A

PROJECT ON

"FACE RECOGNITION BASED SMART ATTENDANCE SYSTEM"

SUBMITTED TO THE SAVITRIBAI PHULE PUNE UNIVERSITY, PUNE IN THE PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF

BACHELOR OF ENGINEERING (COMPUTER ENGINEERING)

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2022 -23

CERTIFICATE

This is to certify that the report entitled

"FACE RECOGNITION BASED SMART ATTENDANCE SYSTEM"

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are bonafide students of this institute and the work has been carried out by them under the supervision of **Prof. G.T. Mane** and it is approved for the partial fulfillment of the requirement of Savitribai Phule Pune University, for the award of the degree of **Bachelor of Engineering (Computer Engineering).**

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ABSTRACT

Our project focuses on the utilization of face detection and face recognition technologies, which have extensive applications in various fields such as mobile devices, military operations, and secure office environments. We aimed to develop a facial recognition system specifically for student attendance, aiming to replace traditional paper-based and fingerprint-based attendance systems.

The core functionality of our project is implemented using LabVIEW, a powerful programming tool known for its effectiveness in facial recognition and other related applications. Our project revolves around a LabVIEW program that effectively detects and recognizes faces, assigning scores and parameters accordingly. Additionally, we have incorporated subsystems including an Excel sheet that integrates with the program, storing students' names, and a messaging device designed to send notifications to absent students or their parents.

The key components of our project consist of the LabVIEW program as the primary system, complemented by the subsystems of an Office Excel sheet for student information management and a computer or laptop to facilitate seamless integration of the various programs.

Overall, our project addresses the need for an efficient and reliable student attendance system by leveraging the power of facial recognition technology and LabVIEW programming. By integrating different components, we aim to provide a comprehensive solution that simplifies attendance management and enhances communication with both students and their parents.

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ABBREVIATIONS

ML	Machine Learning
LBPH	Local Binary Pattern Histogram
SDLC	Software Development Life Cycle
SQL	Structured Query Language
CSS	Cascading Style Sheets
HTML	Hypertext Markup Language
UI	User Interface
FERET	Face Recognition Technology
DARPA	Defense Advanced Research Projects Agency
NIST	National Institute of Standards and Technology
FRVTs	Face Recognition Vendor Tests
ORM	Object -relational Mapping

CHAPTER 1
INTRODUCTION

Introduction

The "Facial Recognition-Based Attendance System for Educational Institutions" project aims to develop a robust and efficient attendance management system using facial recognition technology. By replacing traditional attendance methods, the system focuses on improving data accuracy, time efficiency, and accessibility to attendance records. It integrates various subsystems, including an Excel sheet and messaging system, to enhance functionality and user experience.

The objectives of the project are to develop a facial recognition system that accurately detects and recognizes faces for attendance tracking, replacing manual attendance systems with an automated and efficient solution. The project aims to improve data accuracy by eliminating false attendance recording and enhance time efficiency through automation. Additionally, it provides easy access to attendance records through a secure database, integrating an Excel sheet subsystem for seamless data management. The implementation of a messaging system allows for notifications to absent students or parents.

The project's success will be validated through extensive testing to ensure reliable performance. It also aims to provide a user-friendly interface for system interaction and attendance report generation. Furthermore, the project lays the foundation for future enhancements and scalability, allowing for potential expansion and integration with additional features.

By leveraging facial recognition technology, this project aims to revolutionize attendance management in educational institutions. It offers an efficient and convenient solution that improves data accuracy, reduces time consumption, and enhances accessibility to

attendance records for analysis and decision-making. The implementation of the "Haar Cascade" algorithm enables automated attendance marking, eliminating manual processes and reducing the chances of fraudulent or proxy cases. Overall, this system significantly improves efficiency, saves lecture time, and reduces administrative burdens in educational institutions.

1.1 Overview

The project "Facial Recognition-Based Attendance System for Educational Institutions" aims to develop a robust facial recognition system using LabVIEW to replace traditional attendance methods. The system focuses on improving data accuracy, time efficiency, and access to attendance records. It integrates subsystems such as an Excel sheet and messaging system to enhance functionality.

The objectives of the project include developing a facial recognition system that accurately detects and recognizes faces for attendance tracking, replacing traditional attendance systems with a more efficient facial recognition-based solution, and improving data accuracy by eliminating false attendance recording. The project also aims to enhance time efficiency by automating the attendance process and provide easy access to attendance records through a secure database. It incorporates an Excel sheet subsystem for seamless integration and implements a messaging system for notifications to absent students or parents.

The project aims to validate the system's performance through extensive testing, provide a user-friendly interface for system interaction and attendance report generation, and lay the foundation for future enhancements and scalability. By leveraging facial recognition technology, the project aims to revolutionize attendance management in educational

institutions, improving data accuracy, reducing time consumption, and enhancing accessibility to attendance records for analysis and decision-making.

In summary, the project "Face Recognition Based Smart Attendance System" uses the "Haar Cascade" algorithm to automate the attendance marking process. By detecting and comparing faces in the classroom image with a student database, the system accurately records attendance. This eliminates the need for manual marking, reduces the chances of fraudulent or proxy cases, and saves lecture time. The system offers an efficient and convenient solution for attendance management in educational institutions, improving overall efficiency and reducing administrative burden.

1.2 Motivation

According to the previous attendance management system, the accuracy of the data collected is the biggest issue. This is because the attendance might not be recorded personally by the original person, in another word, the attendance of a particular person can be taken by a third party without the realization of the institution which violates the accuracy of the data. For example, student A is lazy to attend a particular class, so student B helped him/her to sign for the attendance which in fact student A didn’t attend the class, but the system overlooked this matter due to no enforcement practiced. Supposing the institution establish an enforcement, it might need to waste a lot of human resource and time which in turn will not be practical at all. Thus, all the recorded attendance in the previous system is not reliable for analysis usage. The second problem of the previous system is where it is too time consuming. Assuming the time taken for a student to sign his/her attendance on a 3-4 paged name list is approximately 1 minute. In 1 hour, only approximately 60 students can sign their attendance which is obviously inefficient and time consuming. The third issue is with the accessibility of those information by the legitimate concerned party. For an example, most of the parents are very concerned to

track their child’s actual whereabouts to ensure their kid really attend the classes in college/school. However, in the previous system, there are no ways for the parents to access such information. Therefore, evolution is needed to be done to the previous system to improve efficiency, data accuracy and provides accessibility to the information for those legitimate party

1.3 Problem Statement

The existing attendance management system suffers from issues of inaccurate data recording, time-consuming manual processes, and lack of accessibility for concerned parties. To address these problems, there is a need to develop a facial recognition-based attendance system that can accurately detect and identify students' faces from a registered database. The system should improve data accuracy, reduce time consumption, and provide accessibility to attendance information for legitimate parties, such as parents, while maintaining efficiency and reliability.

1.4 Historical development prior to the project

Back in the years, attendance management system in school/colleges was done by manual reporting where the student’s attendance was recorded by placing a mark or signature beside their name in a name list to indicate their presence in a particular class. While the staff in the institution will report their attendance through the punch card machine which also have to be done manually. Later, some of those attendance systems had evolved into using smart cards to replace signature markings where each students/staff will be required to report their attendance using a smart card embedded with a unique identification chip.

CHAPTER 2

LITERATURE SURVEY

Literature Survey

2.1 Adarsh Saraswat, Himani Shah, Jimil Shah, Aayushi Shah, Archana Magare (2021) Smart Attendance System Using Feature Descriptors

The research paper "Smart Attendance System Using Feature Descriptors" introduces an intelligent attendance system that utilizes feature descriptors for accurate tracking. It addresses the limitations of traditional methods and proposes a smart solution. The system employs feature extraction techniques like facial recognition or fingerprint analysis, using methods such as Local Binary Patterns (LBP) or minutiae extraction. Machine learning algorithms like Support Vector Machines (SVM) or Convolutional Neural Networks (CNN) are utilized to train the system. The benefits of the proposed system include automation, reduced errors, real-time monitoring, and report generation. The evaluation showcases the system's performance through metrics such as accuracy, precision, and recall. The paper concludes by emphasizing the potential impact of the smart attendance system in improving attendance management processes and reducing administrative burden. Overall, the research paper provides a detailed exploration of an innovative approach to attendance tracking, highlighting the use of feature descriptors, computer vision techniques, and machine learning algorithms.

2.2 Dr. V Suresh, Srinivasa Chakravarthi Dumpa, Chiranjeevi Deepak Vankayala, HaneeshaAduri, Jayasree Rapa (2020) Facial Recognition Attendance System Using Python and OpenCv

The research paper describes the development of a portable Smart Attendance System that utilizes facial recognition technology to record attendance accurately and efficiently. The proposed system aims to reduce the paperwork and time needed for attendance recording, while providing a user-friendly interface for admins and parents to access the attendance database. The objectives of the project include developing a portable and self-powered system, ensuring fast attendance recording speed, accurate facial recognition, database development, and allowing parents to track their child's attendance. The conclusion highlights the advantages of using technology to improve attendance monitoring and eliminate flaws in the old system, with the only cost being sufficient storage space for the face database. Overall, the system successfully addresses the

drawbacks of the old model and provides convenience to users in accessing attendance information.

2.3 Emerald Tuladhar, Avinash Shah, Anusha Hegde and Sai Alekyak (2021) Attendance Monitoring System Based on Face Recognition

This research paper proposes an attendance management system based on face recognition for online classes and meetings during the COVID-19 pandemic. The system extracts facial features and converts them into a numeric representation for recognition. The attendance system triggers a timer and records a timestamp, and the facial recognition process takes place periodically every 15 minutes to emphasize attentiveness and discipline. The system also includes a mailing system that automatically sends an email of the attendees along with the respective timestamp to the host once the session is completed. The proposed system aims to improve the already existing systems for video conferencing that have poor attendance management systems by providing features like keeping track of the students joining and leaving the class and other background activities done during the class. The paper explains the methodology of the process and how the system uses machine learning algorithms to solve the problem of attendance management. The proposed system can also detect masks and send alert mails to the teacher regarding the background activities done by the student during the ongoing class.

2.4 Md. Salah Uddin Yusuf, Azmol Ahmed Fuad (2021) Real Time Implementation of Face Recognition Based Automatic Institutional Attendance System

The research paper proposes an automatic attendance system using face detection and recognition techniques. The system aims to reduce computational time with available hardware to yield more efficient results. The proposed model utilizes Histogram Oriented Gradients and facial encodings derived from facial landmarks. The system addresses the problems related to accuracy of facial recognition and the resource requirement for quick, real-time facial recognition by applying multi-processing. The system has been designed

to operate on its own accord and compute comprehensible feedback without the requirement of any third-party human interference. A Graphical User Interface has been incorporated into the system for maximum user comprehensibility. The paper discusses the proposed methodology, including video capturing or image acquisition, face detection, and face recognition. The paper also documents the improvement in performance in terms of accuracy across two different methods and the improvement in terms of time requirement for the same method using different strategies for demonstration. The proposed system demonstrates the effectiveness of task parallelization with a minimum amount of hardware desiderata.

2.5 Soumitra Chowdhury, Sudipta Nath, Ashim Dey and Annesha Das (2021) Development of An Automatic Class Attendance System Using CNN-Based Face Recognition

The research paper presents the development of a facial recognition-based automatic attendance system using convolutional neural networks for educational institutions and offices. The traditional attendance system is time-consuming and exhausting when done manually, and biometric systems using voice, iris, and fingerprint recognition require complex and expensive hardware support. The proposed system can detect and recognize multiple persons' faces from a video stream and automatically record daily attendance, achieving an average recognition accuracy of about 92%. The system consists of four main stages: data entry, dataset training, face recognition, and attendance entry. The paper describes each stage in detail and presents the implemented system's graphical user interface (GUI). The system's advantages include effortless attendance recording, avoiding the risk of human error, and non-contact, non-interfering process.

CHAPTER 3

SYSTEM REQUIREMENT SPECIFICATIONS

System Requirement Specifications

3.1 Introduction

The "Face Recognition Based Smart Attendance System" project aims to revolutionize the traditional manual attendance management process by implementing facial recognition technology. The existing attendance systems often suffer from issues such as inaccurate data recording, time-consuming processes, and limited accessibility. To overcome these challenges, this project proposes a solution that leverages the "Haar Cascade" algorithm for face detection and identification. By automating the attendance process through facial recognition, the system eliminates the need for manual marking, reduces the chances of fraudulent or proxy cases, and ensures accurate and reliable attendance records. The project also addresses the concerns of data accuracy, time efficiency, and accessibility for concerned parties, such as parents, by providing a secure and user-friendly interface. By improving attendance management, the project aims to enhance efficiency, reduce administrative burden, and provide valuable insights for educational institutions.

3.1.1 Project Scope

The main intention of this project is to solve the issues encountered in the old attendance system while reproducing a brand new innovative smart system that can provide convenience to the institution. In this project, an application will be developed which is capable of recognizing the identity of each individual and eventually record down the data into a database system. Apart from that, an excel sheet is created which shows the students attendance and is directly mailed to the respected faculty.

The followings are the project scopes:

- The targeted groups of the attendance monitoring system are the students and staff of an educational institution.

- The database of the attendance management system can hold up to 2000 individual's information.
- The facial recognition process can only be done for 1 person at a time.
- An excel sheet is created which contains the student attendance and is mailed to the respected faculty.
- The project has to work under a Wi-Fi coverage area or under Ethernet connection, as the system need to update the database of the attendance system constantly.

- The device on which the application is running is powered up by power bank to improve the portability of the application.

3.1.2 Research Objectives

In order to solve the drawbacks of the previous system stated in 1.1, the existing system will need to evolve. The proposed system will reduce the paperwork where attendance will no longer involve any manual recording. The new system will also reduce the total time needed to do attendance recording. The new system will acquire individual attendance by means of facial recognition to secure data accuracy of the attendance.

The following are objectives of the project:

- To develop a portable Smart Attendance System which is handy and self-powered.
- To ensure the speed of the attendance recording process is faster than the previous system which can go as fast as approximately 3 second for each student.
- Have enough memory space to store the database.

- Able to recognize the face of an individual accurately based on the face database.
  ▪ Allow parents to track their child's attendance.
- Develop a database for the attendance management system.
- Provide a user-friendly interface for admins to access the attendance database and for non-admins (parents) to check their child's attendance by mailing the attendance.
- Allow new students or staff to store their faces in the database by using a GUI.
- Able to show an indication to the user whether the face- recognition process is successful or not.

3.2 Project Requirements:

The requirements are the descriptions of the system services and constraints.

3.2.1.1 Functional Requirements:

System functional requirement describes activities and services that must provide. Taking and tracking student attendance by facial recognition in specific time. Sending the names of the absent student directly to the lecturer Permitting the lecturer to modify the student absent or late. Showing the names of who is absent or late in the screen to avoid errors.

3.2.1.2 Non-Functional Requirements:

Nonfunctional Requirements are characteristics or attributes of the system that can judge its operation.

The following points clarify them:

- Accuracy and Precision: the system should perform its process in accuracy and Precision to avoid problems.
- Modifiability: the system should be easy to modify, any wrong should be correct.

- Security: the system should be secure and saving student's privacy.
- Usability: the system should be easy to deal with and simple to understand.
- Maintainability: the maintenance group should be able to fix any problem occur suddenly.
- Speed and Responsiveness: Execution of operations should be fast.

3.2.2 Software Requirements: Windows 10 or higher, SQLite3 and Visual Studio.

Visual Studio: Visual Studio Code, also commonly referred to as VS Code, is a source-code editor made by Microsoft with the Electron Framework, for Windows, Linux, and macOS. Features include support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded Git. Users can change the theme, keyboard shortcuts, and preferences, and install extensions that add functionality. In the Stack Overflow 2022 Developer Survey, Visual Studio Code was ranked the most popular developer environment tool among 71,010 respondents, with 74.48% reporting that they use it.

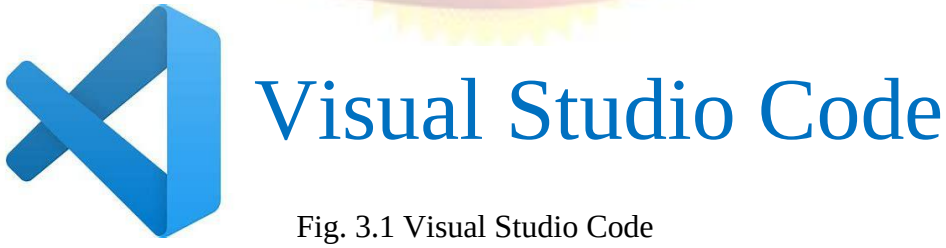


Fig. 3.1 Visual Studio Code

SQLite: SQLite is a lightweight, serverless, and self-contained RDBMS widely used in embedded systems and small-scale applications. It stands out for its simplicity, minimal setup, and single-file operation, enabling easy distribution and deployment. Supporting SQL queries and providing transactional support, it ensures data integrity. Its small footprint makes it ideal for resource-constrained environments like mobile apps, desktop software, and embedded systems. However, SQLite may not be suitable for large-scale applications with high concurrency and throughput requirements. It is best suited for

lightweight applications, prototyping, and scenarios prioritizing simplicity, portability, and efficiency over advanced database features.

Fig. 3.2 SQLite

3.2.3 Hardware Requirements:

Screen, Hard Disc, and RAM

High Resolution Webcam:

A webcam is a type of video camera that is designed to feed or record footage to a computer or computer network. They are mainly employed in video telephony, social networking, live streaming, and security. Webcams are typically connected to a device through USB or wireless protocols. They can be built-in computer hardware or peripheral devices.

Fig. 3.3 Webcam

3.2.4 Technologies Used:

Tools and Technologies Tools and techniques used in the project are described in this section of the thesis. This project focused was mainly focused on Python Programming and its libraries.

3.2.4.1. JavaScript: JavaScript often abbreviated as JS, is a programming language that is one of the core technologies of the World Wide Web, alongside HTML and CSS. As of 2022, 98% of websites use JavaScript on the client side for webpage behaviour, often incorporating third-party libraries. All major web browsers have a dedicated JavaScript engine to execute the code on users' devices. JavaScript is a high-level, often just-in-time compiled language that conforms to the ECMAScript standard. It has dynamic typing, prototype-based object-orientation, and first-class functions. It is multi-paradigm, supporting event-driven, functional, and imperative programming styles. It has application programming interfaces (APIs) for working with text, dates, regular expressions, standard data structures, and the Document Object Model (DOM). The ECMAScript standard does not include any input/output (I/O), such as networking, storage, or graphics facilities. In practice, the web browser or other runtime system provides JavaScript APIs for I/O. JavaScript engines were originally used only in web browsers, but are now core components of some servers and a variety of applications. The most popular runtime system for this usage is Node.js. the two languages are distinct and differ greatly in design.

Fig 3.4 JavaScript

3.2.4.2. HTML:

The Hyper Text Markup Language or HTML is the standard markup language for documents designed to be displayed in a web browser. It is often assisted by technologies such as Cascading Style Sheets (CSS) and scripting languages such as JavaScript. Web browsers receive HTML documents from a web server or from local storage and render the documents into multimedia web pages. HTML describes the structure of a web page semantically and originally included cues for its appearance.

HTML elements are the building blocks of HTML pages. With HTML constructs, images, and other objects such as interactive forms may be embedded into the rendered page. HTML provides a means to create structured documents by denoting structural semantics for text such as headings, paragraphs, lists, links, quotes, and other items.

Fig 3.5 HTML

HTML elements are delineated by tags, written using angle brackets. Tags such as <img/> and <input/> directly introduce content into the page. Other tags such as <p> and <p/> surround and provide information about document text and may include sub-element tags. Browsers do not display the HTML tags but use them to interpret the content of the page.

HTML can embed programs written in a scripting language such as JavaScript, which affects the behaviors and content of web pages. The inclusion of CSS defines the

look and layout of content. The World Wide Web Consortium (W3C), former maintainer of the HTML and current maintainer of the CSS standards, has encouraged the use of CSS over explicit presentational HTML since 1997. A form of HTML, known as HTML5, is used to display video and audio, primarily using the element, together with JavaScript.

3.2.4.3 CSS:

Cascading Style Sheets (CSS) is a style sheet language used for describing the presentation of a document written in a markup language such as HTML or XML (including XML dialects such as SVG, MathML or XHTML). CSS is a cornerstone technology of the World Wide Web, alongside HTML and JavaScript. CSS is designed to enable the separation of content and presentation, including layout, colors, and fonts. This separation can improve content accessibility; provide more flexibility and control in the specification of presentation characteristics; enable multiple web pages to share formatting by specifying the relevant CSS in a separate .css file, which reduces complexity and repetition in the structural content; and enable the .css file to be cached to improve the page load speed between the pages that share the file and its formatting.

Separation of formatting and content also makes it feasible to present the same markup page in different styles for different rendering methods, such as onscreen, in print, by voice (via speech-based browser or screen reader), and on Braille-based tactile devices. CSS also has rules for alternate formatting if the content is accessed on a mobile device. The name cascading comes from the specified priority scheme to determine which style rule applies if more than one rule matches a particular element. This cascading priority scheme is predictable. The CSS specifications are maintained by the World Wide Web Consortium (W3C). Internet media type (MIME type) text/css is registered for use with CSS by RFC 2318 (March 1998). The W3C operates a free CSS validation service for CSS documents. In addition to HTML, other markup languages support the use of CSS including XHTML, plain XML, SVG, and XUL. CSS is also used in GTK widget toolkit.

Fig 3.6 CSS

3.2.4.4 Python: Python is a high-level object-oriented programming language. It was created by Guido van Rossum in 1991 as Python 0.9.0. It was created as the successor of the ABC programming language. Python 2.0 was released on 16 October 2000 and added many features like list comprehension and garbage collecting system. On 3 December 2008, Python 3.0 was released. Python is a very popular programming language and can be used for various purposes. It is widely used for web development, software development, mathematics and data analysis, system scripting, etc. Python is a multi-purpose programming language that works on different platforms like Windows, Linux, Mac, Raspberry Pie, etc. Python is popular than other programming languages because it has a simple syntax than other programming languages. Its syntax allows the programs to write code that is easier to understand and in fewer lines. In this thesis, we use Python for web development. This project demonstrated how Python is used for an effective and reliable web application. Various Python frameworks, libraries are used in this project**.**

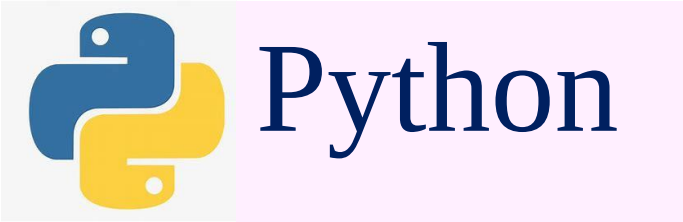


Fig 3.7 Python

3.2.4.5 Django: Django is a high-level web framework based on python. Django was developed between 2003 and 2005 by a team responsible for creating and maintaining newspaper sites. It has continued to grow by releasing Django 1.0 in 2008 through the latest Django 3.1 in 2020. It enables users with rapid and secure development of the websites. It is open source, free with a thriving community, and has up-to-date documentation. Any kind of website can be built using Django. It works on any framework and delivers content in any format (JSON, HTML, XML, etc). Django provides a security framework that helps developers protect their websites. Django uses component-based architecture. It means each component is independent of the other, hence can be easily changed or replaces if needed. It provides a clear separation of different parts that enables to scale for increased traffic at any level by adding hardware. Django uses the Do not Repeat Yourself (DRY) principle. Hence, there is no unnecessary repetition of code. Django is written in Python and hence, can be run on my platforms.

Fig. 3.8 Django

3.2.4.6 OpenCV: OpenCV is an open-source machine learning and computer vision library. OpenCV is a cross-platform library and is free to use. It was launched in 1999. Intel launched OpenCV to advance CPU-intensive applications. It was developed in C++. It provides bindings for Java and Python programming languages. It runs in different operating systems such as Linux, Windows, OSx, etc. It focuses mainly on video capturing, image processing, and analysis. It has face detection 15 and objects detection features. OpenCV can be used to read and write images and capture and save videos. It

can perform feature detection like faces, cars, images, etc. Many established companies like Yahoo, Google, Microsoft, Intel, and many others use the library.

Fig 3.9 OpenCv

3.3 System Implementation Plan

Sr no.	Work Task	Description	Duration
1	Group Formation	Discuss together and form the group	2 weeks
2	Literature Search	Related work done for conceptual data similarity	5 weeks
3	System analysis	Critical analysis and comparison of technologies studied and results achieved inresearch	2 weeks
4	Design and Planning	Modeling and design and dataset searching or creation	4 weeks
5	Implementation	Divided into phases	
	Phase I	Implementation module 1	3 weeks
	Phase II	Implementation module 2	4 weeks

	Phase III	Implementation module 3	3 weeks
	Phase IV	Implementation module 4	3 weeks
6	System Testing	Test system quality, fix errors if any and improve if needed. Test system for different datasets	4 weeks
7	Initial Report	Prepare and upload Initial Report	2 weeks
8	Publication/Conference	Gradiva Review Journal (Volume 9 Issue 4 2023)	4 weeks
9	Final Report	Prepare and upload Final Report	1 week

Table 3.1 System Implementation Plan

CHAPTER 4

Project Plan Execution

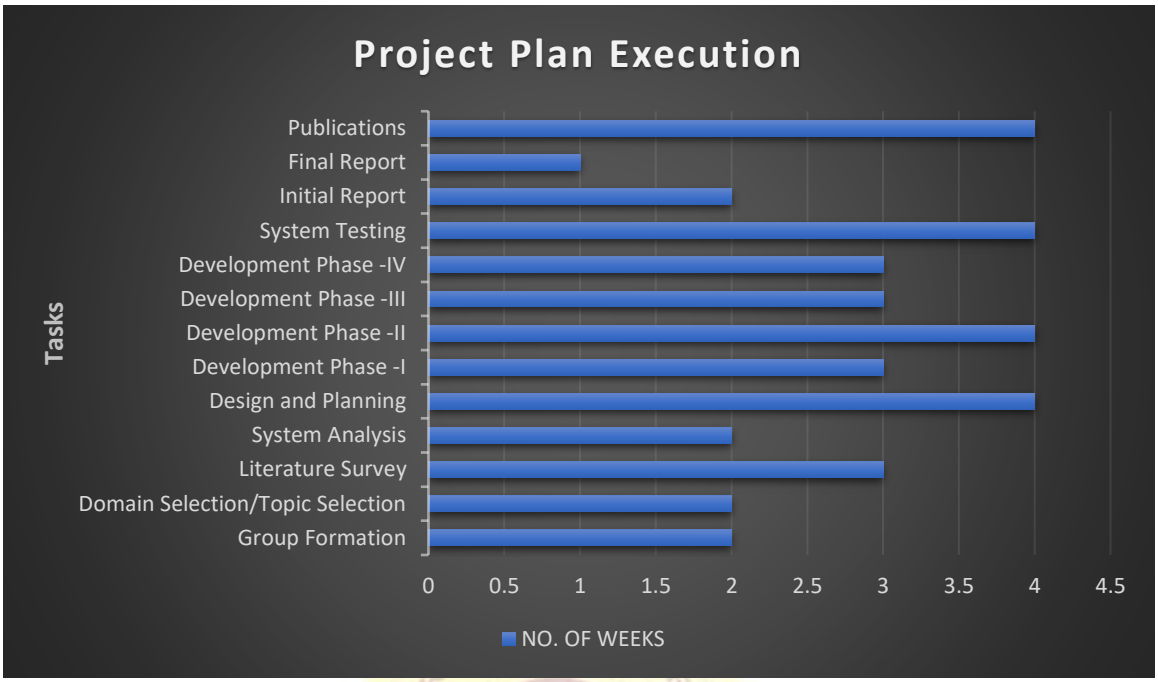


Fig 4.1: Project Plan Execution

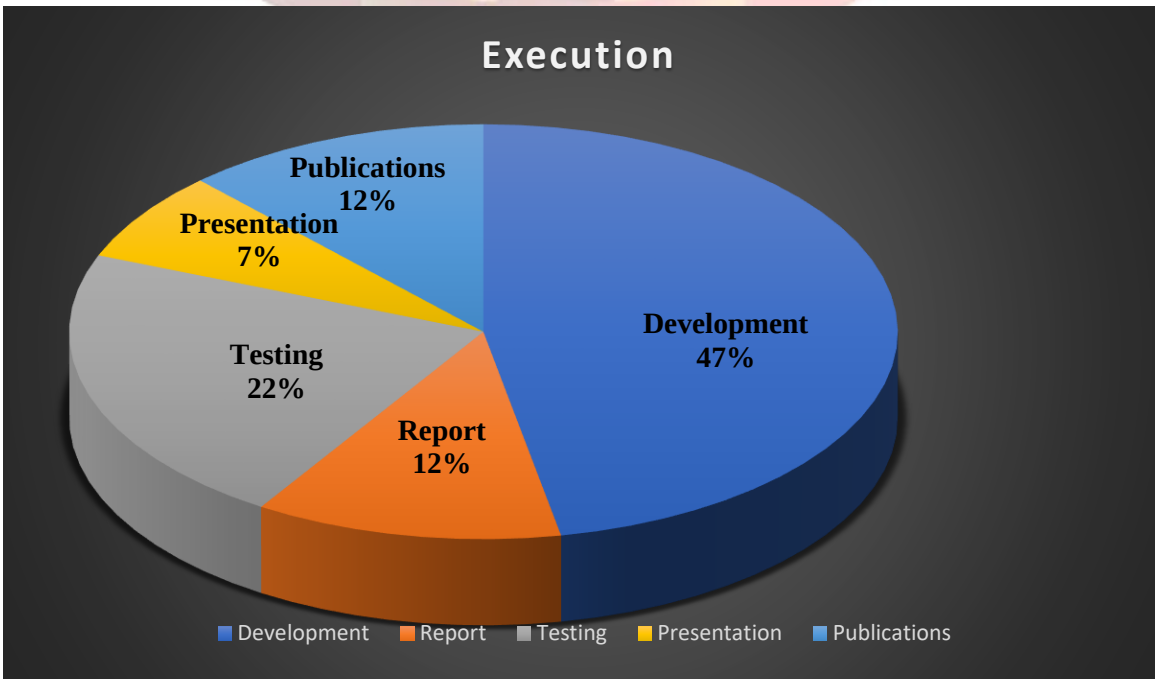


Fig 4.2: Execution

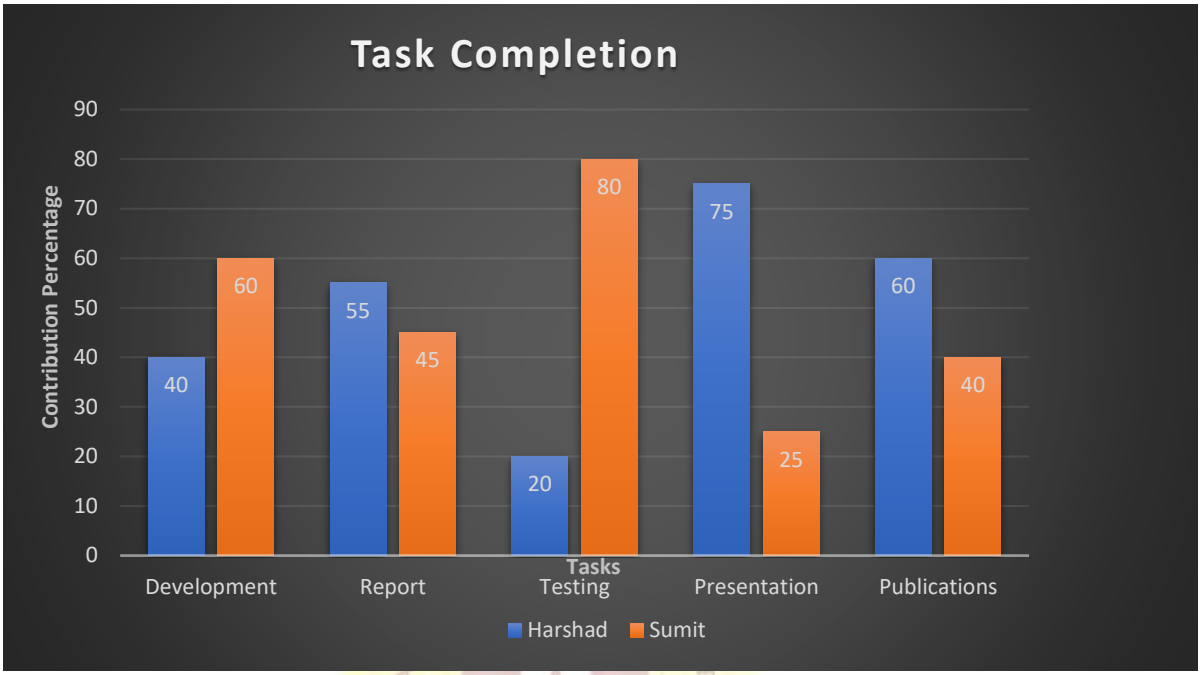


Fig 4.3: Task Completion

CHAPTER 5

IMPLEMENTATION

Implementation

5.1 Existing Methodologies:

PROJECT 1:

This is a project done by students as a final year project at Kingston University London in 2018. The system will be presented an image either via camera or from memory and it must detect the number of faces on it automatically. After identifying faces, the system should crop the faces from the image and store them in memory for image recognition which will be done in the second step. The system should be able to automatically count the number of faces detected on the image. The second step will be the recognition part where the system will be able to match faces from the stored dataset and compare it to the input data from the first step. A software will be used for this system which automatically sorts out the faces. The software will be inter-active so to facilitate interaction between multiple tasks as required. Because the system has two steps, the second phase of the system will involve the training of images on a dataset that are to be used for recognition.

Technology Used The key algorithms are Viola-Jones for face detection and Hidden Markov Model with SVD. • The implementation of The Viola-Jones algorithm is available on softwares like MATLAB, OpenCV and Web Browsers (using adobe flash). • The existing implementation of the Hidden Markov Model with SVD for face recognition are available on MATLAB, C++ and OpenCV libraries.

PROJECT 2:

This is a project done by students as a final year project at University of Nairobi in 2012. The system will comprise of two modules. The first module aka face detector is a mobile component, which is basically a camera that captures student faces and stores them in a file using computer vision face detection algorithms and face extraction techniques. The second module is a desktop application that does face recognition of the captured images

(faces) in the file, marks the students register and then stores the results in a database for future analysis.

Technology Used The following tools will be used in the implementation of the designed system. They've been divided in to two categories; Mobile and Desktop tools. • Mobile Tools The face detection module will use OpenCV library for implementation by use of the frontal Haar Cascade face detector in either Android studio. OpenCV for Android Library - (Open Source Computer Vision) is a library of programming functions mainly aimed at real-time computer vision. Android Studio/ Eclipse IDE - Android Studio is the official IDE for Android application development, based on IntelliJ IDEA. • Desktop Tools EmguCV Library - EmguCV is a cross platform .Net wrapper to the OpenCV image processing library. OpenCV/EmguCV uses a type of face detector called a Haar Cascade. The Haar Cascade is a classifier (detector) trained on thousands of human faces. Visual Studio - Visual Studio is able to build and run the solution examples after a proper configuration of EmguCV. The desktop software will implement the two sub-systems (Training set manager and Face recognizer) together with face detector in windows form.

PROJECT 3:

This is a project done by students as a final year project at University Tunku in 2018 The approach performs face recognition-based student attendance system. This method is also similar to others and begins with the input of an image either loaded from memory or from camera. Then it pre-processes the facial features and extracts it followed by subjective selecting and then the recognition of the facial images from known database. Both LBP and PCA feature extraction methods are studied in detail and computed in this approach in order to make comparisons. LBP is enhanced in this approach to reduce the illumination effect. An algorithm to combine enhanced LBP and PCA is also designed for subjective selection in order to increase the accuracy.

5.2 Proposed Methodology:

Our project is different than all the previous projects made and mentioned above. They have purely used the core of machine vision to implement a face detection mechanism. None of the abovementioned projects have realized the power of LabVIEW programming and LabVIEW Vision modules in which not only pattern matching but other machine vision algorithms like edge tracking, geometric matching can be implemented with ease. Though the general mechanism and flow of events is similar in above projects and our current project however, the mechanism of face detection is completely unique and different.

Projects	1	2	3	Our Project
Face Recognition and Detection	√	√	√	√
Communication(GSM/WiFi)	GSM	GSM	WiFi	WiFi
Time Saving	√			√
Market Demand	√	√	√	√
Local Usage in Schools		√	√	√
Data Saving in Record (Monitoring)	√			√

Table 5.1 Comparative Study of different methodologies

CHAPTER 6

SYSTEM ANALYSIS AND DESIGN

6.1 Work Flow Diagram

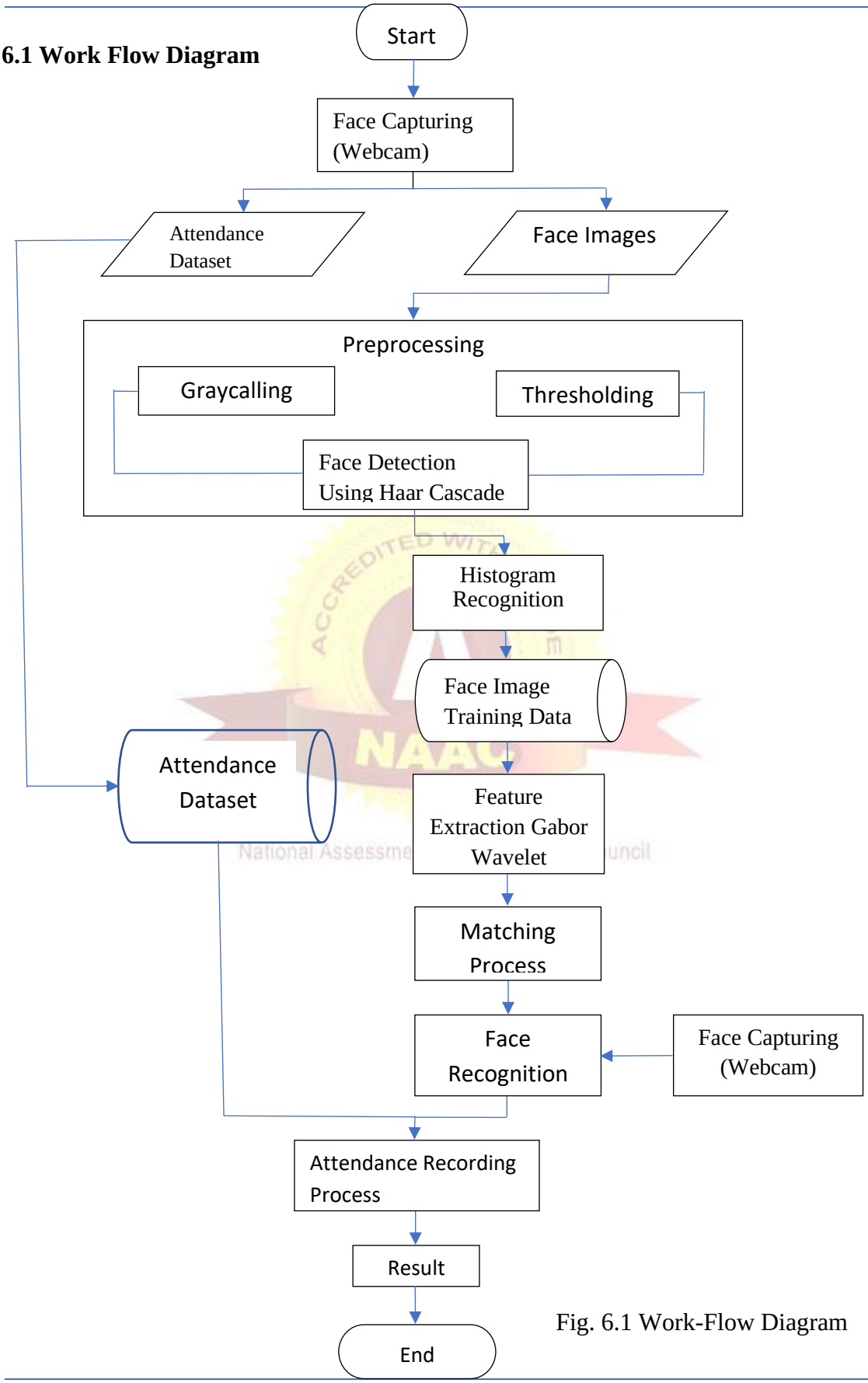


Fig. 6.1 Work-Flow Diagram

6.2 Activity Diagram

6.2.1 Employee Activity Diagram

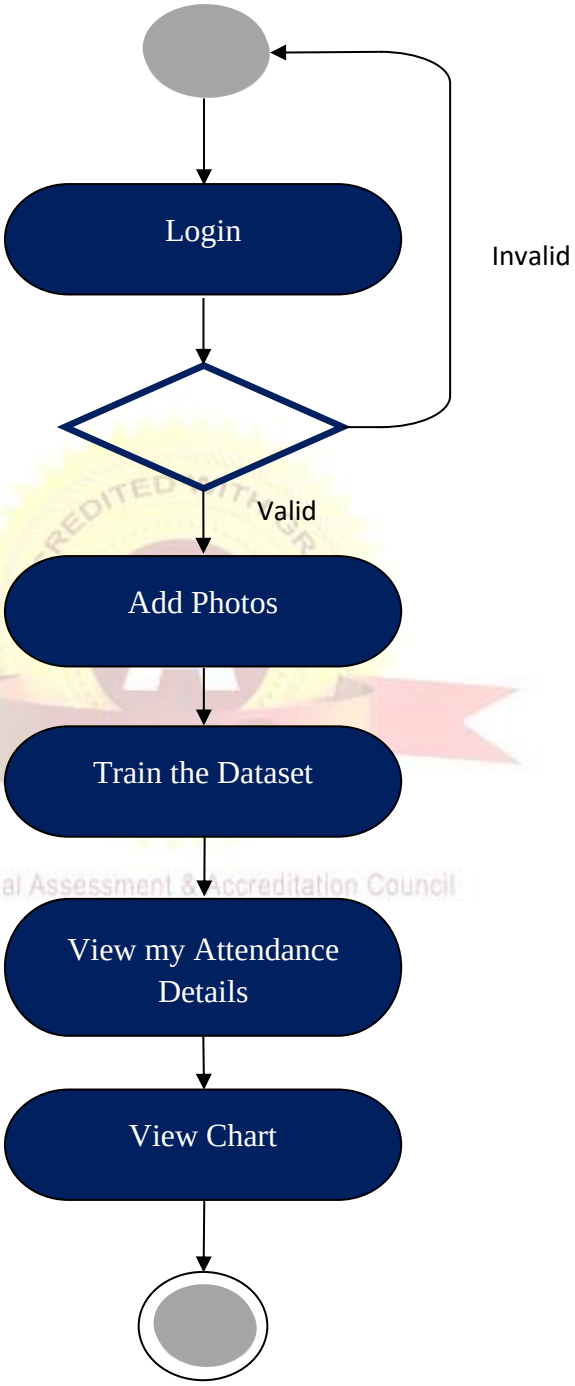


Fig. 6.2 Staff Activity diagram

6.2.2 Attendance Tracking Activity Diagram

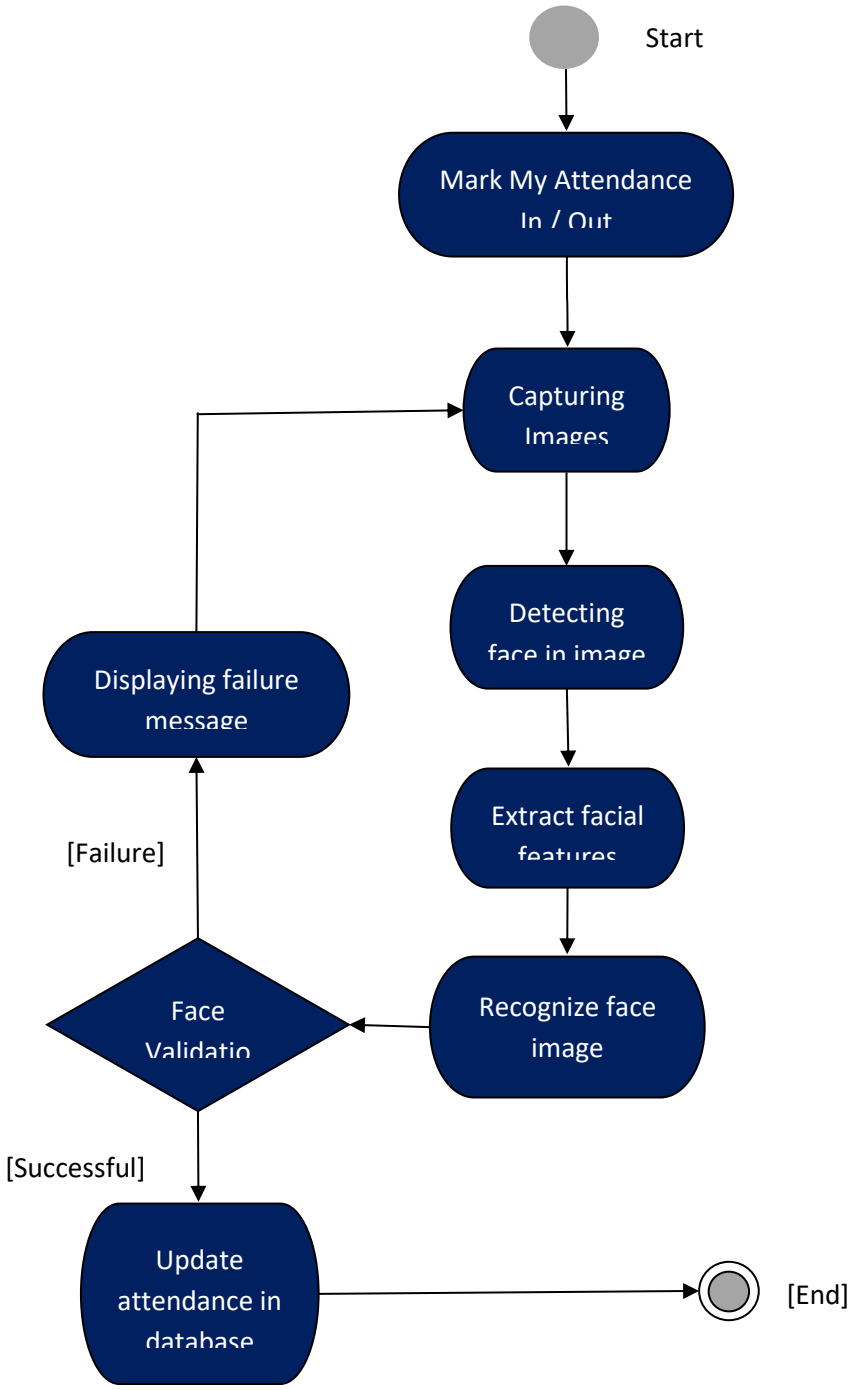


Fig. 6.3 Attendance Tracking Activity diagram

6.3 Sequence Diagram

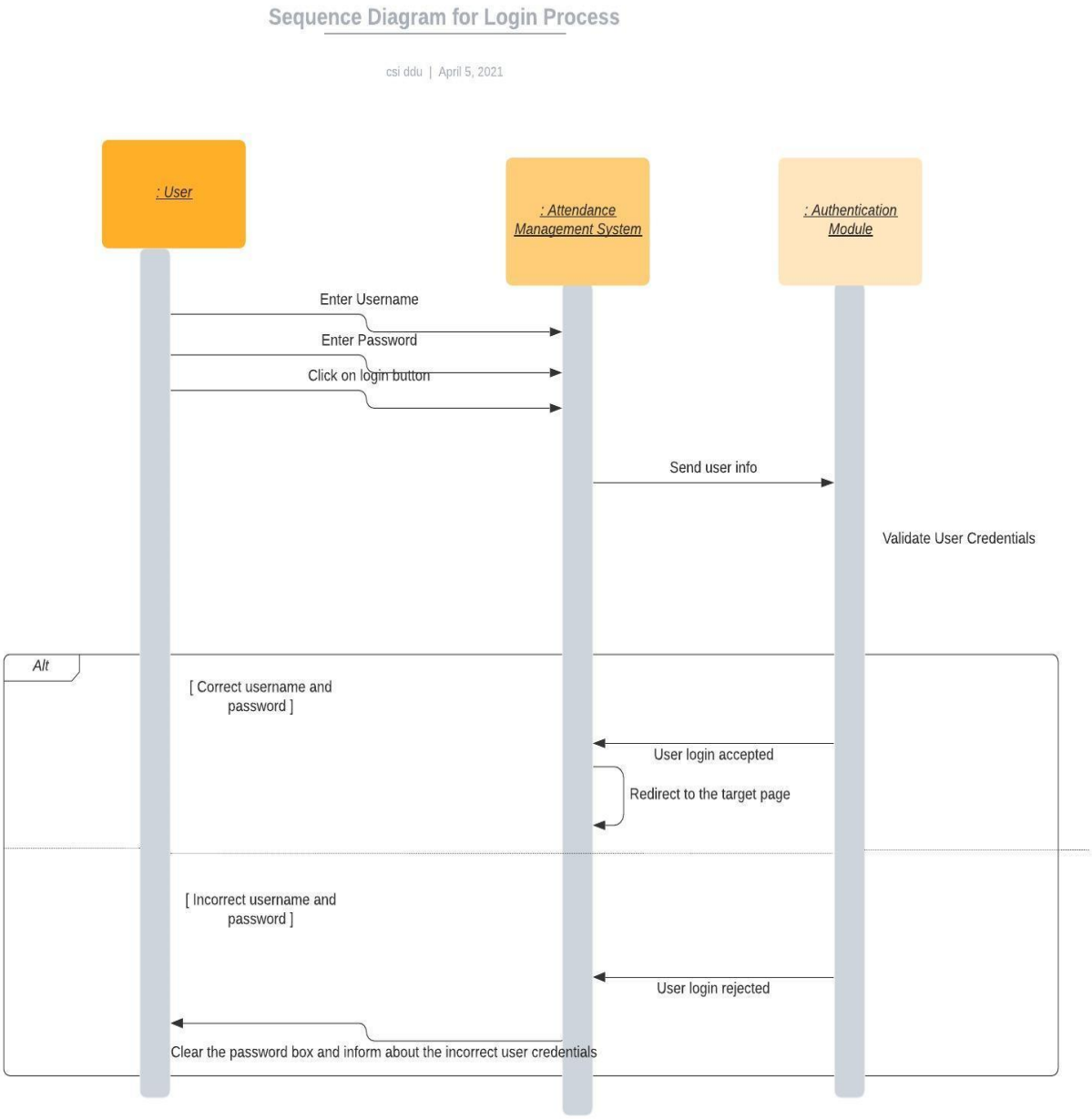


Fig. 6.4 Sequence diagram

3.4 State Diagram

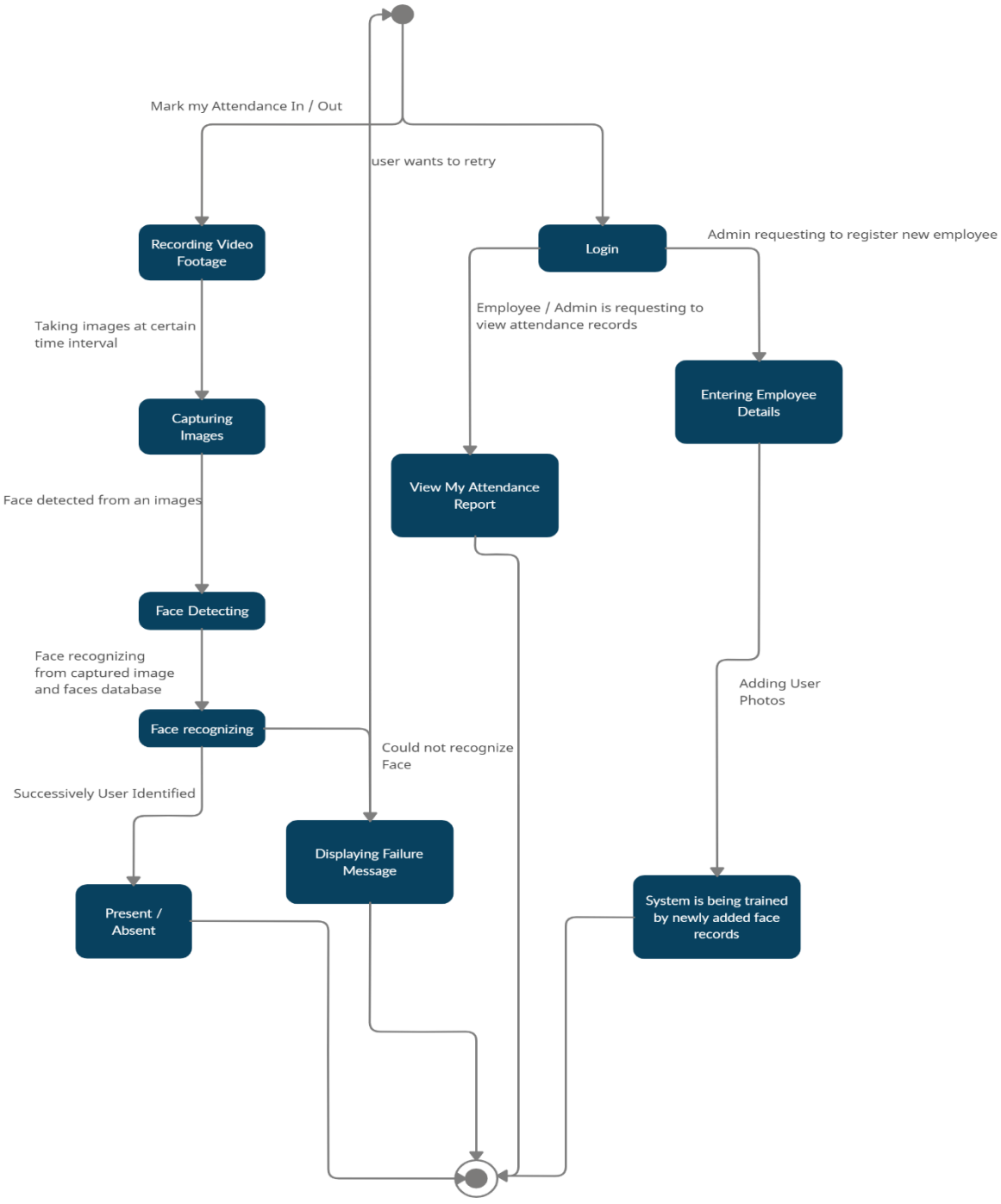


Fig. 6.5 State diagram

CHAPTER 7

RESULTS

Results

1. Welcome Page

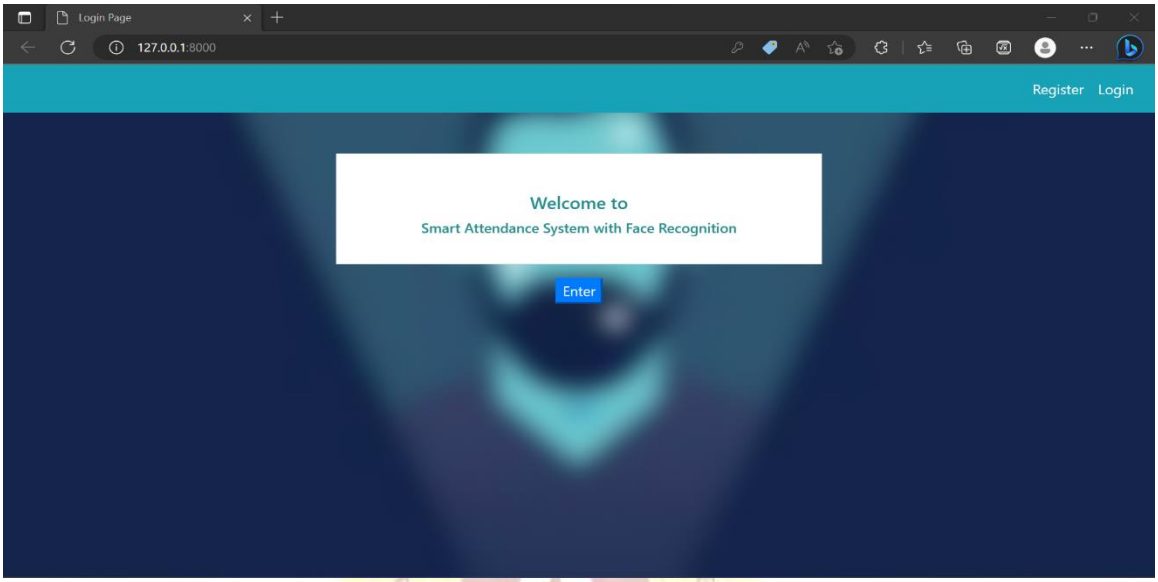


Fig. 7.1 Welcome Page

2. User Registration page

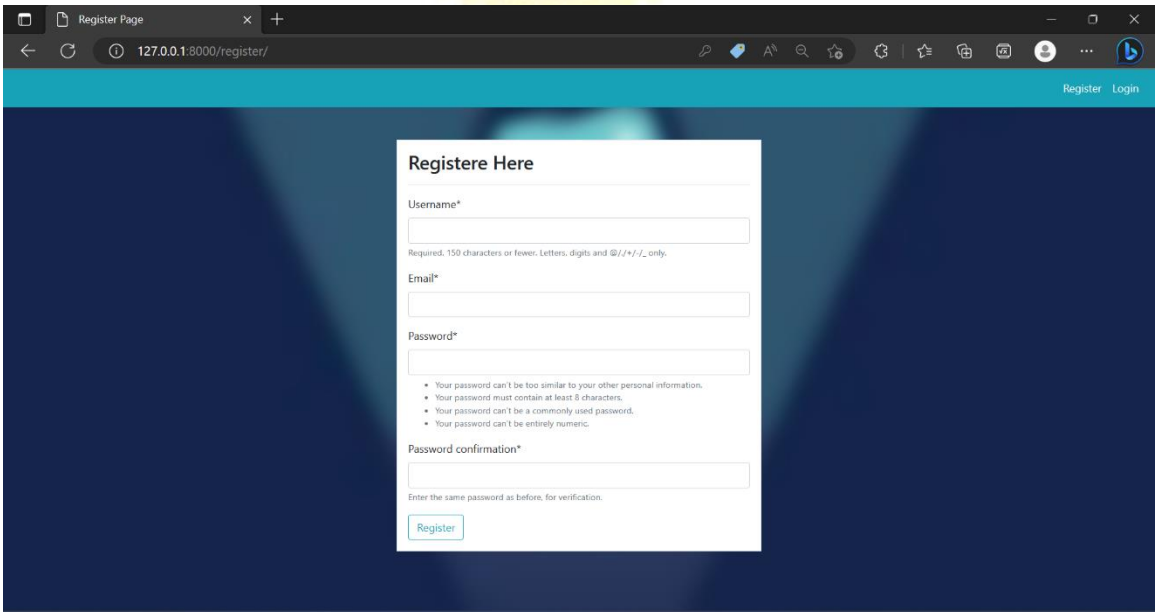


Fig. 7.2 User Registration page

3. User Login

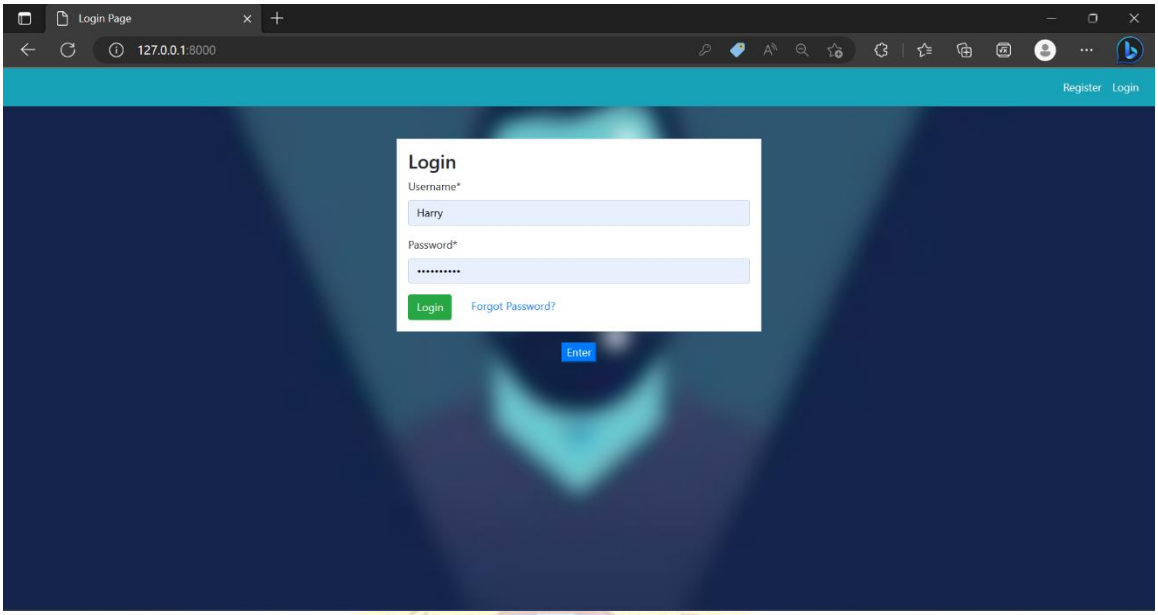


Fig. 7.3 User Login

4. User Home Page

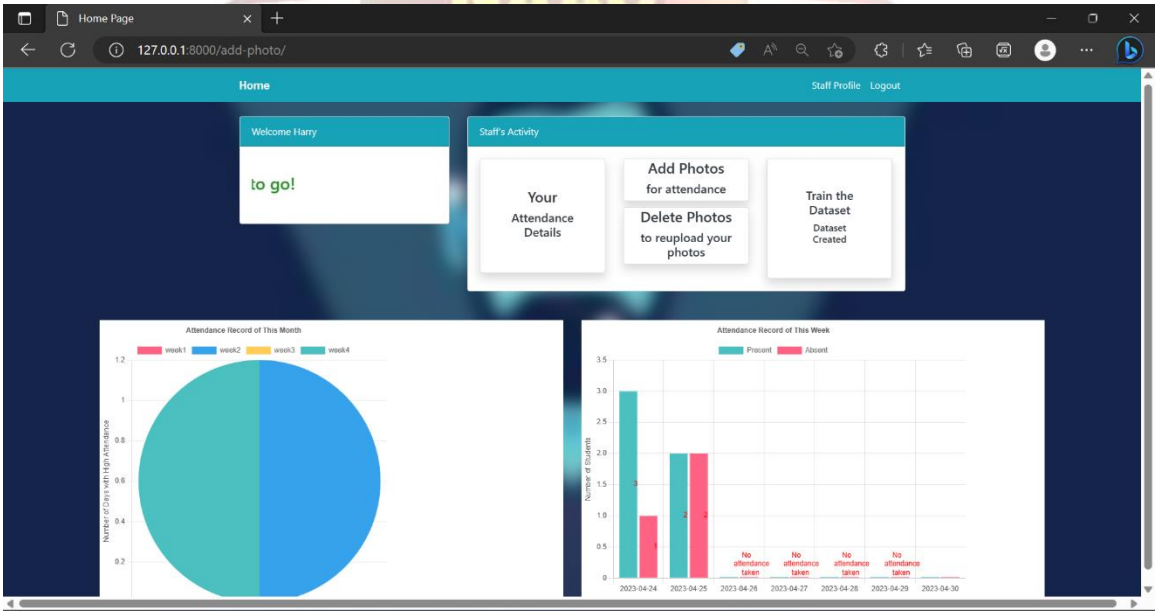


Fig. 7.4 User Home Page

5. Taking Photo’s to Train Model

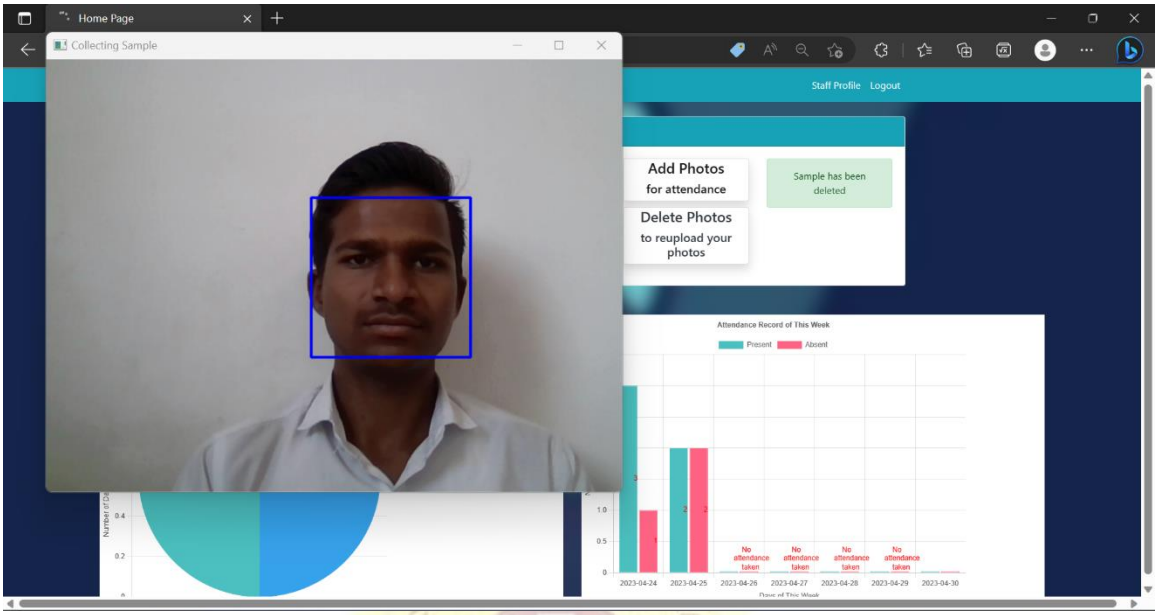


Fig. 7.5 Taking Photo’s to Train Model

6. Model Training Start and Ends

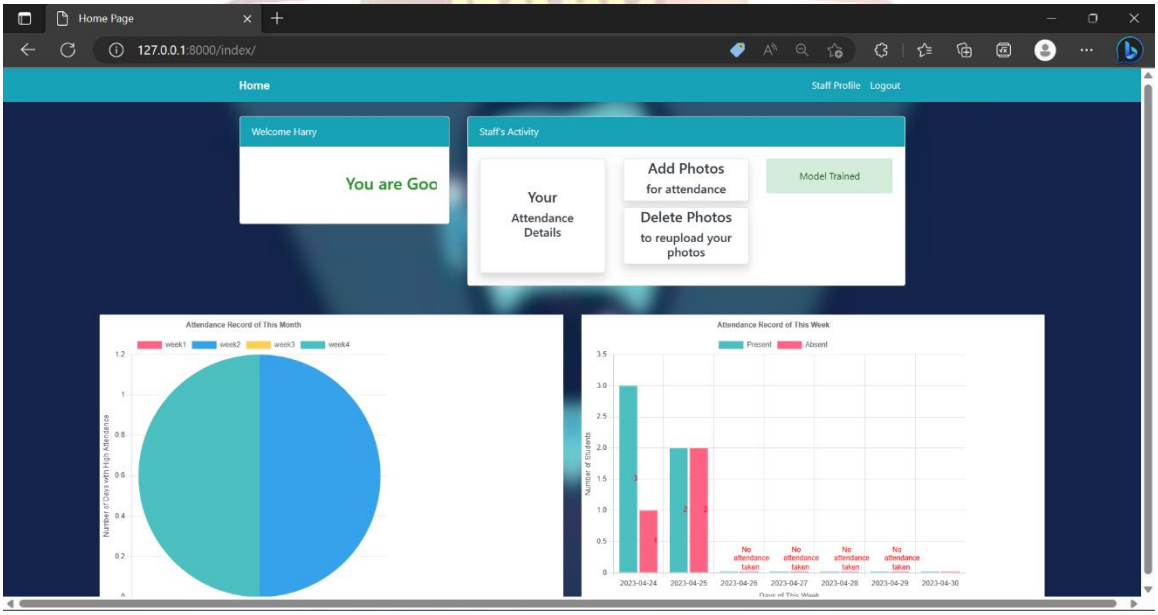


Fig. 7.6 Model Training

7. Admin Login

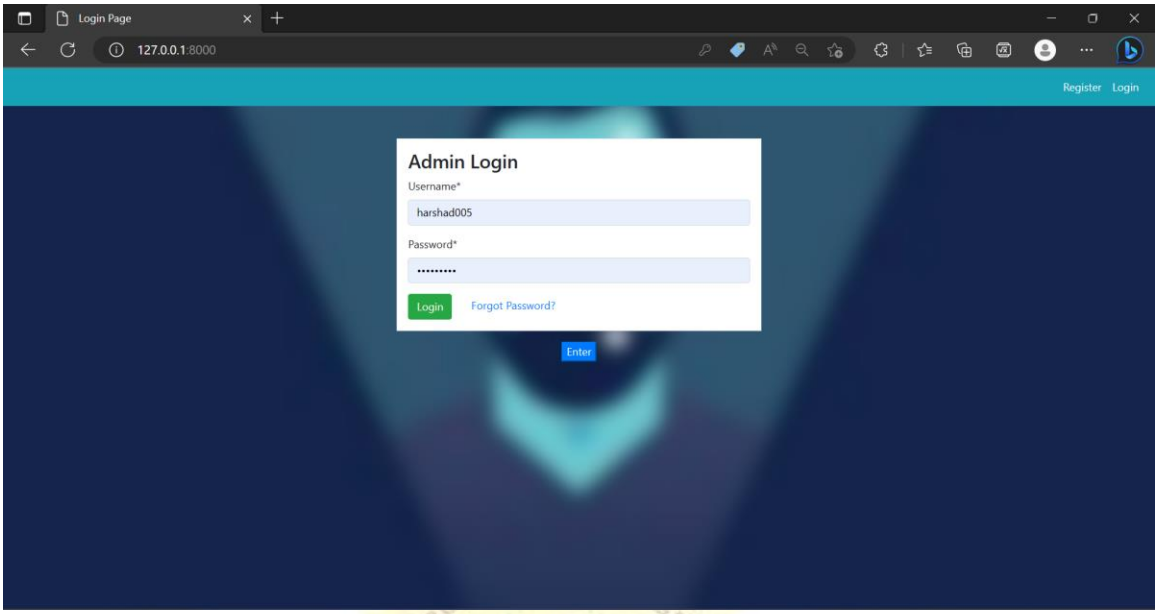


Fig. 7.7 Admin Login

8. Admin Home Page

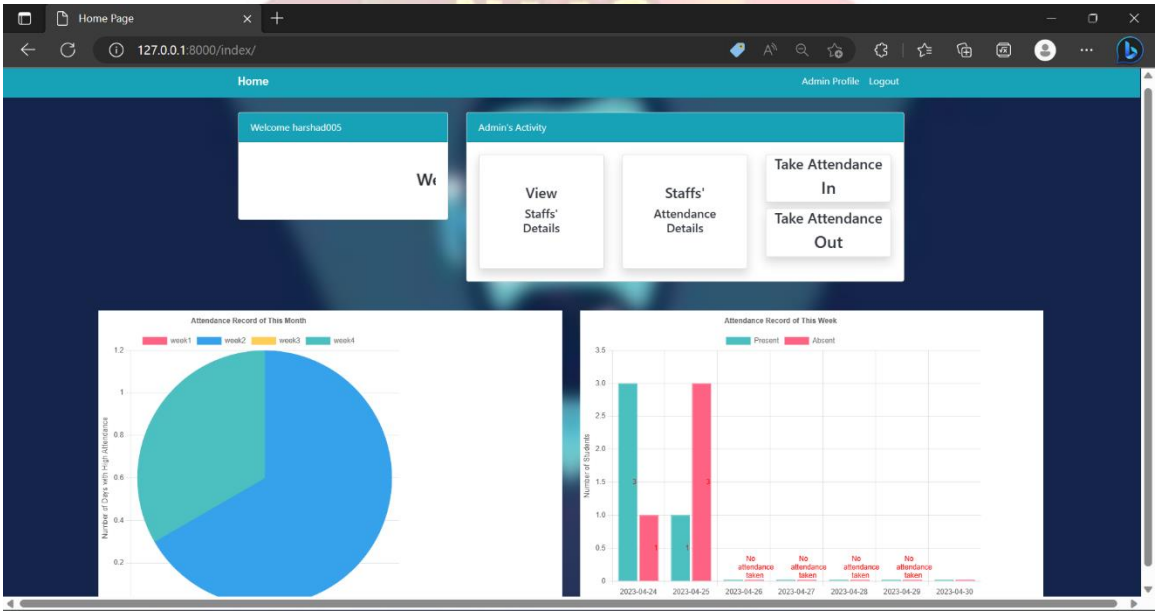


Fig. 7.8 Admin Home Page

9. Taking Attendance

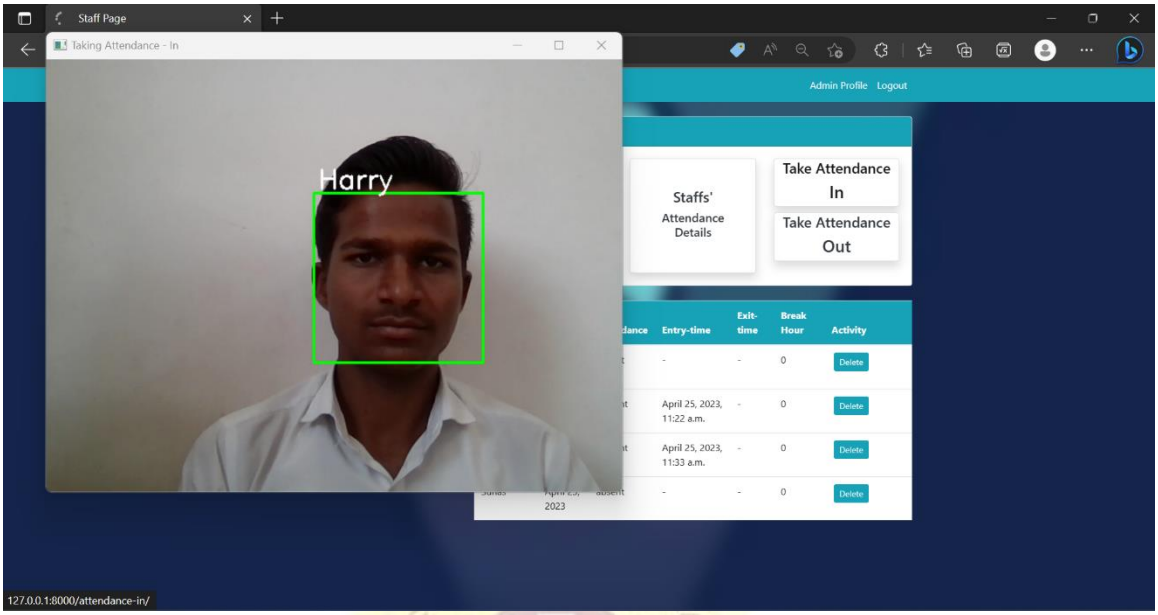


Fig. 7.9 Taking Attendance

10. Attendance Details (Date- 28 April 2023)

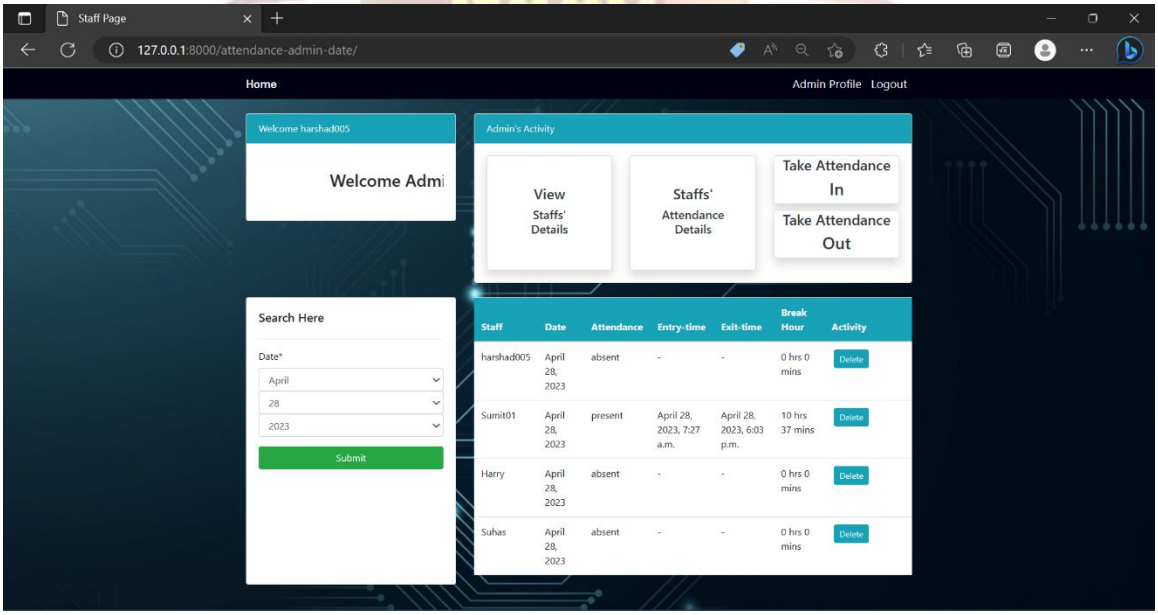


Fig. 7.10 Attendance Details

CHAPTER 8

LIMITATIONS

Limitations

1. **Privacy concerns:** The use of facial recognition technology raises privacy concerns as it involves capturing, storing and processing biometric data of individuals. There are risks of data breaches and misuse of this data, which may lead to privacy violations.
2. **Accuracy:** The accuracy of facial recognition technology is not 100% and may depend on several factors such as lighting conditions, facial expressions, and occlusions. This may result in errors in identifying individuals, leading to incorrect attendance records.
3. **Legal and regulatory compliance:** The use of facial recognition technology may be subject to legal and regulatory requirements, including data protection laws and regulations. The project needs to comply with these laws to avoid any legal implications.
4. **User acceptance:** Some individuals may not be comfortable with the idea of facial recognition technology and may not be willing to have their biometric data captured and stored. This may affect the overall adoption and success of the system.
5. **Twins:** Twins have very similar facial features and characteristics, which may cause the system to confuse one twin with the other, leading to inaccurate attendance records.

CHAPTER 9

ADVANTAGES

Advantages

1. Accuracy: Facial recognition technology offers a high level of accuracy in identifying individuals, even in challenging conditions such as varying lighting or facial expressions. This ensures reliable attendance tracking and prevents errors in recording attendance.

2. Speed: The speed of facial recognition technology allows for real-time processing of large amounts of data. This enables swift and efficient attendance tracking, particularly beneficial in situations where attendance needs to be recorded quickly, such as in busy classrooms or workplaces.

3. Convenience: Implementing face recognition technology eliminates the need for physical attendance sheets and reduces manual effort in maintaining attendance records. Teachers, HR managers, and other personnel responsible for attendance tracking can conveniently manage attendance digitally, saving time and resources.

4. Security: Facial recognition technology leverages unique biometric data, making it highly secure for attendance tracking. It prevents fraudulent activities, such as impersonation or proxy attendance, as everyone's facial features are distinct and difficult to replicate.

5. Cost-effective: Adopting a face recognition-based attendance system eliminates the need for costly hardware like biometric scanners or attendance registers. This reduces expenses for organizations while providing an efficient and accurate attendance solution.

6. Scalability: Facial recognition technology can be easily scaled to accommodate organizations or institutions with multiple locations. It allows for centralized attendance management, enabling seamless integration across various branches or campuses.

7. Automated reporting: The automated attendance reporting feature of facial recognition systems generates comprehensive reports. These reports can be utilized by HR departments to monitor employee attendance, track patterns, and evaluate performance. It reduces manual efforts and enables data-driven decision-making.

8. Improved productivity: By automating attendance tracking, facial recognition systems free up valuable time for HR departments and teachers. They can allocate resources to more strategic tasks, leading to improved productivity and efficiency in the workplace or educational setting.

9. Ease in maintaining attendance: The face recognition-based attendance system simplifies the process of maintaining attendance records. It eliminates the need for manual paperwork and reduces administrative tasks associated with attendance tracking. This leads to a more efficient and streamlined attendance management process.

10. Reduced paper work: With the automation of attendance using facial recognition, there is a significant reduction in paper usage, contributing to a more environmentally friendly approach. This not only saves resources but also promotes sustainability within the organization.

11. Automatically operated and accurate: The system operates automatically, requiring minimal human intervention. It accurately identifies individuals based on their unique

facial features, ensuring precise attendance records. This eliminates the possibility of errors or false attendance recording.

12. Reliable and user-friendly: Facial recognition technology provides a reliable method for attendance tracking. It is user-friendly and does not require physical contact or additional equipment, making it convenient for both administrators and users. This improves user acceptance and promotes a positive experience.

CHAPTER 10

APPLICATIONS

Applications

1. **Government organizations:** The system can help government organizations to ensure the security of their premises and sensitive information by verifying the identities of employees and visitors. It can also be used to track the attendance of employees and ensure that only authorized personnel have access to restricted areas.

2. **Enterprises:** The system can be used by enterprises to track the attendance of employees and monitor their activities within the premises. It can also be integrated with access control systems to restrict unauthorized entry and ensure the security of the workplace.

3. **Schools and colleges:** The system can help schools and colleges to track the attendance of students and reduce the risk of proxy attendance. This can ensure that students attend classes regularly and accurately, leading to better academic performance.

4. **International borders:** The system can be used at international borders to ensure border security by detecting fake entries and tracking the movement of people entering and leaving the country. It can also help to prevent illegal activities.

5. **Industries:** The system can be used by industries to track the attendance of employees and monitor their activities to ensure productivity and efficiency. It can also be used to restrict access to sensitive areas and equipment, ensuring the safety of employees and equipment.

CHAPTER 11

CONCLUSION AND FUTURE SCOPE

Conclusion and Future Scope

Conclusion:

In conclusion, this project aimed to develop a facial recognition system for student attendance using the concepts of facial recognition, LBPH (Local Binary Patterns Histogram), and web development with Django. The project successfully achieved its goal by creating a functional prototype of the system.

The system allows the administrator to create a teacher account and add students and their information to the database. Teachers can then log in to the system and take attendance of the students. The system utilizes a camera to detect the students' faces and records their attendance in the database. Both teachers and administrators have access to the attendance reports of the students.

The project demonstrated the successful implementation of LBPH algorithm in Django to create a web application for attendance tracking. By automating the attendance process through facial recognition, the system simplifies the task of maintaining attendance records and reduces the administrative workload.

Future Scope:

Although the project has achieved its primary objective, there is ample scope for further development and enhancement. Some potential future directions for the project include:

1. Expansion of Features: The system can be expanded to incorporate additional features such as assignment submission, result management, and grade tracking. This would provide a more comprehensive platform for both students and teachers, facilitating effective academic management.

2. Integration with Student Information System: The facial recognition system can be integrated with existing student information systems used in educational institutions. This

integration would enable seamless data synchronization and provide a unified platform for managing student-related information.

3. Performance Optimization: The system's performance can be further optimized to improve the speed and accuracy of facial recognition. This could involve exploring advanced algorithms or techniques to enhance the recognition capabilities, especially in challenging lighting conditions or with variations in facial expressions.

4. Mobile Application: Developing a mobile application version of the system would increase accessibility and convenience for users. Students and teachers could easily access the system and perform attendance-related tasks using their smartphones, enhancing the overall user experience.

5. Data Analysis and Reporting: Incorporating data analysis capabilities into the system would allow for deeper insights and reporting on attendance patterns, student performance, and trends. This would enable educational institutions to make data-driven decisions and implement targeted interventions where necessary.

6. Integration with Biometric Devices: The system could be extended to integrate with biometric devices such as fingerprint scanners or iris recognition systems. This would provide additional options for attendance verification and further enhance security.

7. Multi-factor Authentication: Implementing multi-factor authentication, such as combining facial recognition with a secondary authentication method like a unique PIN or fingerprint, would add an extra layer of security to the system.

REFERENCES

References

1. Adarsh Saraswat, Himani Shah, Jimil Shah, Aayushi Shah, Archana Magare (2021) Smart Attendance System Using Feature Descriptors

2. Dr. V Suresh, Srinivasa Chakravarthi Dumpa, Chiranjeevi Deepak Vankayala, HaneeshaAduri, Jayasree Rapa (2020) Facial Recognition Attendance System Using Python and OpenCv

3. Emerald Tuladhar, Avinash Shah, Anusha Hegde and Sai Alekyak (2021) Attendance Monitoring System Based on Face Recognition

4. Md. Salah Uddin Yusuf, Azmol Ahmed Fuad (2021) Real Time Implementation of Face Recognition Based Automatic Institutional Attendance System

5. Dr. Santaji Krishna Shinde, Mr. Manoj D. Shelar, Mrs. Priya M. Jadhav, Mr. Pradip M. Paithane, Mrs. Sarita S. Shinde (2022) Framework For Attendance Management Using Face Recognition

6. Aleksa Cuk, Branivoj Miljkovic, Milos Todorovic Aleksander Ivanovic, Miodrag Zivkovic (2019) Application for Student Attendance Based on Face Recognition

7. Raneem Alghamdia, Wafaa Alsubaieb, Renad Alharthic, WedyanAlghamdid, Dabiah A. Alboaneene and Nourah F. Alqahtanif (2019) A Smart Attendance System for Imam Abdulrahman Bin Faisal University Using Facial Recognition

8. P.Vilash1, V. Praveen Kumar2, K. Srinivas Reddy3, N. Sai Kalyan4,Mrs Soppari Kavitha5 (2022) Automatic Attendance Monitoring System Using Image Processing

9. Clyde Gomes, Sagar Chanchal2, Tanmay Desai3, And Diptijadhav4, (2020) Class Attendance Management System Using Facial Recognition

10. Sudhir Bussa,Ananya Mani,Shruti Bharuka,Sakshi Kaushik (2020) Smart Attendance System Using Opencv Based On Facial Recognition

11. Soumitra Chowdhury, Sudipta Nath, Ashim Dey And Annesha Das (2021) Development Of An Automatic Class Attendance System Using Cnn-Based Face Recognition

12. Partha Chakraborty, Chowdhury Shahriar Muzammel, Mahmuda Khatun, Sk. Fahmida Islam, Saifur Rahman (2022) Automatic Student Attendance System Using Face Recognition

13. Ibrahim Al-Amoudi, Rosdiyana Samad, Nor Rul Hasma Abdullah, Mahfuzah Mustafa, and Dwi Pebrianti (2022) Automatic Attendance System Using Face Recognition with Deep Learning Algorithm

14. Dhanush Gowda H.L, K Vishal, Keertiraj B. R, Neha Kumari Dubey, Pooja M. R. (2020) Face Recognition based Attendance System

15. Dr. Shrija Madhu , Ms. Anusha Adapa, Ms. Visrutha Vatsavaya, Ms. Padmini Pothula. (2019) Face Recognition Based Attendance System Using Machine Learning

16. Ghalib Al-Muhaidhri [1], Javeed Hussain[2], (2019) Smart Attendance System Using Face Recognition

17. Dulyawit Prangchumpol (2019) Face Recognition for Attendance Management System Using Multiple Sensors

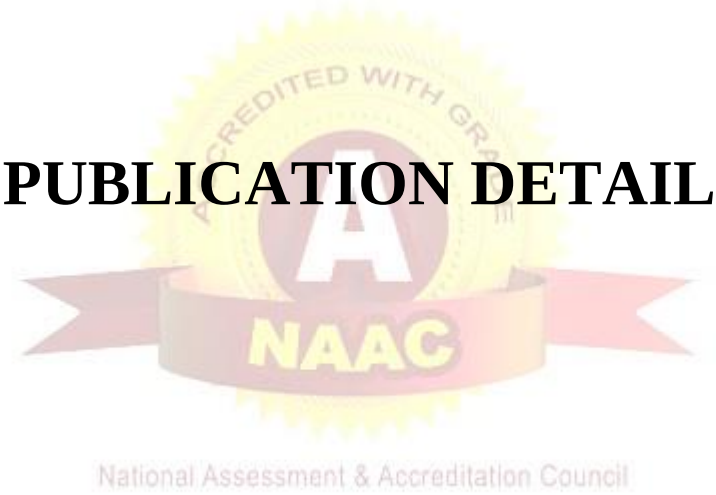
18. Maulana Dimas Iffandi, Rangga Nata Adiningrat, Jeremia Rizki Pandapota, Jihad Ramadhan, Bayu Kanigoro(B), And Edy Irwansyah (2020) Attendance System with Face Recognition

19. Sharanya T,Sucharith P,Ujwal Kasturi,Trisheeka Mahesh(2020) Online Attendance Using Facial Recognition

20. P. Kowsalya, J. Pavithra, G. Sowmiya, C.K. Shankar (2019) Attendance Monitoring System Using Face Detection & Face Recognition

21. Djoanna Marie Vasquez Salac (2019) An Android-Based Class Attendance Monitoring System Using Face Recognition Technology

PUBLICATION DETAILS



GRADIVA REVIEW JOURNAL ISSN NO : 0363-8057

FACE RECOGNITION BASED SMART ATTENDANCE SYSTEM

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Abstract: *modern technology These days, face detection and facial recognition technologies are crucial, and we've seen that they're being used in a variety of places, including cellphones, the military, and some high-risk information offices. In order to replace the traditional paper attendance system and the finger print attendance system, we chose to create a gadget that can detect and recognise faces. LabVIEW will be used for the primary function in our project because it is a highly useful programming tool for facial applications as well as other applications. Our project is based on a main LabVIEW programme that identifies and scores faces while providing parameters. In addition, the subsystems include an Excel sheet that is integrated with the programme and a messaging system that can either send a message to absent students or their parents. Our project consists of a computer (or laptop) to connect the programmes on, a LabVIEW programme as the main system and subsystems, an Office Excel file to include the students' names, and other materials.*

1. INTRODUCTION

Facial Recognition-Based Attendance System for Educational Institutions is the topic of this research. This chapter will go into great detail on the project's historical background, problem and motivation, research objectives, project scope, and project contributions.

Motivation:

The accuracy of the data gathered is the main problem, according to the prior attendance management system. This is due to the possibility that the attendance may not be personally recorded by the original person; in other words, a specific person's attendance may be recorded by a third party without the institution's knowledge, which compromises the accuracy of the data. For instance, student A might not have gone to a specific class because he or she was too lazy to go, thus student B might have helped the student sign for attendance even though the system would have known that because there was no enforcement being done. If the institution decides to implement enforcement, it may need to squander a lot of time and resources, which is not at all realistic. As a result, no recorded attendance in the old system may be used for analysis. The second issue with the prior system is that it takes too much time. assuming a student takes around a minute to sign his or her name on a 3–4 page name list to indicate attendance. Only about 60 pupils can sign their attendance in one hour, which is obviously time-consuming and wasteful. The third problem is with the legitimate interested party's ability to access those data.

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As an illustration, the majority of parents are quite concerned about tracking their children's location to make sure they are actually enrolled in classes at school or college. The parents cannot obtain this information under the prior system, though. Therefore, the previous system needs to be evolved in order to increase efficiency, data quality, and information accessibility for those who are genuine parties.

2. LITERATURE SURVEY

Facial Recognition Attendance System Using Python and OpenCv by Dr. V Suresh, Srinivasa Chakravarthi Dumpa, Chiranjeevi Deepak Vankayala, Haneesha Aduri, and Jayasree Rapa (2020)

The research article presents the creation of a portable Smart Attendance System that makes precise and effective use of facial recognition technology to track attendance. While offering a user-friendly interface for administrators and parents to access the attendance database, the proposed solution seeks to reduce the paperwork and time needed for attendance recording. The project's goals include creating a mobile, self-powered system, guaranteeing quick attendance recording, precise facial recognition, database creation, and enabling parents to monitor their child's attendance. The benefits of adopting technology to enhance attendance monitoring and fix previous system problems are highlighted in the conclusion, with the only expense being enough storage space for the face database.

Emerald Tuladhar, Avinash Shah, Anusha Hegde and Sai Alekyak (2021) Attendance Monitoring System Based on Face Recognition.

This study suggests a face recognition-based attendance control system for online classrooms and meetings during the COVID-19 pandemic. For recognition, the system extracts face traits and transforms them into a numeric representation. To emphasise discipline and attention, the attendance system starts a timer, records a timestamp, and uses facial recognition regularly every 15 minutes. The system also has a mailing component that, after the session is over, automatically emails the host with a list of the attendees and their corresponding timestamps. By including capabilities like monitoring new students joining, the suggested solution seeks to enhance the video conferencing systems now in use that have subpar attendance management systems.

Md. Salah Uddin Yusuf, Azmol Ahmed Fuad (2021) Real Time Implementation of Face Recognition Based Automatic Institutional Attendance System

The research report suggests a face detection and recognition-based automatic attendance system. To produce more effective outcomes, the system seeks to use the hardware at hand to shorten computing times. The suggested approach makes use of face encodings obtained from facial landmarks and Histogram Oriented Gradients. The system uses multi-processing to overcome issues with facial recognition accuracy and the resource requirements for rapid, real-time facial recognition. Without the need for outside human intervention, the system is intended to run autonomously and compute understandable feedback. For optimal user comprehension, a Graphical User Interface has been added into the system. The proposed methodology is discussed in the paper, along with video or picture acquisition, face detection, and face recognition. The study also details improvements in accuracy performance for two different methods and improvements in time requirements for the same method utilising several demonstration strategies. The suggested system shows task parallelization's effectiveness while requiring the least amount of hardware.

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Soumitra Chowdhury, Sudipta Nath, Ashim Dey and Annesha Das (2021) Development Of An Automatic Class Attendance System Using Cnn-Based Face Recognition.
The research paper describes the creation of a convolutional neural network-based automatic attendance system for educational institutions and workplaces. With an average identification accuracy of roughly 92%, the suggested system can automatically record daily attendance while detecting and recognising several people's faces from a video feed. Data entry, dataset training, face recognition, and attendance entry are the system's four key phases. The paper demonstrates the graphical user interface (GUI) for the implemented system and provides a detailed description of each stage. Easy attendance tracking, avoiding the possibility of human error, and a non-contact, non-interfering process are some of the benefits of the system.

3. PROPOSED METHODOLOGY

Compared to all the other projects that have been produced and stated above, our project is unique. To construct a face detection technique, they have solely relied on the fundamentals of machine vision. None of the projects discussed above have fully tapped into the potential of LabVIEW programming and LabVIEW Vision modules, which make it simple to implement machine vision algorithms like edge tracking and geometric matching in addition to pattern matching. Although the overall workings and course of events in the previous projects and in our current project are similar, the face detection workings are entirely new and unique.

Projects	1	2	3	Our Project
Face Recognition andDetection	√	√	√	√
Communication(GSM/ WiFi)	GSM	GSM	WiFi	WiFi
Time Saving	√			√
Market Demand	√	√	√	√
Local Usage in Schools		√	√	√
Data Saving in Record (Monitoring)	√			√

Fig Comparitive Study of different methodologies

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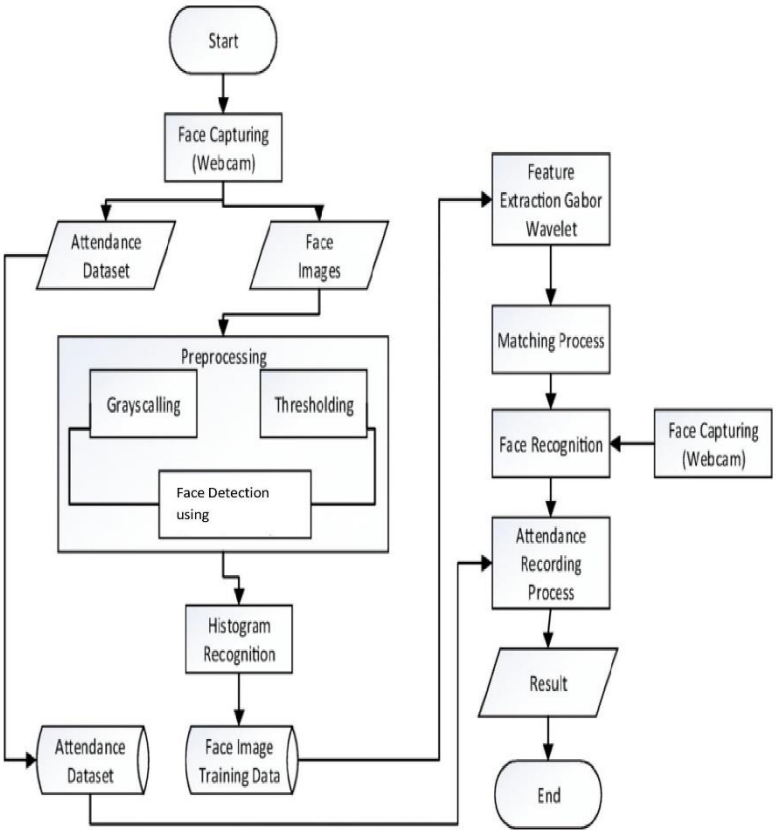
4. SYSTEM DESIGN

Work Flow:



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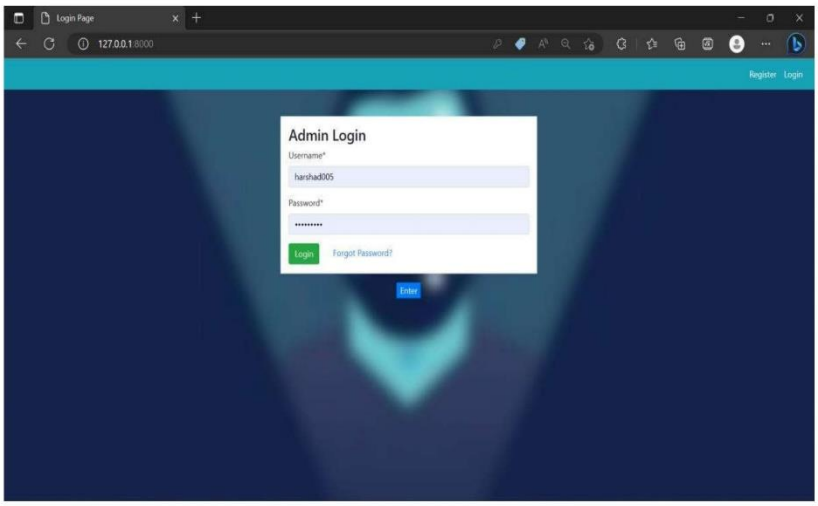
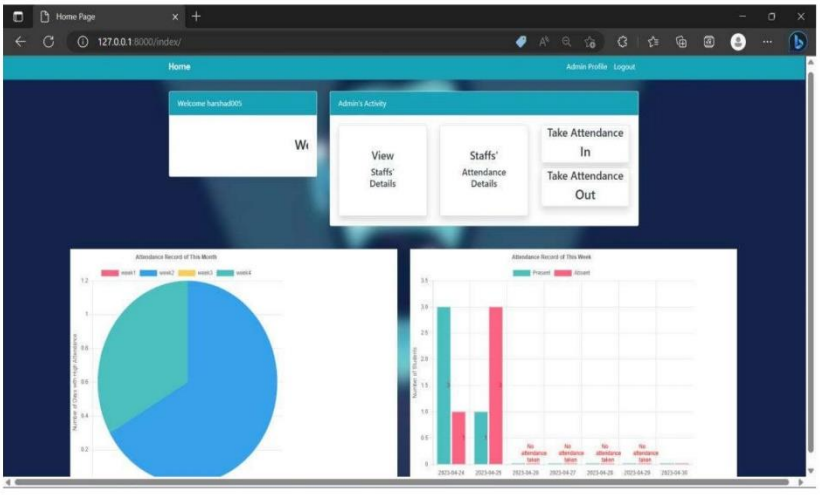
5. RESULTS





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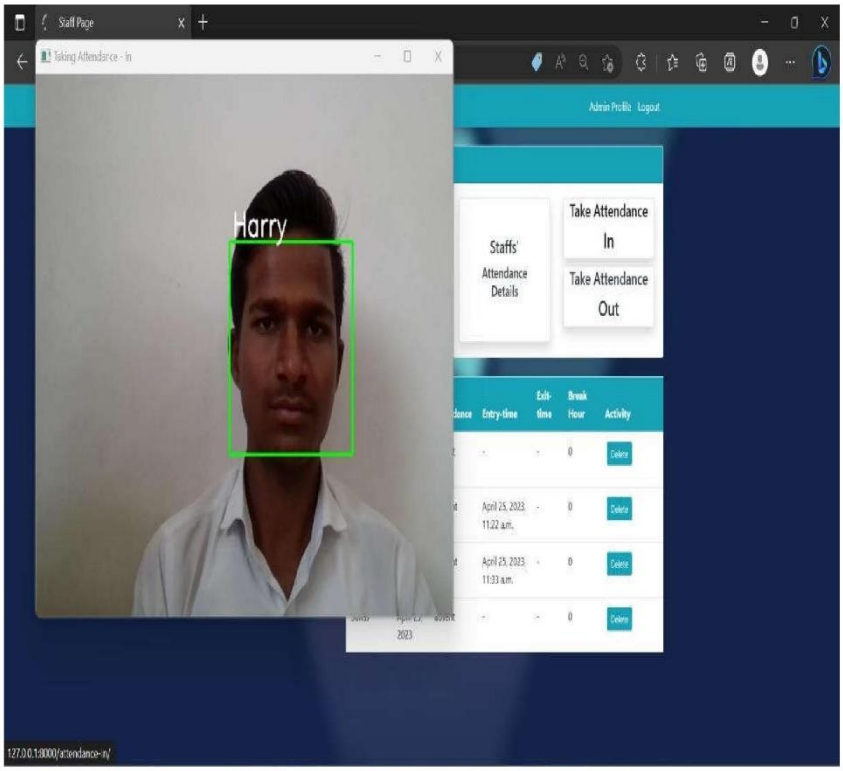

6. CONSLUSION & FUTURE SCOPE

The project's objective was to construct a facial recognition system for tracking student attendance. In this thesis, the concepts of LBPH and facial recognition are widely covered. Similar to that, Django web development is also covered, followed by explanations and implementation examples. The project's outcome was a successful facial recognition system prototype that allows the administrator to set up a teacher account and add students and their data to the database. Teachers can then log into the system and record each student's attendance. A camera recognises the student's face, and the database records their attendance. The pupils' attendance report was accessible to teachers and administrators. The project was effective in showing how LBPH might be used with Django to build a web application overall. Once established, it can be used to record students' attendance history and take their attendance. By including new features for teachers and students, this project has the potential to evolve further in the future. Additional elements could be added, such as assignments, outcomes, and grades.

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7. REFERENCES

1. Adarsh Saraswat, Himani Shah, Jimil Shah, Aayushi Shah, Archana Magare(2021) Smart Attendance System Using Feature Descriptors

2. Dr. V Suresh, Srinivasa Chakravarthi Dumpa, Chiranjeevi Deepak Vankayala,HaneeshaAduri, Jayasree Rapa (2020) Facial Recognition Attendance SystemUsing Python and OpenCv

3. Emerald Tuladhar, Avinash Shah, Anusha Hegde and Sai Alekyak (2021) Attendance Monitoring System Based on Face Recognition

4. Md. Salah Uddin Yusuf, Azmol Ahmed Fuad (2021) Real Time Implementation of Face Recognition Based Automatic Institutional Attendance System

5. Dr. Santaji Krishna Shinde, Mr. Manoj D. Shelar, Mrs. Priya M. Jadhav, Mr. Pradip M. Paithane, Mrs. Sarita S. Shinde (2022) Framework For AttendanceManagement Using Face Recognition

6. Aleksa Cuk, Branivoj Miljkovic, Milos Todorovic Aleksander Ivanovic, MiodragZivkovic (2019) Application for Student Attendance Based on Face Recognition

7. Raneem Alghamdia, Wafaa Alsubaieb, Renad Alharthic, WedyanAlghamdid, Dabiah A. Alboaneene and Nourah F. Alqahtanif (2019) A Smart Attendance System for Imam Abdulrahman Bin Faisal University Using Facial Recognition

8. Clyde Gomes, Sagar Chanchal2, Tanmay Desai3, And Diptijadhav4, (2020) ClassAttendance Management System Using Facial Recognition

9. Sudhir Bussa,Ananya Mani,Shruti Bharuka,Sakshi Kaushik (2020) SmartAttendance System Using Opencv Based On Facial Recognition

10. Soumitra Chowdhury, Sudipta Nath, Ashim Dey And Annesha Das (2021) Development Of An Automatic Class Attendance System Using Cnn-Based FaceRecognition

11. Partha Chakraborty, Chowdhury Shahriar Muzammel, Mahmuda Khatun, Sk.Fahmida Islam, Saifur Rahman (2022) Automatic Student Attendance SystemUsing Face Recognition

12. Ibrahim Al-Amoudi, Rosdiyana Samad, Nor Rul Hasma Abdullah, MahfuzahMustafa, and Dwi Pebrianti (2022) Automatic Attendance System Using FaceRecognition with Deep Learning Algorithm

13. Dhanush Gowda H.L, K Vishal, Keertiraj B. R, Neha Kumari Dubey,Pooja M. R. (2020) Face Recognition based Attendance System

14. Dr. Shrija Madhu , Ms. Anusha Adapa, Ms. Visrutha Vatsavaya, Ms. Padmini Pothula. (2019) Face Recognition Based Attendance System UsingMachine Learning

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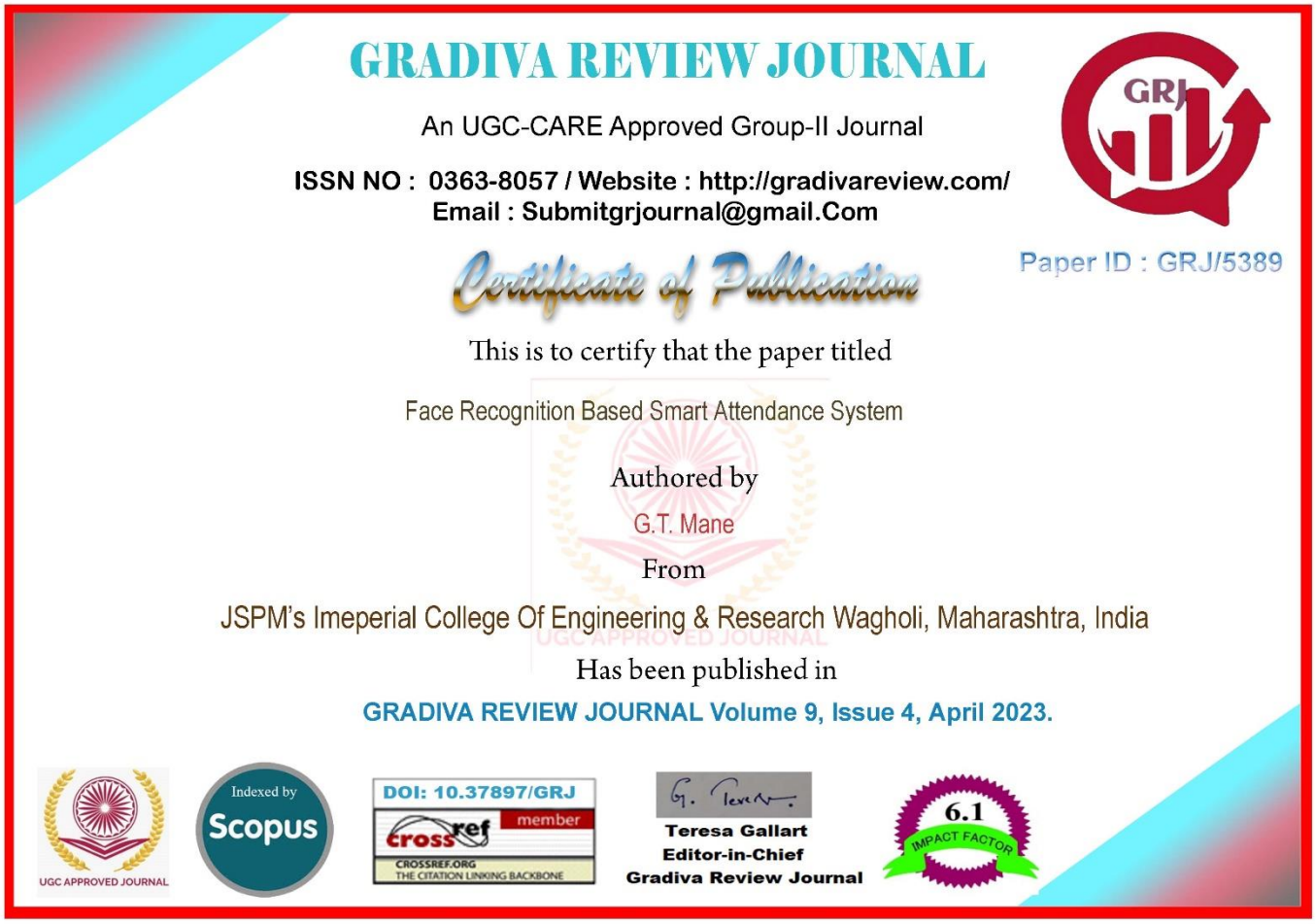

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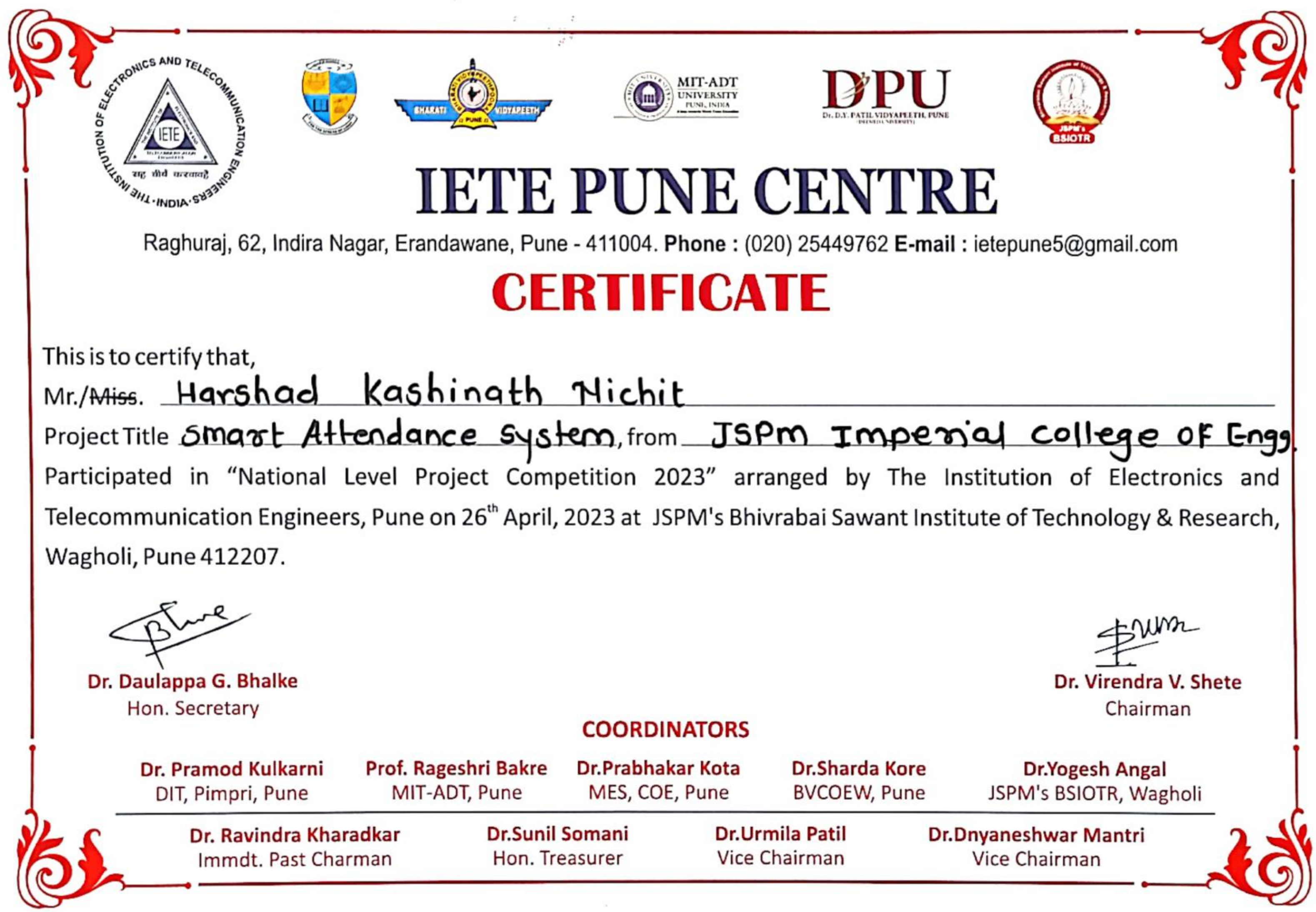

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Project Title Smart Attendance System, from JSPM Imperial college of Engg.

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