SECURE ATTENDANCE TRACKING WITH FACIAL VERIFICATION

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ABSTRACT

Face recognition can be considered one of the most successful biometric identification methods among several types including fingerprints, iris recognition and retina. In recent times, face recognition has been developed very much mainly due to 2 reasons: first it is due to availability of modern technologies and second is due to ability to save time using face recognition in the process of taking attendance. This abstract presents an overview of a smart attendance system that utilizes face recognition based on machine learning. The traditional method of taking attendance in various institutions and organizations are time consuming, inefficient and prone to errors. Before all these, the faculty has access to add the student details such as name, phone number, image and mail-id. Then the image is captured through camera during class hours and marks attendance. With the advancement in machine learning and comparision techniques, secure attendance system utilizing face recognition has emerged as an innovative solution. Secured smart attendance using Real Time Face Recognition is a real-world solution which comes with day to day activities of handling employees.

1.INTRODUCTION

1.1 Introduction

to Face Recognition: An attendance tracking system with facial verification is a modern solution that combines facial recognition technology with attendance management. This system offers a secure and efficient way to track and record the attendance of individuals. This technology offers improved accuracy, security and ease of use, making it a valuable tool for attendance management in diverse environments. Secure attendance tracking with facial verification not only simplifies attendance recording but also enhances by reducing the risk of fraud. Face recognition involves two steps, first step involves the detection of faces and second step consist

of identification of those detected face images with the existing database. There are number of face detection and recognition methods introduced. Face recognition works either in form of appearance based which covers the features of whole face or feature based which covers the geometric feature like eyes, nose, eye brows, and cheeks to recognize the face. With the advancement in machine learning and comparision techniques, secure attendance system utilizing face recognition has emerged as an innovative solution. Done through machine learning. Before all these, the faculty has access to add the student details such as name, phone number, image and mail-id.

Then the image is captured through camera during class hours and marks attendance. This improved face recognition was able to recognize multiple faces with high accuracy level. It is widely used in various areas such as security and access control, forensic medicine, police controls and in attendance management system. Attendance records automatically without any physical interaction between student and faculty. This attendance recording system mainly used in educational institutions, corporative sectors, hospitals, events and conferences and gym and fitness centres. Human face is an important biometric object in image and video databases of surveillance systems. Secured smart attendance using Real Time Face Recognition is a real-world solution which comes with day to day activities of handling employees. The main objective of this work is to make the attendance marking and management system efficient, time saving, simple and easy. Here faces will be recognized using face recognition algorithms.

 The processed image will then be compared against the existing stored record and then attendance is marked in the database accordingly. Compared to existing system traditional attendance marking system, this system reduces the workload of people. This proposed system will be implemented with 4 phases such as Image Capturing, Segmentation of group image and Face Detection, Face comparison and Recognition, Updating of Attendance in database. 2 1.2 History: The concept of using face recognition for attendance management dates back to the early 1990s when researches began exploring the potential of this technology to automate the process of tracking attendance in various settings, including schools, offices, and public spaces. In 1991, Turk and Pentland proposed a method for face detection using eigenfaces, which became the foundation for many subsequent facial recognition algorithms. In the late 1990s and early 2000s, facial recognition technology began to be used in a variety of applications, including

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security and surveillance. However, it was not until the mid2000s that facial recognition technology became accurate enough to be used for attendance tracking. In 2005, the University of Maryland, College Park developed a face recognition system called Face it all that was able to achieve a 99% accuracy rate in controlled settings. This led to the development of commercial face recognition systems that could be used for attendance tracking in schools, businesses, and other organizations. The first commercial face recognition system for attendance tracking was developed by Cognitec in 2006. The system, called Face ME, was used by a number of organizations, including the Massachusetts Institute of Technology (MIT) and the University of California, Berkeley. The history of smart attendance using face recognition can be traced back to the early 1970s, when the first automatic face recognition systems were developed.

These early systems were based on handcrafted features, such as the distance between the eyes and the width of the mouth. However, they were not very accurate and were only able to recognize a small number of faces. In the 1990s, there was a significant breakthrough in face recognition technology with the development of principal component analysis (PCA) and linear discriminant analysis (LDA). These algorithms were able to extract more sophisticated features from faces, such as the shape of the nose and the texture of the skin. This led to a significant improvement in the accuracy of face recognition systems. In the early 2000s, face recognition technology was further improved with the development of support vector machines (SVMs) and deep learning algorithms. These algorithms are able to learn complex patterns from data, which allows them to recognize faces with even greater accuracy.Today, face recognition technology is used in a wide variety of applications, including security, surveillance, and access control. It is also being used to develop smart attendance systems, which can automatically mark students present in class.

2.LITERATURE SURVEY

Literature Survey 1:

Title: "Face Recognition Techniques for Secure Attendance System: A Comprehensive Review"
Abstract: This literature survey provides a comprehensive review of the various face recognition techniques applied in secure attendance systems. It explores the evolution of face recognition technology, its applications in attendance management, and the challenges associated with

different algorithms and hardware. The survey serves as a foundational resource for understanding the landscape of face recognition in secure attendance systems.

Literature Survey 2:

Title: "Secure Attendance Systems: State-of-the-Art Face Recognition Approaches" Abstract: This survey focuses on state-of-the-art face recognition approaches in smart attendance systems. It reviews advanced algorithms, deep learning models, and their applications in automating attendance tracking, providing insights into the current advancements in this field.

Literature Survey 3:

Title: "Privacy and Security in Secure Attendance Systems Using Face Recognition" Abstract: In this survey, we explore the privacy and security considerations in smart attendance systems that utilize face recognition. It discusses data protection, encryption, and privacy preservation measures, along with security enhancements to protect attendance records against unauthorized access and data breaches.

Literature Survey 4:

Title: "Machine Learning and Deep Learning in Face RecognitionBased Secure Attendance Systems" Abstract: This literature survey delves into the integration of machine learning and deep learning techniques in smart attendance systems based on face recognition. It reviews the models, algorithms, and neural networks used for face recognition and attendance tracking, offering insights into the role of AI in this context.

Literature Survey 5:

Title: "Challenges and Future Trends in Secure Attendance Systems Using Face Recognition" Abstract: This survey addresses the challenges and future trends in secure attendance systems employing face recognition. It discusses issues related to real-world deployment, scalability, and adaptability, while also envisioning the potential innovations and advancements in this evolving field.

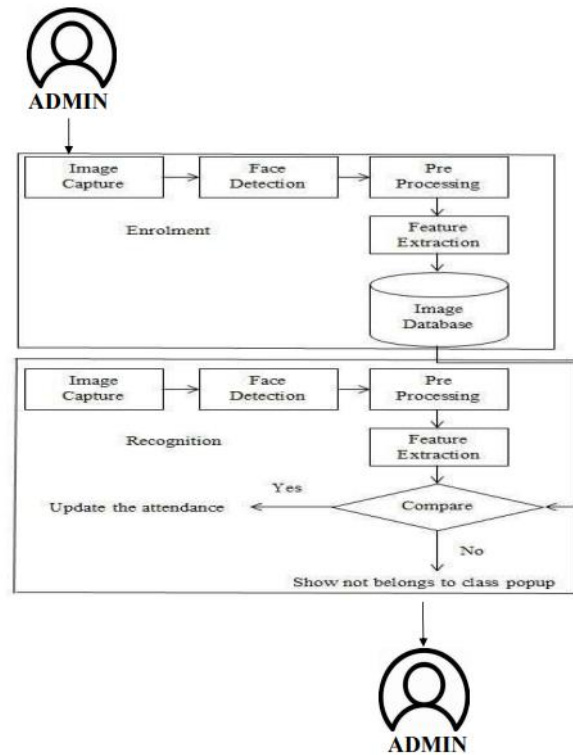## 3.SYSTEM DESIGN

3.1 SYSTEM ARCHITECTURE:

Fig 1: System Architecture

3.2 ACTIVITY DIAGRAM:

Activity diagram is another important diagram in UML to describe the dynamic aspects of the system. Activity diagram is basically a flowchart to represent the flow from one activity to another activity. The activity can be described as an operation of the system. The control flow is drawn from one operation to another. An activity diagram is a behavioral diagram i.e. it depicts the behavior of a system. An activity diagram portrays the control flow from a start point to a finish point showing the various decision paths that exist while the activity is being executed. We can depict both sequential processing and concurrent processing of activities using an activity diagram.
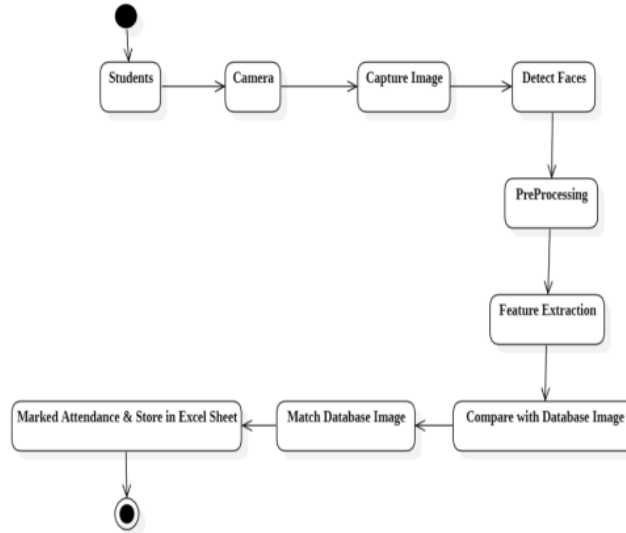
Fig 2: Activity Diagram

4.OUTPUT SCREENS

4.1 Home Page:

The first step of the project is explained by the below window. It consists of Mark Attendance, Add Person, Train Images, View Attendance, Quit buttons. By clicking the required button we can proceed the next step.

Fig 3: Home Page

4.2 Add Person Window:

The second step of the project is explained by below window. In this screen we have to give the basic details of the person like Id & Name, then click on the submit button to save that data in database.

Fig 4: Add Id and Name of the Student

➢ The data we submitted in the above window, is stored in the Excel Sheet mentioned below format.

Fig 5: Stored Student Details in Database

➢ After submiting the details of the person, automatically the below window will be opened to capture the persons faces.
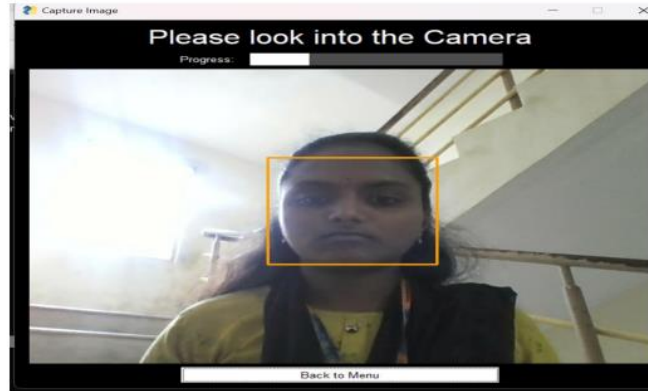
Fig 6: Add Person Face in Database

4.3 Train Image Window:

In this window, it will train the images which are captured in the above window and stores in the database
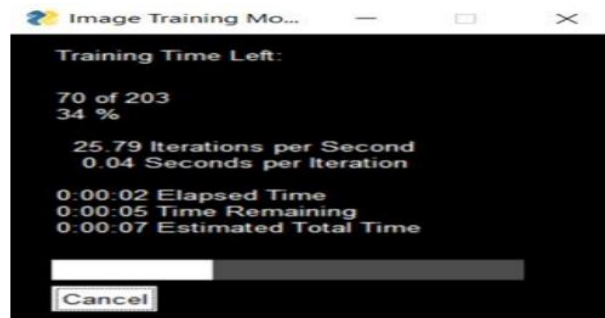

Fig 7: Train the Images in Database

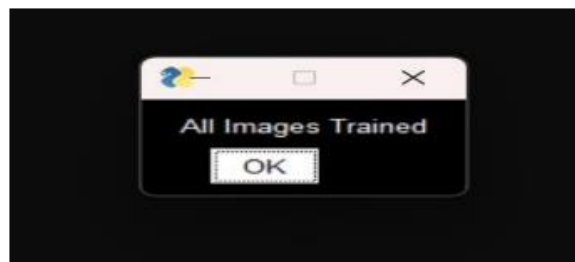➢ After training all the images of a person, it will display the below window like all images are trained.

Fig 8: Images Trained

➢ After images are trained, all trained images are stored in the database just like below window.

Fig 9: Trained images are stored in database

4.4 Mark Attendance Window:

This window explains about the lecture duration, in this we have to set the timer according to our schedule. By this we can capture the attendance.
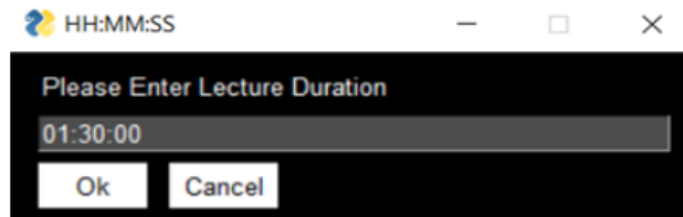

Fig 10: Lecture Duration

4.4.1 Save Attendance Window:

In this window, it saves the attendance by clicking save attendance button.

Fig 11: Saves Attendance

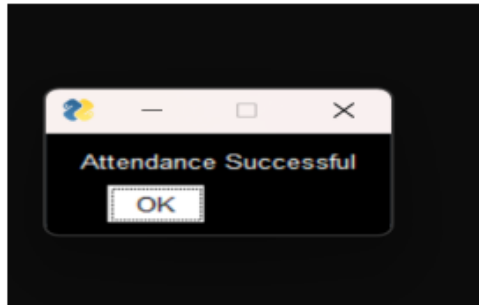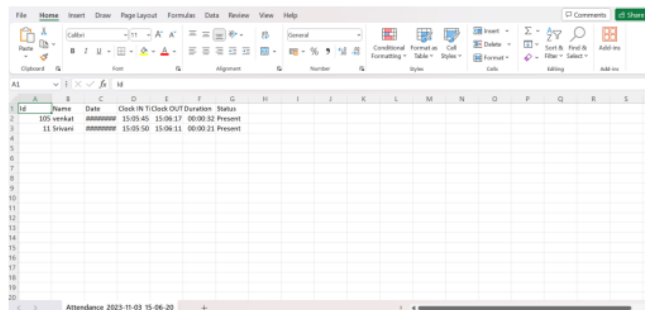➢ After attendance saved, it displays the below window i.e., Attendance Successful.

Fig 12: Attendance Saved

4.5 View Attendance:

After attendance saved, we can view the attendance in the Excel Sheet which is stored as the below format.

Fig 13: Attendance Sheet

5.CONCLUSION

Attendance is one of the most important aspect for all the organizations, schools and offices. Our project makes attendance capturing easy, efficient and faster. Our project also makes the attendance system secure since attendance is marked using face recognition algorithm and all the users will be allowed specific ID. The project automatically keeps track of time and marks attendance with respect it hence it keeps record of the total time for which each employee/student/user was present. This project generates an attendance report and automatically saves it and thus makes the process of taking attendance a lot easier and faster than manually marking attendance.

6.FUTURE ENHANCEMENT

Our Project can be further developed as an app by providing compatibility for various operating systems. Adding feature for storing time tables for each day of the week so that teacher/administrator does not need to enter lecture duration and subject for lecture/details of meeting. Also, the above feature would help making an enhanced attendance system with not only attendance report of each lecture but then could also track attendance of each person/student/employee. This project could also be developed as a more secure attendee system by denying permission to entry to meeting/lecture if person is not recognised and giving an alert to the administrator/teacher asking if the person is authorised or not hence administrator/teacher would also have an option to have the person as a guest/observer in the meeting and hence the attendance report would be generated accordingly. One of the next developments can be to make the program loading time significantly less and making the program to look faster and with smooth animations.

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