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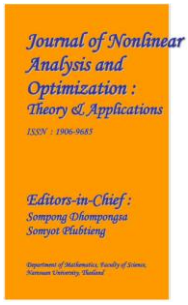

REAL-TIME FACIAL RECOGNITION BASED ATTENDANCE SYSTEM

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ABSTRACT

In academic institutions, workplaces, and various organizations, the task of attendance taking stands as a fundamental routine. Traditionally conducted through manual methods like roll calls or name listings, this duty now seeks a modern upgrade. The objective of this project is to create a Real- time Facial Recognition based attendance system, aimed at converting this manual process into an automated workflow which meets the requirements for bringing modernization in attendance handling and time management. The system first captures an image of each student using a webcam and stores the information in the database thereby mapping it into a face coordinate structure. The next time a registered student enters the premises, the system will promptly recognize them and record their attendance, including the timestamp. In this project, we come up with a new hardware system for human face detection which makes use of a Printed Circuit Board with an LCD display screen,camera,Wi-fi module and Raspberry Pi which are surface mounted on it. The major steps in this work are face detection followed by face recognition and generation of a google spread sheet with the student attendance.

Keywords : Attendance management system, Face Detection, Face Recognition, PCB module, Machine learning,Raspberry Pi.

INTRODUCTION

Tracking student attendance is important for every schools and institutions. The main reason for attendance record is to reduce absenteeism and to ensure that each and every student is present in the class for justifying their presence. Attendance systems are used by businesses of all kinds to track the department in which work is done as well as the start and stop times of students and employees. A thorough record of attendance concerns, including who arrives late and who calls in sick, is also kept by many organizations. Organizations can benefit greatly from an attendance system in numerous ways. The professor calls on each student by their name and records their attendance using the traditional method. This process of recording attendance takes lots of times that disturbs the entire lecture. The other method of taking attendance are depended on two types of biometric as physiological characteristics (face, fingerprint, finger geometry, hand geometry, palm, iris, ear and voice) and behavioral characteristics (signature and keystroke dynamics). Face detection and recognition system is more expensive, exact, easy to understand and non intrusive process as compare to other biometrics.

Among the obtainable biometric techniques face recognition is a trendy research topic with a number of applications in several industrial areas counting inspection and security, entertainment

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and effective reality and human-machine relations. The hardware components consists of a PCB embedded with a controller,wifi module. Camera and LCD display can be fixed externally . The database, python code and others requirements are uploaded externally. The output which is nothing but the student attendance can be obtained by generating a spreadsheet which contains the attendance of each and every student whose data is already taken and stored in the database uploaded. This process is not limited to the educational institutions and schools, organizations and industries can also use facial recognition based attendance management system for tracking employees attendance .This could save time, and reduce errors .

LITERATURE SURVEY

[1] A.F. Abate, M. Nappi, D. Riccio, and G. Sabatino mentioned that Face recognition systems fall into two categories: verification and identification.Face verification is a 1:1 match that compares a face image against a template face images, whose identity is being claimed. On the contrary, face identification is a 1:N problem that compares a query face image against all image templates in a face database to determine the identity of the query face.Authors also mentioned the spreading of various biometric techniques that includes the human features like finger print,voice,iris,hands and face .

[2] Yang, Hao; Han, Xiaofeng developed a novel facial recognition technology-based real-time video-based attendance system. The technology using facial recognition and vedio recognition technology automatically records attendance by taking pictures of students faces using a webcam and comparing them with data stored in a database, saving time and effort on human labor.Authors also performed a discussion on the accuracy rate of various attendance checking methodologies and the accuracy rate of real-time vedio processing.

[3] Evanjalin A.B. Christy D. 2 , Karthika N. 2 & Reshma R.S. 2 demonstrated an automatic attendance system that makes use of face recognition methods using IOT, ESP 32,Raspberry Pi, OpenCV library. Through the use of a web server, the system takes real-time picture capture, processes it for face detection, and automatically updates attendance records.The authors mentioned that an attendance sheet can be generated for each and every student.

[4] Arun Katara1, Mr. Sudesh2, V.Kolhe developed " Facial recognition attendance monitoring system" that undergoes face recognition of different person or student.From recognition attendances is upload to database using face detection and recognition of student or workers. From this manual work is decrease by human and automatically attendance system based on faces process done.

[5]Shrivastava, K., Manda, S., Chavan, P. S., Patil, T. B., & Sawant-Patil, proposed a sound and secure system for automation of attendance system by the integration of the face recognition technology by using Haar-cascade classifiers to detect faces and Linear Binary Pattern Histogram machine learning algorithm for face identification.Authors also used Linear Discriminant Analysis for gender classification among the students.

EXISTING METHOD

An attendance system is a mechanism used to track and manage the attendance of individuals within an institution or an organization. Attendance taking procedures are evoluting right from the traditional methods of taking attendance by roll calls to biometric based attendance system.The

accuracy of the information collected is that the biggest challenge within the previous attending management systems as a result of it will happen that the attending won't be marked in person by the first person, in another words, attending of a specific person are often marked by third party person that reciprocally violates the accuracy of the information. For example, if student X is lazy to attend a specific lecture, therefore student Y helped X to sign for the attending. Suppose the establishment establishes social control, it would got to waste heaps of human resource and time that successively won't be sensible in the least. So all the recorded attending within the previous system isn't reliable for the utilization of study. The second drawback of the recent system is that it's too time intense. Forward the time taken for a specific student to sign his/her attending is just about a second. In 1 hour, just about around sixty students will sign their attending this method is incredibly inefficient and time intense. RFID (Radio Frequency Identification) card system, fingerprint system and iris recognition system are the existing biometric based techniques that are used for taking attendance .The spreading rate of these methods is increasing now-a-days and so their limitations.RFID card system is implemented due to its simplicity. However, the user tends to help their friends to check in as long as they have their friend's ID card. The fingerprint system is indeed effective but not efficient because it takes time for the verification process so the user has to line up and perform the verification one by one.Many attendance management systems that already exists lack efficiency and information sharing. Therefore, in this current proposed system, those limitations are overcome and also further improved and made much efficient.

PROPOSED METHOD

The proposed system is a Real- time Facial Recognition based attendance system, aimed at converting this manual process into an automated workflow which meets the requirements for bringing modernization in attendance handling and time management.Among the obtainable biometric techniques face recognition is a trendy research topic with a number of applications in several industrial areas counting inspection and security, entertainment and effective reality and human-machine relations.The hardware system for human face detection makes use of a Printed Circuit Board with an LCD display screen, camera, Wi-fi module and a controller module. The major steps in this work are face detection followed by face recognition and generation of spread sheet with the attendance of students.The system uses deep learning for Facial Recognition.This process is not limited to the educational institutions and schools, organizations and industries can also use facial recognition based attendance management system for tracking employees attendance .This could save time, and reduce errors .

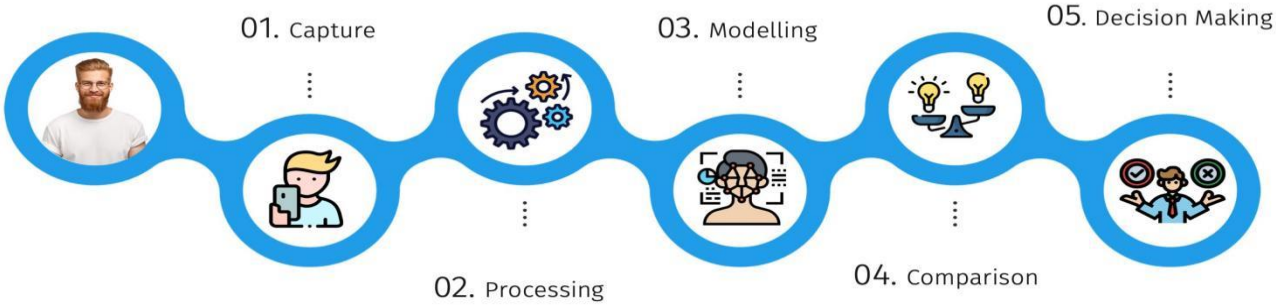

Fig: Proposed system

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EXPERIMENTAL IMPLEMENTATION

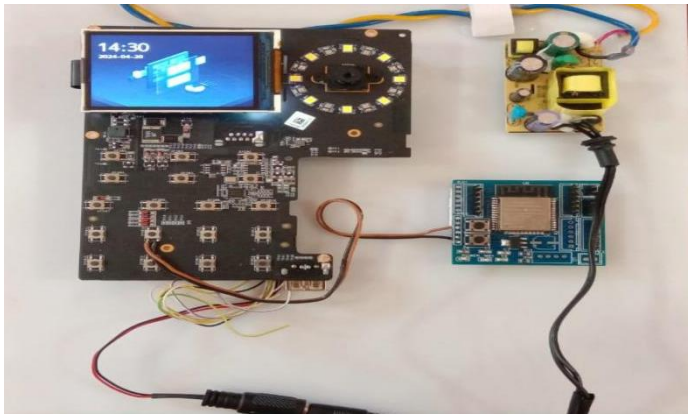

Fig:Experimental Setup

1. Setting up the Model

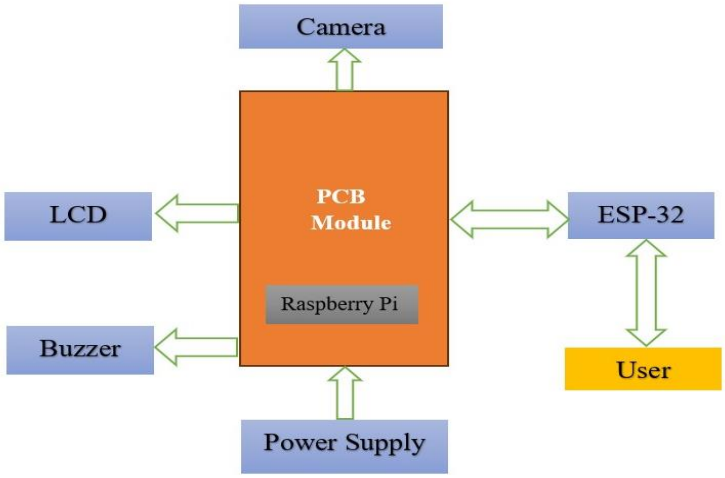

Fig: Block Diagram

The model is operated by giving 12V DC supply from the external source. Then after verification process using User name and the password were added. Now execute the further process like adding users and their names .This process can be done by connecting the system with our mobile throughWi-fi and adding directly from the mobile.

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2.Capturing and Storing Face Data

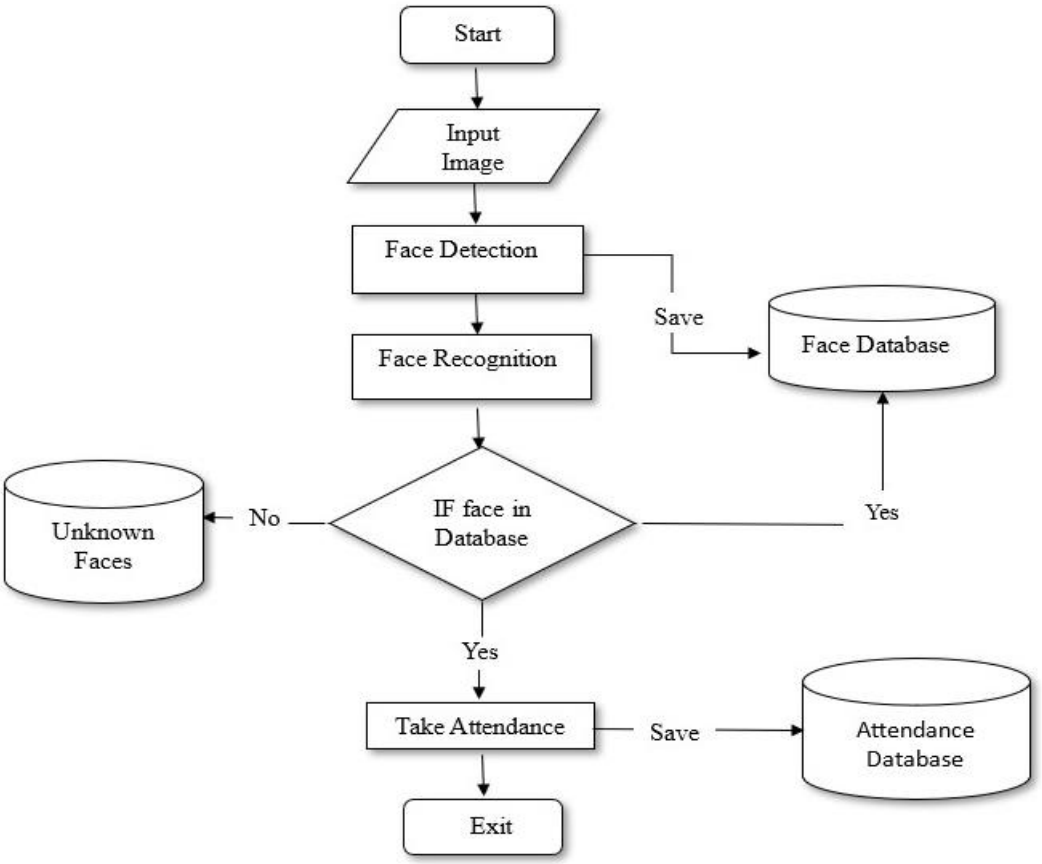

Fig: Flowchart

When capturing and storing face data for a face recognition system, it's essential to ensure the quality and security of the stored information. The process involves capturing high-resolution images of individuals' faces using a suitable 2 Mega pixel camera connected to the system. The images are then processed and stored in a secure database. It's crucial to consider factors such aslighting conditions, facial expressions, and head orientation during the capture process to ensure accurate and reliable face data. Additionally, implementing encryption and access control measures is vital to safeguard the stored data from unauthorized access or misuse.

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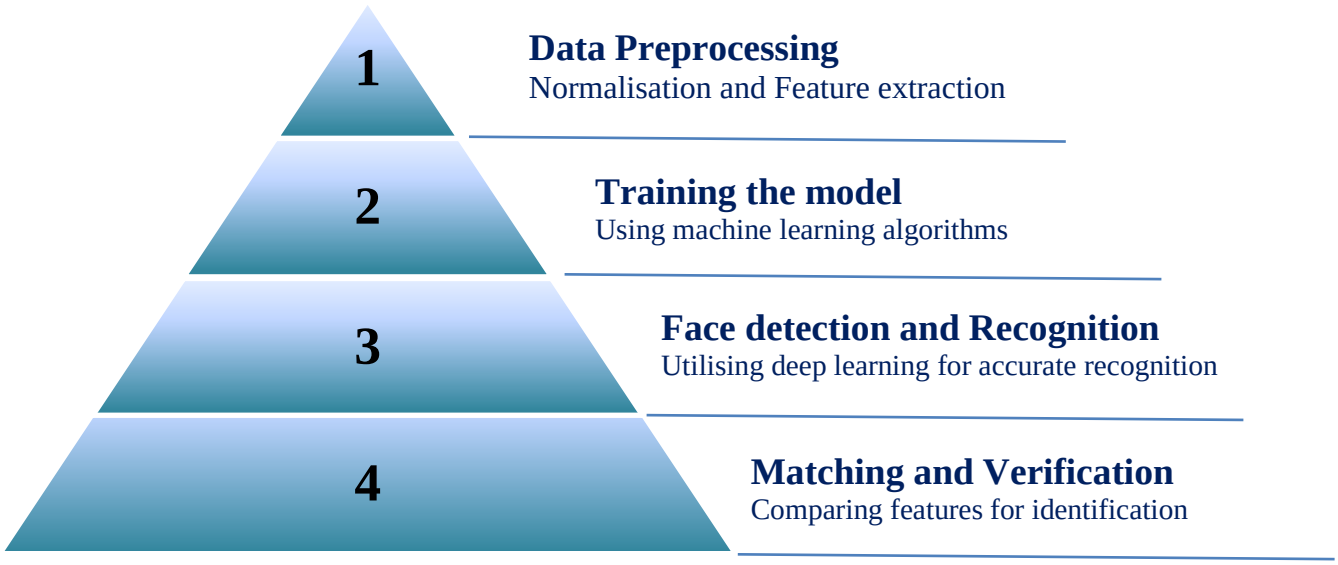
3.Face Recognition Algorithm Implementation



Implementing a face recognition algorithm involves several key steps. First, the face data undergoes preprocessing, which includes normalization and feature extraction to prepare it for the model. Subsequently, the model is trained using machine learning algorithms, allowing it to learn and recognize distinct facial features. During the recognition phase, deep learning techniques are employed for accurate and efficient face detection and recognition. The final step involves matching and verification, where the extracted features are compared for identification purposes, ensuring high precision and reliability in the recognition process.

4.Attendance Tracking and Reporting

- Adding User

  After connecting the device with the mobile through wi-fi , sign in to the web page and add the user along with the ID and name ie add the students along with their roll numbers and names and save the details.

- Attendance tracking

  After verifying whether the face is detected and recognized return to the web page and check the details of the students ,go to the attendance statistics and download the report in the required form

- Customized reporting

  The system allows for the creation of personalized reports based on specific parameters such as attendance trends, individual performance, and class or work group metrics. Later this data with attendance can be reported to the respective lecturers and students of the institution.

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RESULTS

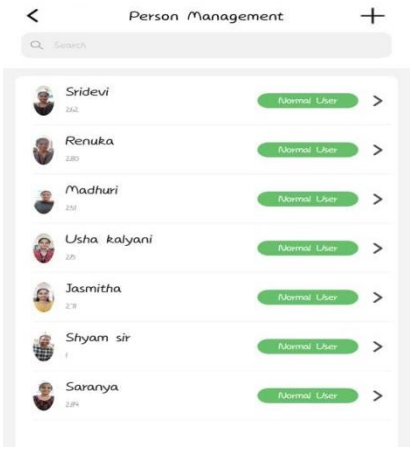


Fig: List of Users

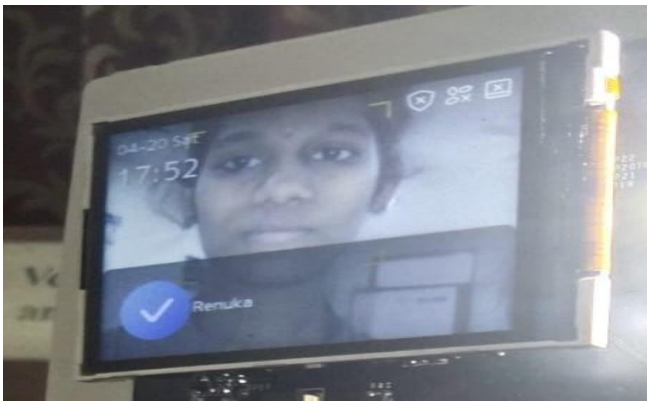
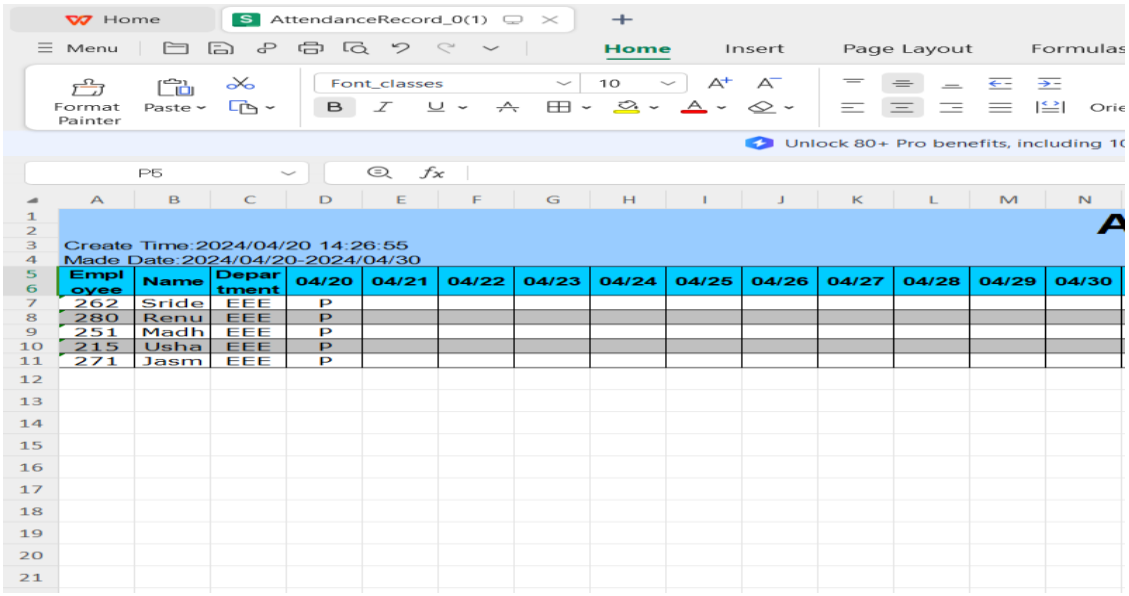


Fig: Face recognized



Employee	Name	Department	04/20	04/21	04/22	04/23	04/24	04/25	04/26	04/27	04/28	04/29	04/30
262	Sride	EEE	P										
280	Renu	EEE	P										
251	Madh	EEE	P										
215	Usha	EEE	P										
271	Jasm	EEE	P										

Fig : Attendance sheet

CONCLUSION

Implementations of facial recognition system are crime prevention, video surveillance, person verification, and similar security activities. Facial Recognition Based Attendance System has been envisioned for the purpose of reducing the errors that occur in the traditional attendance taking system. The aim is to automate and make a system that is useful to educational institutes. Using machine learning algorithms which are freely over the internet the proposed system becomes more accessible. This system can be applicable in small scale industries where the employees attendance can be tracked automatically and their pay slip can also be generated. This method is secure enough, reliable and available for use. Proposed algorithm is capable of detecting multiple faces. As compared to the olden methods and procedures this method can improve the accuracy and reduces the time consumption. The system is user -friendly, easy to use and consistent which provides more security, privacy.

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