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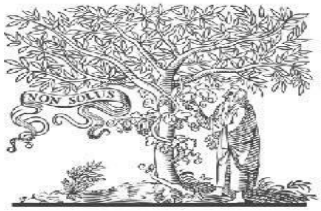

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FACE RECOGNITION AND RFID VERIFIED ATTENDANCE SYSTEM

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***Abstract*— Proper attendance management and maintaining of it is essential and given first priority for all the educational and academic institutions in order to spread and to ensure the quality of education for all students. This paper is used to present a model for automated attendance system to reduce manual data collection and end the possibility of fraud. This model mainly focuses on how facial recognition is integrated with the Radio Frequency Identification (RFID) recognizes and that is used to count the authorized students as they enter and leave the classroom. The smart attendance system keeps a genuine record of each enrolled student, greatly eliminating traditional tedious work. Additionally, this intelligent system keeps an attendance record for every student enrolled in a particular course and provides the necessary information as and when required. In our project, recognizing a person's face and simultaneously verifying it via RFID greatly removes the limitations of existing manual attendance systems. Another additional feature of this project is to save energy by implementing a system with IR modules that turns on the electronics in the room only when people are present.**

Keywords*— *Image processing technique, OpenCV(Open Source Computer Vision Library), face recognition, The RFID tag, The RFID reader, Arduino project, IR module

I. INTRODUCTION

According to the Co build Learner Dictionary, an attendance is the most important and considerable fact that someone attends a considerable event or attends an institution regularly, or an event attendance is the number of people who attend that event. It also shows when someone visits a place or event. Empirical evidence suggests that there is a most significant association between the student attendance and the academic performance of the student. It is also said that the all students with the low attendance rates generally have the low retention rates. Mazza and Dimitrova also agreed, arguing that student participation in a course can say subject behaviour that can be used to measure propensity and commitment to the course.

All the students or employee's attendance is maintained by all schools, colleges, organizations and universities. Faculty must keep the proper records of the attendance in secure manner. The Manual recording of the attendance systems are the most inefficient and required more time for creating the records and calculating the average of the attendance for each and every student. Therefore, there is a need of a system that is used to solve the problem of organizing the student records in an efficient manner and calculating average attendance. The proposed model or system should store all the details of attendance weather the student is absent or present in an electronic format for easy attendance management. Most universities still use traditional methods of student attendance. Using this method, many students help their friends by registering their attendance in case they miss the institute. When using this method, the attendance list is manually analyzed and maintained by the instructor to know the list of enrolled and absent students. If the attendance list is lost, the instructor will need to re-record attendance and the absent student will be given the opportunity to register on the new attendance list.

This process also impacts students as they spend time manually signing, reviewing, and submitting attendance sheets. Therefore, there is a need to develop a computerized system to help manage instructors, easily record attendance, and maintain that attendance. Teachers have

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easy access to this system. The manipulations and management of students attendance data should be handled by the system, eliminating the need for faculty and staff to manually analyze student attendance. There are two types of attendance systems they are as follows:

A) Manual Attendance System (MAS)
B) Automated Attendance System (AAS).

A) Manual Attendance System (MAS)

The student manual recording of attendance system is the process that requires the faculty associated with that subject to that name and the student and the faculty is used to manually mark their attendance.

Figure 1. Manual Attendance System (MAS)

The Manual attendance can be seen as a the time-consuming process, teachers may miss someone, or students may reply to a friend's absence multiple times. So, given the traditional process of attending classes, a problem arises. To solve all of these problems, we are going to the automatic

Figure 2. Automatic Attendance System attendance system "AAS".

B) Automatic Attendance System (AAS)

The "Automatic Attendance System (AAS)" is a process which uses facial recognition technology in order to automatically determine whether the student is present or absent in the classroom. It is also possible for detecting whether students are in sleep or in wake during lectures and can be implemented during the exams to ensure student attendance.

The student's attendance can be detected by capturing their faces with the video live streaming services on the high quality monitors, making it a very reliable machine for detecting the presence of all students in a classroom. There are two common ways for detecting the face of the human. They are as follows:

- Feature based approach.
- Brightness based approach.

Traditional attendance tracking systems have several problems, such as one student losing his name and another student's attendance record being inaccurate. Another problem with paper attendance sheets is that instructors can lose them. Student attendance analysis requires instructors to manually perform calculations to obtain student attendance rates.

Improvements in technology have become useful tools for the development of new systems, removing the shortcomings and enhancing the advantages of traditional methods. All of these reviews indicate that attendance records are a key indicator of student success at most institutions of higher education. This student attendance project presents an integrated management system that uses information technology for various purposes within an organization. It is used to verify the students faces and the students RFID cards at the same time. When a student face matches with the RFID, the student's attendance is automatically provided and gets stored in the secured database.

II. PROBLEM STATEMENT

The problem of attendance systems is to accurately and efficiently record the presence of people within a particular organization or institution. Attendance systems must be able to detect and record the presence or absence of people in real-time or near real-time. It must also be able to handle large amounts of data, maintain data accuracy, and minimize errors. Additionally, the system should be easy to use, accessible only to authorized persons, and compliant with data protection

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regulations. An attendance system should provide timely and accurate attendance reports to support the decision-making process and facilitate communication between the organization, employees and stakeholders.

In conclusion, the old attendance system has several limitations and drawbacks that could hinder its effectiveness in accurately and efficiently recording attendance. These limitations include inaccuracies, security vulnerabilities, and the difficulties in maintaining and updating the system databases.

Therefore, it is necessary to adopt a new and improved attendance system that addresses these limitations and provides a more effective and efficient way of recording attendance.

III. EXISTING SYSTEM

A) RFID Verified Attendance System:

Figure 3. RFID Verified Attendance System

The "Radio Frequency Identification (RFID)" is a communication system technology that is defined as the medium that used to identify and track the special tags embedded in objects or living things using radio frequencies. The RFID system is the means of wireless communication that uses the electromagnetic waves and capacitive coupling in the high frequency part of the spectrum in order to communicate between RFID readers and the RFID tags through various modulation techniques and coding schemes. By integrating the various components such as the RFID reader kit, The RFID card, the microcontroller and SD card, that you can set up an RFID based portable attendance system.

B) Fingerprint Based Attendance System:

Every time the user is used to swipe a finger over the fingerprint module, the fingerprint module that is used to capture the fingerprint and looks for the ID associated with that particular fingerprint in the system which is already recorded. When the fingerprint ID is matched with the pre-recorded data, Presence Registered appears on the LCD along with a beep and the LED get turns off until the system is ready to accept input again. In addition to the fingerprint module and the RTC module is also used for the time and the date in order to check when does the attendance is marked.

Time and date is used to run continuously in the system. So, that the Arduino takes real date and time the real user puts her finger on the fingerprint and stores it in her EEPROM in the allocated space.

IV. PROPOSED SYSTEM

It captures each student's face while simultaneously reading the RFID tag and storing it in a database for attendance. You must recognize all features of the student's face.

1. Teachers do not need to manually record class attendance.
2. The attendance database is updated for the respective student automatically.

V. OBJECTIVE

1. Detecting unique face images.
2. Detecting faces among the other face characters such as spectacles, beard etc.
3. Automatic update of attendance list without human intervention.
4. Time is a very valuable resource, so waste less time.
5. Reduction of flaws done by the students, Employees etc...

VI. WORKING OF PROPOSED MODEL

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Figure 4. Fingerprint Based Attendance System.

A) Flow Chart

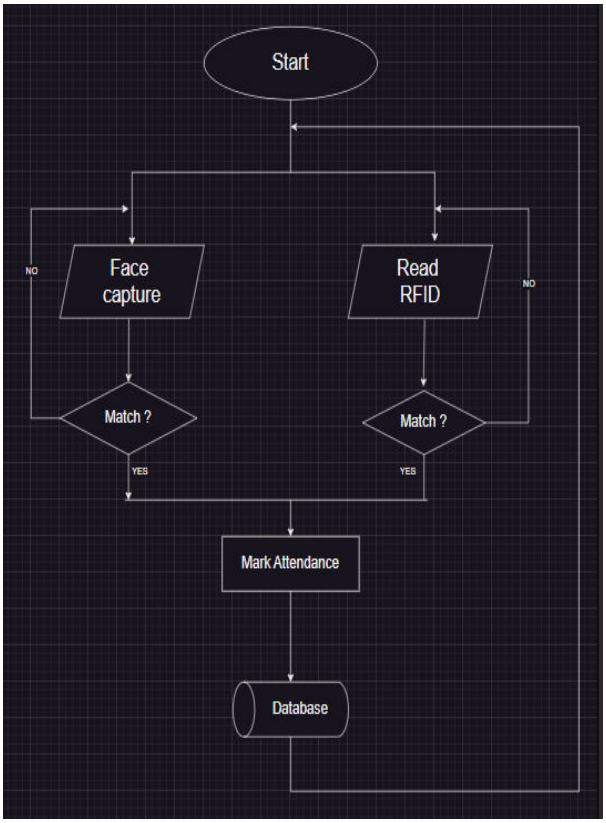

Figure 5. Flow chart for Proposed Model

From the above flow chart, it is understood that,

Step1: Initially, the face of the student is captured using the face recognition technology and checked with the pre-recorded data.
Step2: Simultaneously, the RFID reader is used to read RFID card and checked with the pre-recorded data.
Step3: If the face and RFID card of that student is matched with the pre-recorded data then, attendance is provided for that student.
Step4: If the face and RFID card of that student is not matched with the pre-recorded data then, attendance is not provided for that student.
Step5: Entire data is stored in the data base.

B) Circuit Diagram

First, all the necessary coding parts are completed. Next, power up both the Arduino and the Raspberry Pi and run the Python face script. Then put your face in front of the camera and put the RFID card on the RFID module after detection. If the card is successfully loaded, the name and confirmation of existence will be displayed on his OLED display. At the same time, her second Arduino stores the person's presence time along with her RFID name and face. To view the entire smart attendance system database, open the attendance text file on the SD card.

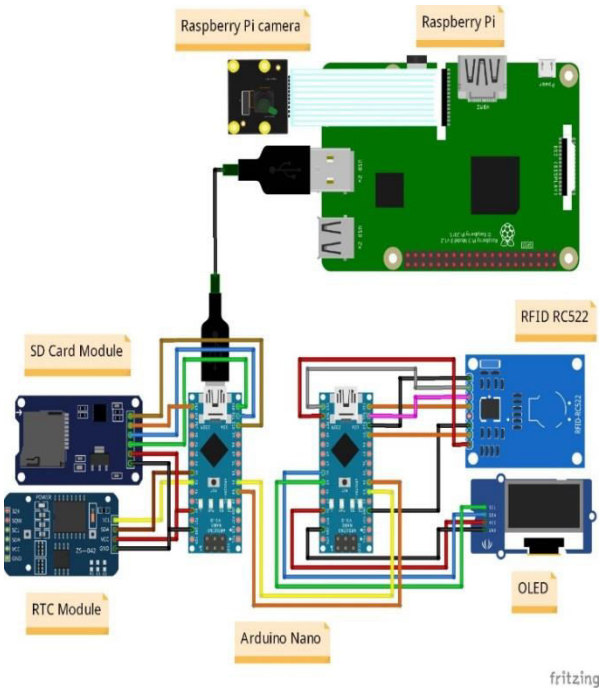

Figure 6. Circuit Diagram of Face Recognition and RFID verified Attendance System.

VII. RESULT

The camera module is interfaced with the Raspberry PI and also the SD card module is interfaced with the Raspberry PI and there is a serial connection between the SD card module and the RFID module. The face recognition program is constructed in the Raspberry PI using the Python IDLE. The entire kit is shown in the below

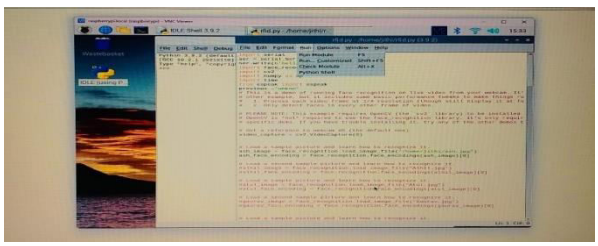

figure.Initially switch ON the power supply

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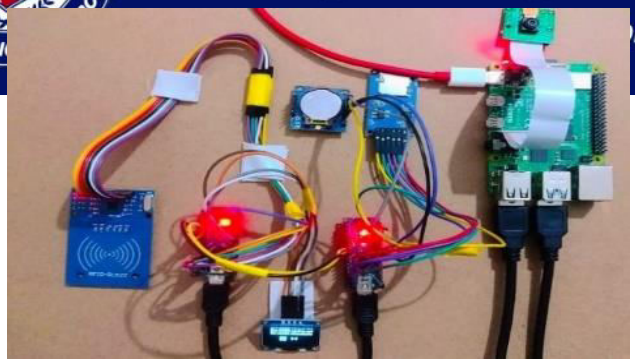


therefore, Raspberry PI, SD card module and the RFID module get power supply.

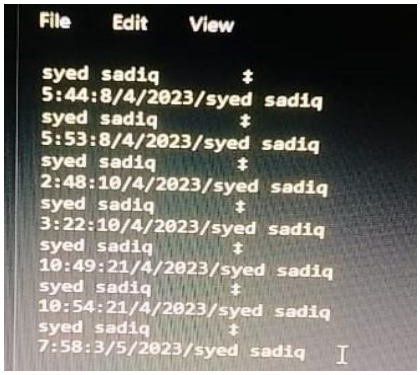
When the program is started executing a streaming video get opens and starts capturing the students faces using the Raspberry PI camera and checks with the pre-recorded data present in it as shown in the below figure.

Simultaneously the RFID card of that student is read by the RFID module as shown in the below figure.

Figure RFID reader is reading RFID card.

When the RFID card matches the student's face, the student's presence is marked and shown on the display. Which is an OLED display as shown in the below figure.

Entire data is stored in the SD card module



the recorded/ stored data is shown in the below figure.

VII. ADVANTAGES AND APPLICATIONS

A) Advantages:

a. Proxy attendance can be caught.
b. Hard copy paperwork of attendance sheets is reduced.
c. Data stored for long time compared to attendance sheet.
d. Fully automated and human interaction is reduced.
e. Time loss is reduced.

B) Applications:

a. Used at confidential areas such as military areas.
b. Used in educational organizations, offices etc.
c. Used where Real time data management is required.
d. It is used to monitor the prisoners.

It can provide access for only authorized

Figure Detecting the face of the student.

persons only.

VIII. CONCLUSION

The design and implementation of the face recognition and RFID verified smart attendance system based on the facial recognition and the RFID verification was the goal of the first paper, and both parts worked as intended and were successful. That it goes without saying, therefore, that the proposed model has the potential in order to overcome the manual attendance systems due to its efficiency and convenience. Our models are easy to use and provide the most accurate and organized data. And with minor modifications, the system can be deployed in any secure facility.

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