since some students were recognized as others, they achieved an accuracy of 82%.

However, most of these systems have corresponding limitations in terms of portability, accessibility, authenticity, or cost. Therefore, trying to overcome the shortcomings of the respective systems leads to the development of a Smart attendance monitoring system(SAMS) based on face recognition. Unlike other biometric and non-biometric attendance systems, facial recognition technology has unique advantages. Each student has a separate facial identity and cannot be faked by mere proxies. In addition, class teachers feel more familiar with the student based on their facial expressions than their names or matriculation number. These works have the following contributions:

- The best face selection method by evaluating face quality and robust face representation using a deep convolutional network.
- Wearable devices based on embedded systems for teaching support.

## Chapter 3

# Problem Statement

The main purpose of the CMS app is not only to use facial recognition to automatically mark the attendance of the students but also to provide a common platform for all college activities. Our objective here is to streamline the attendance marking process which many times is seen as a burden to handle daily. Making a user-friendly UI with unmatched ease of use and management makes it the most compelling alternative to an age-old technique of attendance management and spreading the news of events and other college activities. We can further add even more functionality to make it the only application a college might need for all the various needs.

### 3.1 Project Planning

A platform that is an appealing alternative to an antiquated method of managing attendance and disseminating information about events and other college activities is made possible by creating a user-friendly UI with unsurpassed simplicity of use and maintenance. We can yet add more features to make it the sole application a college would require for all of its requirements.

### 3.2 Project Analysis

To use a facial recognition system to automatically mark the attendance of students and to develop an app to provide and enhance the functionality of a college campus. We intend to make a seamlessly integrated environment for Faculty and student interaction as well as for managing their attendance on the same. This will provide a platform where students will have a better knowledge of what's happening in the institute, they will be able to communicate to their assigned faculty for some help and guidance also.

### 3.3 System Design

#### 3.3.1 Hardware Requirements:

- Intel Core i7 processor 10th gen
- Graphic Card – 2GB
- Ram 8GB
- Camera

### 3.3.2 Software Requirements:

- Windows 10
- Python 3.7 (Jupyter)
- Visual Studio Code
- OpenCV
- Matplotlib
- NumPy
- Pandas
- Sklearn

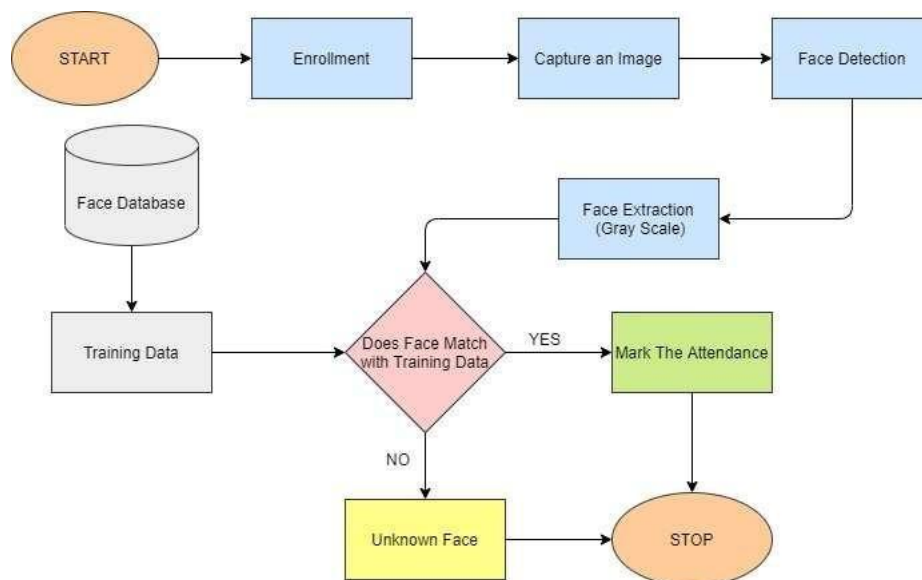
## Chapter 4

# Implementation

The methods and materials required to our platform are described in this section.

### 4.1 Proposed Model

The primary aim of our model is to detect the face and recognize it with maximum accuracy. We will distribute this task into two models for better performance.



**Figure 1-Model Flow Chart**

### Face Database

In order to start working on the models, first we will need to create and maintain a face database. The face database stores all the face images in such a way that the data can be retrieved by our model easily.

For data collection, we made an online form that was shared among various class groups. The online form collected basic information from each individual and at last, it asked for a minimum of five images of their face. We also used an offline available dataset which was already collected by another source.

The screenshot shows a Google Forms interface for a 'Campus Management System'. The form is titled 'Campus Management System' and includes a header with the email '20051402@kiit.ac.in' and a 'Switch account' link. A note states: 'The name, email, and photo associated with your Google account will be recorded when you upload files and submit this form.' Below this, there is a red asterisk indicating required fields. The form contains several input fields: 'Branch \*', 'Year \*' (with radio buttons for 1 to 5), 'Section \*', 'Mobile Number \*', 'Name \*', and 'Roll Number \*'. Each field has a 'Your answer' placeholder. There is also an 'Upload Image of your face(minimum 5)' section with an 'Add file' button. At the bottom, there is a toggle for 'Send me a copy of my responses.' and a 'Submit' button. A 'Clear form' link is also present. A footer note says 'Never submit passwords through Google Forms.'

Figure 2 – Online data collection form

## Data Preparation

Once we have collected the data, we'll need to read it in our model. So, we converted the data into a CSV (comma-separated value) file as it is one of the simplest platform-independent approaches. The CSV file contains only the filename followed by ';' followed by the label (integer value) of the corresponding image.

Each line in the CSV file will look like this:

/path/image.jpg; 0

## 4.2 Testing

### Encoder File

```

1 import cv2
2 import numpy as np
3 import face_recognition
4 import os
5 import pickle
6
7 path = 'E:\Face Recognition Based Attendance System'
8 trainingImages = 'Training_Images'
9 dataset = 'dataset_faces.dat'
10 images = []
11 classNames = []
12 myList = os.listdir(path+'/'+trainingImages)
13 #print(myList)
14
15 #Find Names
16 for cl in myList:
17     curImg = cv2.imread(f'{path}/{trainingImages}/{cl}')
18     images.append(curImg)
19     classNames.append(os.path.splitext(cl)[0])
20
21
22 def findEncodings(images):
23     encodeList = {}
24     i = 0
25     for img in images:
26         img = cv2.cvtColor(img, cv2.COLOR_BGR2RGB)
27         encode = face_recognition.face_encodings(img)[0]
28         encodeList[classNames[i]] = encode
29         i += 1
30     return encodeList
31
32 print('Encoding Started...')
33 all_faces_encodings = findEncodings(images)
34 with open(f'{path}/{dataset}', 'wb') as f:
35     pickle.dump(all_faces_encodings, f)
36
37 print('Encoding Complete.')
```

```

Encoding Started...
Encoding Complete.
```

**Figure 3– Encoder File code**

This is the first file of our model which is used to train the model on the given images as well as store the training data in a file for later use. In this file, we have taken use of multiple libraries. CV2 is used to read images from the directory and convert the images into a proper format for pre-processing to take place. We will be labeling each image with the student's roll number so as to make it easier to mark the attendance in the system using these labels only. So now our program reads the images, stores the label mapped with the images, and then cv2 converts these images into proper format. Now we use dlib library's pre-trained face recognition model which works on a deep learning model to get our encoding for each image. These encodings are what we need to, later on, match to recognize the face. After all the encodings have been calculated we then store these encodings into a .dat file for later use. Storing these encodings enables us to make the attendance marking process go faster as we will not have to retrain the model whenever we need to mark the attendance for any class.

## Attendance Marking File

```

1 import cv2
2 import numpy as np
3 import face_recognition
4 import os
5 from datetime import datetime
6 import pickle
7
8 path = 'E:\Face Recognition Based Attendance System'
9 attendance = 'Attendance 1 May.csv'
10 dataset = 'dataset_faces.dat'
11 with open(f'{path}/{dataset}','rb') as f:
12     all_faces_encodings = pickle.load(f)
13
14 classNames = list(all_faces_encodings.keys())
15 encodeListKnown = np.array(list(all_faces_encodings.values()))
16
17 file = open(f'{path}/{attendance}','w')
18
19 def markAttendance(name):
20     with open(f'{path}/{attendance}','r+') as f:
21         myDataList = f.readlines()
22         nameList = []
23         for line in myDataList:
24             entry = line.split(',')
25             nameList.append(entry[0])
26         if name not in nameList:
27             now = datetime.now()
28             dtString = now.strftime('%H:%M:%S')
29             f.writelines(f'{name},{dtString}\n')
30
31 cap = cv2.VideoCapture(0)
32
33 while True:
34     success, img = cap.read()
35     imgs = cv2.resize(img,(0,0),None,0.25,0.25)
36     imgs = cv2.cvtColor(imgs,cv2.COLOR_BGR2RGB)
37
38     facesCurFrame = face_recognition.face_locations(imgs)
39     encodesCurFrame = face_recognition.face_encodings(imgs,facesCurFrame)
40
41     for encodeFace, faceLoc in zip(encodesCurFrame, facesCurFrame):
42         matches = face_recognition.compare_faces(encodeListKnown,encodeFace)
43         faceDis = face_recognition.face_distance(encodeListKnown,encodeFace)
44         #print(faceDis)
45         matchIndex = np.argmin(faceDis)
46
47         if matches[matchIndex]:
48             name = classNames[matchIndex].upper()
49             print(name)
50             y1,x2,y2,x1 = faceLoc
51             y1,x2,y2,x1 = y1*4,x2*4,y2*4,x1*4
52             cv2.rectangle(img,(x1,y1),(x2,y2),(0,255,255),2)
53             cv2.rectangle(img,(x1,y2-35),(x2,y2),(0,255,0),cv2.FILLED)
54             cv2.putText(img,name,(x1+6,y2-6),cv2.FONT_HERSHEY_COMPLEX,1,(255,255,255),1)
55             markAttendance(name)
56
57
58
59 cv2.imshow('Webcam',img)
60 cv2.waitKey(1)

```

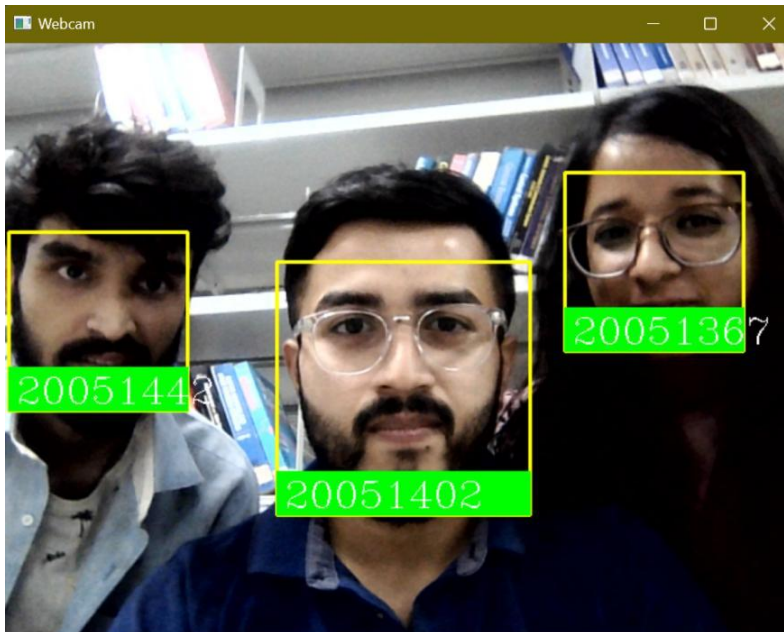
Figure 4-Attendance marking file

This is the main working file with the help of which we use the webcam to get the images of students in real-time and use the trained data to recognize the face and mark the attendance of the student with the time stamp in a CSV file. After finding the new encoding from the webcam we compare it with the training model encodings if a match is found we call the markAttendance() function which opens a CSV file and adds a row in it with the student's SAP ID as well as the time stamp. If by any chance the same face is encountered again, we ignore it so as to prevent multiple entries for the same student.



### 4.3 Result Analysis

#### Model in Action



	A	B	C
1	20051402	12:33;07	
2	20051367	12:33;07	
3	20051442	12:33;24	
4			
5			
6			

Figure 5 – Model in action & CSV file

### 4.4 Quality Assurance

To ensure a high-quality CMS app, a comprehensive quality assurance process must be implemented. This process includes verifying the accuracy and dependability of the facial recognition technology used for attendance marking, ensuring that the app provides a user-friendly interface for managing attendance and accessing college activities, evaluating the app's ability to easily communicate information about college events and activities, testing new features proposed to add value to the app and meet college needs, and more.

To evaluate usability, conducting user testing is necessary to ensure the UI is intuitive, user-friendly, and accessible while conforming to accessibility guidelines for users with disabilities. Performance testing should ensure the app can handle heavy usage and large volumes of data and perform well under different network conditions, while safeguarding user data.

## Backend Development using MongoDB with Node.js:

The portion of any application that is hidden from end users—but visible to administrators and developers—is called the backend. Any application's server-side is what it is. The program facilitates users' access to information. It gathers, aggregates, and modifies the data before returning it to the user with the desired formatting. Writing libraries, developing APIs, and interacting with the server without a graphical user interface are all examples of backend tasks.

One popular technology stack for backend development is MongoDB with Node.js. MongoDB is a NoSQL database that allows for flexible and scalable data storage, while Node.js is a runtime environment that enables server-side JavaScript execution. Together, they provide a powerful and efficient solution for building robust backend systems. By using MongoDB with Node.js, developers can easily handle data operations, perform complex queries, and create APIs to connect the frontend and backend components of an application.

**Backend Languages:** The following languages are used to create the backend of any application:

- ❖ PHP is a scripting language that was created primarily for web development. PHP is characterized as a server-side scripting language since it is performed on the server.
- ❖ C++: C++ is a competitive programming language that is object-oriented. It can also be utilized on the backend
- ❖ Java is a programming language that is also object-oriented and has a high scalability. The code is platform-neutral and can run on multiple computers.
- ❖ Python: This is a simple-to-learn programming language that's mostly used for machine learning and developing scripts.
- ❖ JavaScript: This scripting language is utilized in web development to create interactive and responsive webpages.
- ❖ Node.js: Node.js is a cross-platform, open-source runtime environment that allows JavaScript code to be executed directly from a browser. We are utilizing MongoDB as our database and Node.js as our backend language.

## Node.js:

### Node.js Architecture

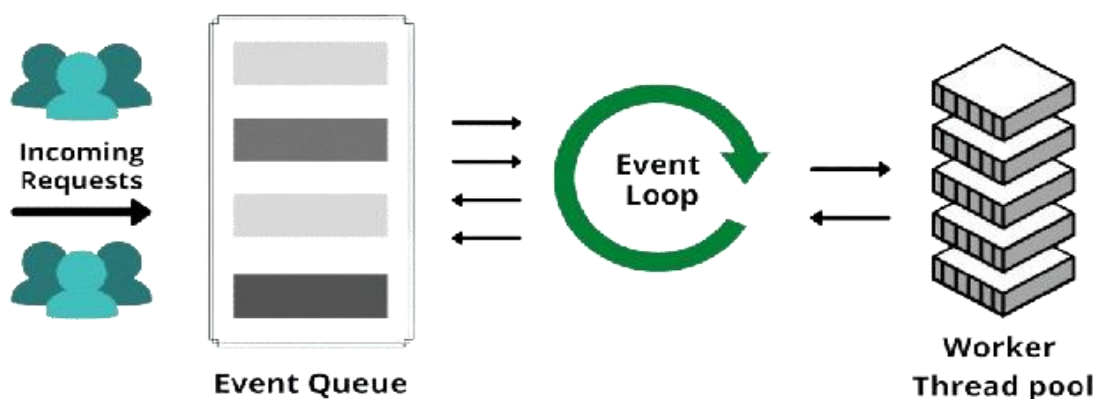


Figure 6- Node.js Architecture

Node.js is a component that depends on the JavaScript runtime on Chrome to enable the development of quick and flexible association apps. Because Node.js employs an event-driven, non-detracting I/O approach, it is both lightweight and practical, making it the perfect choice for data-driven, continuous applications that uncover distributed devices. Node.js is neither a programming language, nor is it a framework. This programming language is used to create back-end systems, such as mobile applications and web applications with APIs. Numerous organizations, like PayPal, Uber, Netflix, Walmart, and others, use it on a daily basis.

Node.js features include:

- ❖ Open-source
- ❖ Functions on multiple operating systems (Windows, Mac, Linux, etc.)
- ❖ Event-driven and asynchronous
- ❖ Extremely Quick
- ❖ Highly Scalable with a Single Thread

### **MongoDB:**

MongoDB is one of the most widely used databases. MongoDB: MongoDB is a multi-stage record-based database system. MongoDB, a NoSQL data set application, uses archives that resemble JSON and optional diagrams. In addition to being developed by MongoDB Inc., MongoDB is licensed under the Server-Side Public License. As a report information base, MongoDB stores data in records that resemble JSON. We acknowledge that this is the most widely used method for thinking about information and that it is far more remarkable and expressive than the traditional line/segment model.

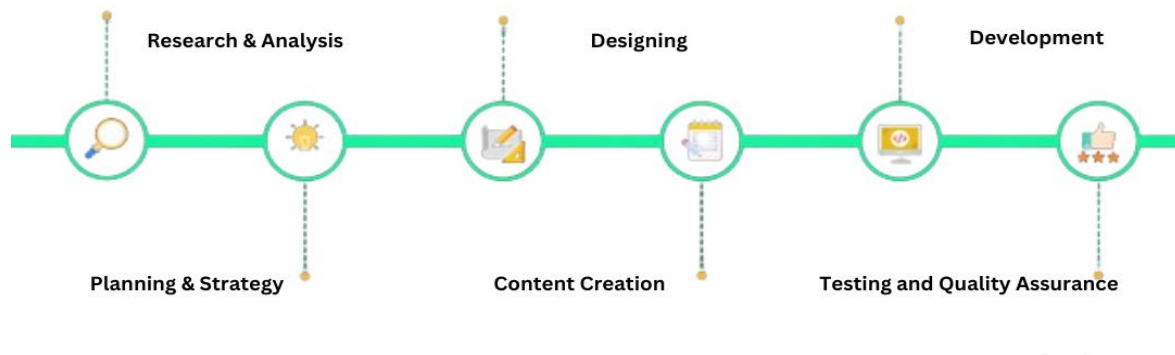
<b>MySQL</b>	<b>MongoDB</b>
Database	Database
Table	Collection
Index	Index
Row	BSON Document
Column	BSON Field
Join and linking	Embedded documents
Primary key	Primary key
Group by	Aggregation

**Table 1 MySQL vs. MongoDB terms**

## **Front End Development**

The front-end development process of loading a website involves several steps. First, the browser sends a request to the server for the website's HTML file. Once the HTML file is received, the browser starts parsing it and begins building the Document Object Model (DOM) tree. As the DOM tree is being constructed, the browser also downloads any external resources referenced in the HTML, such as CSS stylesheets and JavaScript files. Finally, once all resources are downloaded and parsed, the browser renders the website.

## 7 Phases of Web Development Life Cycle



**Figure 7- Web Development Life Cycle**

### A) Web Application

We have employed the following features to produce a responsive web application:

1. The web page's content is defined by HTML.
2. The web page's design and layout are specified by CSS.
3. The online page behavior using JavaScript programs, CSS and HTML

Markup language for hypertext is represented by HTML. It is the common markup language for pages that define the content's style. They consist of the site's structural elements. With HTML, users may create and modify sections, headings, links, and more on a website by using various

labels and elements. The possibilities are endless. With the help of a specific HTML code, you should be able to construct almost anything on a webpage.

However, the report style—which includes text styles, page designs, and tone—is determined by CSS. To give HTML elements on website pages a particular appearance, CSS associates with them. JavaScript The language known as JavaScript is used to create and manage content on websites, enabling you to program a page's behavior to carry out a certain task.

JavaScript is a fundamental language that has a long list of programming features that let you perform a lot of different things with your website. For example, JavaScript is used to execute code in response to certain events on the webpage. Should you have included a "tick" event in your code, it would detect when a catch is pressed and initiate the associated action.

JavaScript then suggests to websites or applications to perform a task again, without requiring a page reload, improving relationships.

**Bootstrap:** A free and open-source CSS framework called Bootstrap enables easy, responsive first-party web development. It includes layout designs for typography, structures, gets, courses, and other interface elements that are built on JavaScript and (then again) CSS.

## **Backend Program**

We utilized REST Architecture in the Backend Application. Representational State Transfer is referred to as REST. This architectural style is employed in the development of interactive apps. A subset of HTTP was utilized. We developed our APIs using REST. Application Programming Interface is referred to as API. It is a collection of development and integration protocols for application software.

In the project, we have created three APIs for student:-

- ❖ Student Signup
- ❖ Student Login
- ❖ Student Profile Student Signup

### **Student Signup:**

- The student's phone number and email address are initially examined in the Signup API to determine whether or not the student has already registered.
- We will save all the information and create a user account for the student if they haven't registered yet. After being hashed, the password is entered into the database.
- After that, a special token for the student login is created and sent back to the frontend to confirm the student signup.

### **Student Login:**

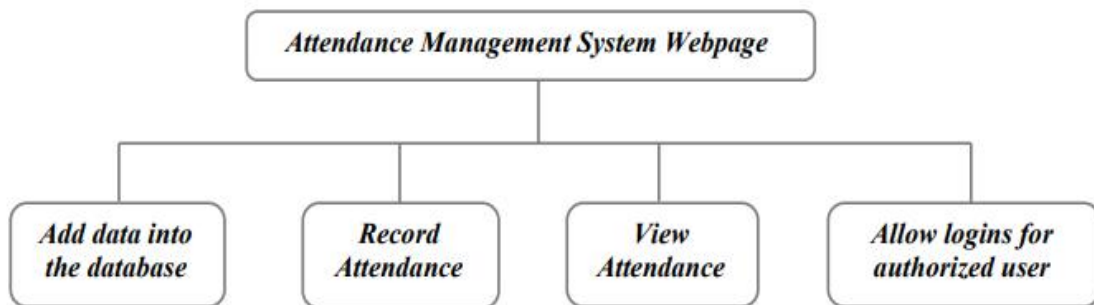
We have included two methods for signing in to the Login API:

1. Via email.
2. Via Facebook.

- The login credentials obtained from the request are verified in the database.
- A token will be generated and sent back in response if the credentials match; if not, an error message will be sent.

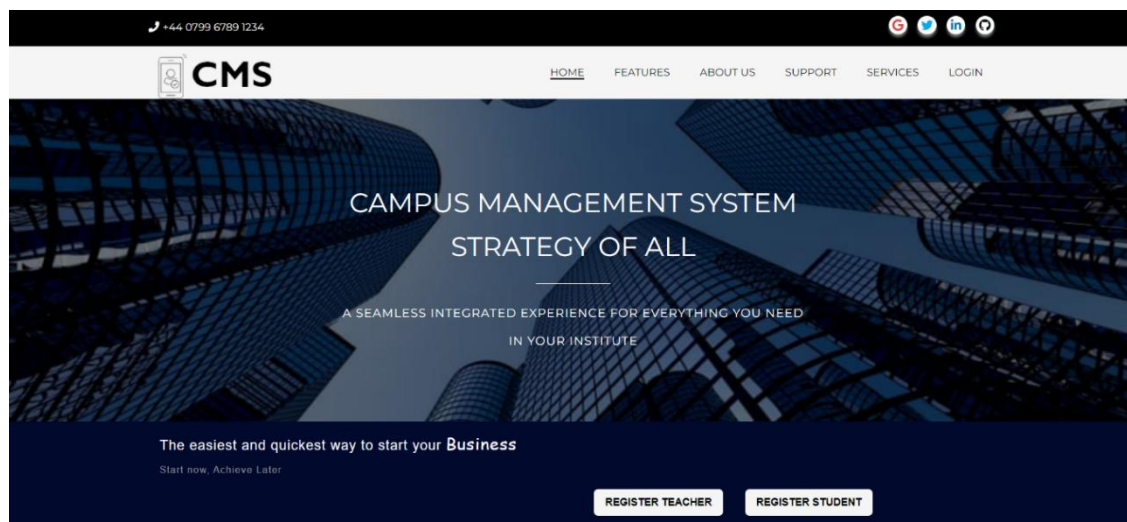
**Student Profile:**

- The user details will be supplied in response to a request made through the Profile API if the request headers contain a valid bearer token.
- We shall provide an error message in response if the request headers contain an invalid token or no token at all.

**Frontend Web Application:****Figure 8: Summary of Services Provided by the CMS webpage**

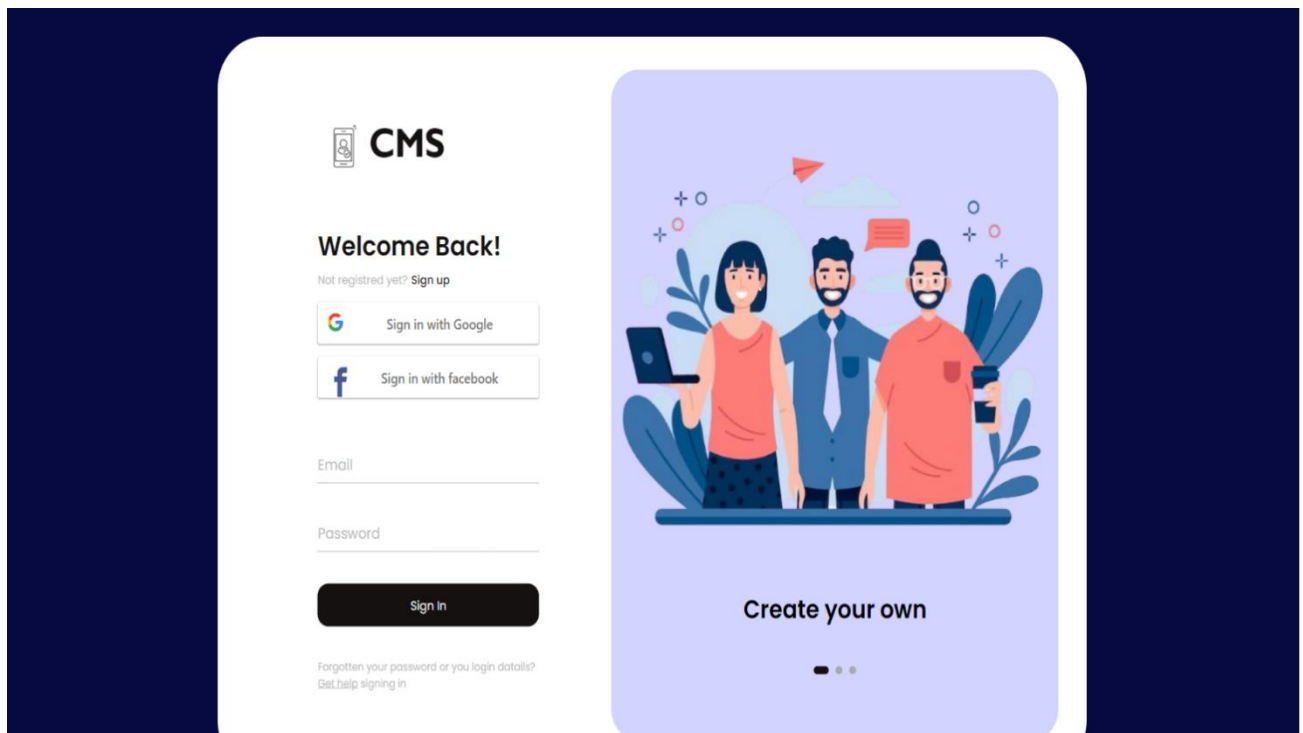
We have built three webpages in phase 2 of the project:-

- ❖ Home Page
- ❖ Login Page
- ❖ Registration Page

**Home Page:****Figure 9: Home Page of CMS Website**

- This page greets the user initially.
- CMS's home page.
- The user can access every function and component of the CMS by using this page.
- It provides the user with access to various parts of the website.
- At the bottom of this page, there is a form for questions and feedback.
- Interactive animations are also displayed underneath CMS's social media handles.
- This page makes use of a number of contemporary CSS features.

### Login Page:

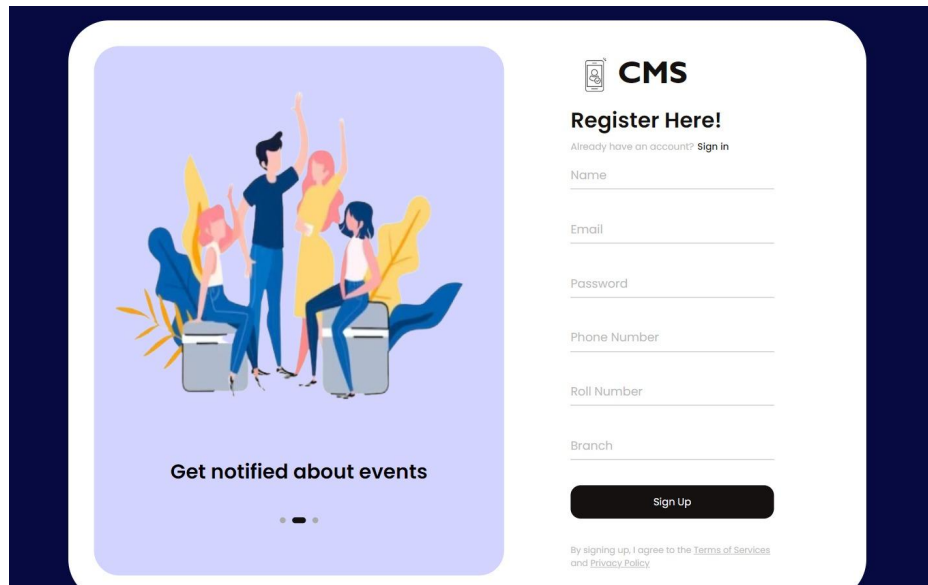


**Figure 10: Login Page of CMS Website**

- There is a page for registered users to log in to. Students can access their accounts with ease. Users who have forgotten their password also have an option.
- Authorized User Login: In this project, the attendance management system webpage designed is protected by authorized logins.
- For those who have not yet registered, a registration link is provided at the end; otherwise, they will be redirected to the login page.
- Auto-fill is enabled on the email and password request form.



## Registration Process:



**Figure 11: Registration Page of CMS Website**

The 'Register Student' link directs us to the google form which is to be filled by the student in order to register for the attendance process.

## Teacher Login Functionality

### Overview

The Teacher Login functionality is designed to provide educators with a secure access point to manage attendance using facial recognition technology. Upon successful login, teachers will gain access to their classes and have the capability to take attendance for each specific classroom they oversee.

### Features

- **Authentication:** Teachers will have unique credentials (username/password) to access the platform securely. Multi-factor authentication can also be implemented for added security.
- **Dashboard Overview:** Upon logging in, teachers will be directed to a personalized dashboard displaying all the classes they are assigned to, allowing them to select the specific classroom for attendance.
- **Classroom Details:** Upon selecting a classroom, the teacher will be presented with comprehensive details about that particular class. This may include:
  - ❖ Class name and section
  - ❖ Scheduled time and date
  - ❖ Number of enrolled students

### Attendance Taking Interface:

Once the classroom is selected, the teacher will have access to the attendance-taking interface. This interface will feature:

Option to initiate face recognition functionality through the camera for authentication purposes.  
List of enrolled students with their names and photos for easy identification.



**Real-time Updates:**

The attendance records will be updated in real-time upon the teacher's action, providing immediate feedback on the presence of students.

**Accessibility:** The system will be responsive and accessible from various devices, enabling teachers to take attendance remotely if needed.

## Workflow

**Login Process:**

Teacher navigates to the login page and enters their unique credentials (username and password). Upon successful authentication, the system verifies the teacher's identity and grants access to the dashboard.

**Dashboard and Classroom Selection:**

The teacher is presented with a dashboard showcasing all classes they are assigned to. Upon selecting a class, the system fetches and displays detailed information about the chosen classroom.

**Taking Attendance:**

The teacher initiates attendance for the selected class.

The system activates the face recognition feature through the camera.

Enrolled student details along with their photos are displayed for the teacher to mark attendance.

**Attendance Submission:**

After confirming attendance, the teacher submits the records.

The system updates the attendance database in real-time, reflecting the changes instantly.

## Chapter 5

# Standards Adopted

### 5.1 Design Standards

A software project's design is a crucial undertaking that needs considerable planning and thought. Here are a few guidelines for designing software projects:

- Clearly State Project Objective
- Utilize Proper Architecture
- Design a Modular Structure
- Adhere to Industry Standards
- Think about Scalability
- Make maintenance plans
- Implement design patterns
- Verification Control

### 5.2 Coding Standards

Coding standards are collections of coding rules, guidelines, and best practices. A few of the coding standards are:

- Try to write as few lines as you can.
- Adopt sensible naming practices.
- Divide code snippets from the same section into paragraphs.
- Indent control structures at their beginning and end using indentation. Indicate the connection between them in detail.
- Avoid calling long functions. A single function should, ideally, complete a single task

### 5.3 Testing Standards

There are some ISO and IEEE standards for quality assurance and testing of the product. The standards followed for testing and verification of our project work include

(1) Unit Testing: The most compact testable unit of a software program is tested. Developers carry it out throughout the coding phase.

(2)Regression Testing: Regression testing verifies that no new mistakes have been added to the software after the adjustments have been made by testing the modified portions of the code and the portions that may be impacted due to the alterations.

## Chapter 6

# Conclusion and Future Scope

### 6.1 Conclusion

Our proposed model of automatic attendance marking through the use of Python's Deep learning model for face detection is a significant technological achievement that has the potential to revolutionize the process of attendance-taking. The traditional method of taking attendance in a classroom involves a teacher calling out each student's name and manually ticking off their presence on a sheet of paper. This process can be time-consuming and prone to errors.

Our model simplifies this process by using facial recognition technology to identify each student as they enter the classroom. The system captures a photo of each student's face, compares it to a database of known faces, and automatically marks their attendance accordingly. This approach saves valuable lecture time that would otherwise be spent on attendance-taking, allowing the teacher to focus on delivering more content or answering questions and doubts.

The potential benefits of this technology are clear, and more educational institutions will likely adopt it in the future to improve the efficiency and accuracy of attendance-taking.

### 6.2 Future Scope

In the future, this attendance system could be enhanced with new features such as integration with biometric technologies or machine learning-based analytics. Additionally, mobile app integration could provide an even more convenient way for users to access their attendance records and for teachers to mark attendance.

In the future, expanding our attendance management system by integrating a dedicated mobile application presents a promising avenue. This integration aims to offer students and teacher's a convenient access to attendance-related functionalities on their smartphones or tablets. The mobile app will replicate the web platform's features, enabling users to view schedules, mark attendance, and receive real-time notifications.

The system could also incorporate IoT devices or augmented reality to create a more interactive and engaging experience for users. Furthermore, gamification elements could be introduced to motivate students to improve their attendance and engagement.

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## INDIVIDUAL CONTRIBUTION REPORT:

### CAMPUS MANAGEMENT SYSTEM

AKSHAT SINGH  
20051402

**Abstract:** Monitoring student attendance is a crucial aspect of any institution for assessing student performance. However, manually taking attendance during lectures can be time-consuming, taking up to 20% of the lecture time. This time could be better spent elsewhere. Our goal is to simplify the attendance marking process, which can often be perceived as a daily burden. To achieve this, we propose implementing a face recognition attendance system that will automatically mark attendance, thereby reducing the instructor's workload.

**Individual contribution and findings:** played a key role in providing coding solutions, software support, and data management. This involved evaluating the software to meet the user's requirements. I worked on implementing various codes to automate the attendance processes, which greatly reduced the time and effort required to take attendance manually. My contribution to the project was vital in making the attendance processes seamless, efficient, and reliable.

**Individual contribution to project report preparation:** my contributions included drafting the introduction and writing the abstract. In addition, I was responsible for identifying and elaborating on all the problem statements and system requirements. By taking up these tasks, I played a vital role in setting up the project, ensuring that the goals and objectives were clear and well-defined. My efforts contributed to the smooth running of the project and helped in achieving its ultimate goals.

**Individual contribution to project presentation and demonstration:** In addition to my other contributions, I took charge of the coding standards employed in the project. I also shared the project's objectives and outlined its potential future possibilities. By doing so, I ensured that all members had a clear understanding of the project's scope and its technical aspects, which helped facilitate effective collaboration and decision-making.

Full Signature of Supervisor:

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Full signature of the student:

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## CAMPUS MANAGEMENT SYSTEM

SHUBHRA SINHA

20051367

**Abstract:** Monitoring student attendance is a crucial aspect of any institution for assessing student performance. However, manually taking attendance during lectures can be time-consuming, taking up to 20% of the lecture time. This time could be better spent elsewhere. Our goal is to simplify the attendance marking process, which can often be perceived as a daily burden. To achieve this, we propose implementing a face recognition attendance system that will automatically mark attendance, thereby reducing the instructor's workload.

**Individual contribution and findings:** played a key role in collecting image data and conducting surveys to gain a comprehensive understanding of the current scenario. Afterward, I meticulously analyzed all the datasets and their usefulness in obtaining the desired results. Helped in debugging and deployment of the code.

**Individual contribution to project report preparation:** played a key role in collecting image data and conducting surveys to gain a comprehensive understanding of the current scenario. Afterward, I meticulously analyzed all the datasets and their usefulness in obtaining the desired results. Helped in debugging and deployment of the code. I also took charge and meticulously crafted the website from scratch and transformed it into a dynamic, visually appealing, and user-friendly digital platform using HTML, CSS and Javascript.

**Individual contribution to project presentation and demonstration:** In the presentation, I created the section that outlined the features of our model, the section that outlines what the website of our project includes, the technology used to develop the model and finally the functional and non-functional requirements, along with the constraints, and added a detailed final touch to the presentation.

Full Signature of Supervisor:

.....

Full signature of the student:

.....



## **CAMPUS MANAGEMENT SYSTEM**

**HARSHIT MISHRA**

**20051442**

**Abstract:** Monitoring student attendance is a crucial aspect of any institution for assessing student performance. However, manually taking attendance during lectures can be time-consuming, taking up to 20% of the lecture time. This time could be better spent elsewhere. Our goal is to simplify the attendance marking process, which can often be perceived as a daily burden. To achieve this, we propose implementing a face recognition attendance system that will automatically mark attendance, thereby reducing the instructor's workload.

**Individual contribution and findings:** I played a role in developing the design solution to solve our attendance marking and maintenance problem and also took a role in ensuring the robustness and reliability of our attendance management system through comprehensive testing and quality assurance measures. I helped in the integration of facial recognition technology into our attendance management system, enabling secure authentication and streamlined attendance marking. My primary focus and significant contribution within the project centered around Backend Development using REST API, where I played a pivotal role in architecting and implementing the system's core functionalities.

**Individual contribution to project report preparation:** My contributions to the project also included preparing major report writing areas, such as model training and testing, as well as implementing techniques to ensure their success. I wrote the sections pertaining to backend development in the report. I helped in Technical Documentation, detailing the backend architecture, API endpoints, database schema, and the overall system design. Also contributed to the literature survey section.

**Individual contribution to project presentation and demonstration:** I prepared the part of the PowerPoint presentation that contained the problem statement, introduction, and abstract of the project and also backend application which I explained during the presentation.

Full Signature of Supervisor:

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Full signature of the student:

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## **CAMPUS MANAGEMENT SYSTEM**

SHUBHAM DALAI  
20051440

**Abstract:** Monitoring student attendance is a crucial aspect of any institution for assessing student performance. However, manually taking attendance during lectures can be time-consuming, taking up to 20% of the lecture time. This time could be better spent elsewhere. Our goal is to simplify the attendance marking process, which can often be perceived as a daily burden. To achieve this, we propose implementing a face recognition attendance system that will automatically mark attendance, thereby reducing the instructor's workload.

**Individual contribution and findings:** I played a role in developing the design solution and also I conducted thorough cross-browser testing using tools like BrowserStack to guarantee compatibility across popular browsers, including Chrome, Firefox, Safari, and Edge. I actively contributed to setting up and optimizing the database structure, utilizing MySQL to efficiently manage student and class data. Through rigorous testing and debugging, I resolved different issues and collaborated closely with other members to ensure smooth integration.

**Individual contribution to project report preparation:** My contributions to the project also included preparing major report writing areas, such as conclusion and future scope as well as implementing techniques to ensure their success. Also, made some contributions to other parts of the document.

**Individual contribution to project presentation and demonstration:** I prepared the part of the PowerPoint presentation that contained the future scope and conclusion, which I explained during the presentation.

Full Signature of Supervisor:

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Full signature of the student:

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# TURNITIN PLAGIARISM REPORT

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