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An Implementation of Embedded System for Student Record Keeping using IOT

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ABSTRACT: Every organization whether it be an educational institution or business organization, it has to maintain a proper record of attendance of students or employees for effective functioning of organization. Designing an efficient attendance management system for students to maintain the records with ease and accuracy is an important key behind motivating this project. Nowadays attendance is taken on paper and records are maintained where someone keeps all the records and does all the calculations at the end of the month due to which it takes time and students have to wait till month end to know their attendance. This system would improve accuracy of attendance records because it will remove all the hassles of roll calling and will save valuable time of the students as well as teachers.

KEYWORDS: IoT (Internet of things), attendance, fingerprint, Node MCU, OLED display.

I. INTRODUCTION

Attendance plays a major role in educational institutions. The most common means of taking attendance in the classroom is by calling out the roll numbers of students or asking the students to manually sign the attendance sheet, which is passed around during the lecture. The process of manually taking and maintaining the attendance records becomes highly cumbersome. Biometric systems have reached a sufficiently advanced stage wherein they can now be deployed in systems without hampering portability. With the recent development of various cloud based computing and storage systems, data can be securely stored and retrieved whenever required. Primarily, fingerprints and iris images are considered to be the most reliable for use in biometric systems.

The system make use of biometric scanners for marking attendance .the scanner is connected with an development board which has a microprocessor which process the data, the system is total online and uses Iot technology which make system easy to maintain its record and data is available online which is easily accessible connectivity is provided by internet wire or wirelessly .the processer connects all the peripherals together and process the data accordingly. Fingerprint is data in real time and also attendance is also marked in real time.

Whenever any student put it finger on finger print scanner it scans the finger print and matches with the data base present inside fingerprint scanner and if the finger matches it will marked it as present with time online on the website.

II. LITERATURE SURVEY

Internet of Things (IOT) based Attendance and Intrusion Detection System by Karthikeyan B, Astha Puri, Rohan Mathur and Anurag Mishra

In this paper we learnt about the development and implementation of Iot based attendance system and intrusion detection. In which Radio Frequency Identification (RFID) based attendance management system is one such method, along with a camera to optimize it. The camera is utilized for intrusion detection in restricted areas whereas the motion detection is done by the PIR, making the whole system more efficient. A significant upgrade worked upon here is about making it global so that the concerned authorities can monitor it from a web site from any device; as well as the security can look for intruders. The first point of interaction of any person with this design would be the PIR, which would detect any motion within its specified range. This in turn would activate the RFID and the person who has come within the PIR's range would then have to show his/her tag to the RFID sensor. Then the system match's the tag number with the list of approved tags stored in its memory and if validated would allow entry, if not then a camera attached would click a picture of the person assuming him/her to be an intruder and an alarm would be sent via email to

the concerned authority. All the information would also be uploaded to a web page so as to avoid any ambiguity and enable easy access to a person in charge.

Implementation of IoT Based Attendance System on a Dedicated Web-Server by Nadar Prince, Abhishek Sengupta, Ms. Keerthi Unni

This paper we learnt about the fingerprint module which can store a large data of the class can reduce the manual work involved. This project uses the concept of Internet of Things to set up a smart attendance tracking system. Attendance system based on face recognition using Eigen face and PCA algorithms by Priyanka Wagh, Roshani Thakare, Jagruthi Chaudhari, and Shweta Patil. From this paper we have learned about the management of attendance system by different biometric system. In this system they have used different algorithm like illumination invariant, Viola and Jones algorithms. Their major step was to take attendance on the basis of face recognition. This system is effective to maintain the attendance and record of student.

III. METHODOLOGY

This proposed attendance management system uses fingerprint identification. In identification, the system recognizes an individual by comparing his/her biometrics with every record in the database. In general, biometric identification consists of two stages:

Enrolment and Authentication

During enrolment, the biometrics of the user is captured (using a fingerprint reader, which are likely to be an optical, solid state or an ultrasound sensor or other suitable device) and the unique features are extracted and stored in a database as a template for the subject along with the student ID. The objective of the enrolment module is to admit a student using his/her ID and fingerprints into a database after feature extraction. These features form a template that is used to determine the identity of the student, formulating the process of authentication. The enrolment process is carried out by an administrator in the attendance system. During authentication, the biometrics of the user is captured again and the extracted features are compared (using a matching algorithm) with the ones already existing in the database to determine a match. The identification accuracy of a biometric system [8] is measured with the false (impostor) acceptance rate (FAR) and the false (genuine individual) reject rate (FRR). The FAR/FRR ratios depend, among other factors, on the type of difficulty of the algorithms used in the fingerprint extraction. Usually, algorithms with high-medium complexity lead to acceptable low FRR/FAR.

DESCRIPTION-

Block diagram shows a general representation of any system connection and components inside it. In this system we have used Node MCU which is a microcontroller with WiFi enable init, and the sensor R307 which is a fingerprint sensor which gives input to Node MCU and an OLED display used to show output. Power supply is up to 5 volts and can be given through battery or by means of USB from computer. Server is where data is sent or updated; the bidirectional arrow means we can receive data or send data to Node MCU from server by means of internet wirelessly.

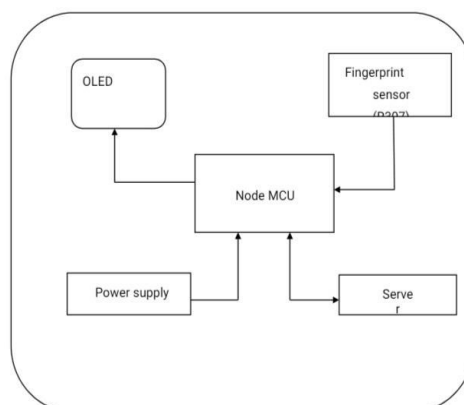


Figure 1: Block diagram

Enrolling process-

In the enrolment process, the fingerprint of each student is recorded. The fingerprint of the student is scanned using the fingerprint scanner in the system. Each fingerprint is assigned an ID number. The ID number is stored on the NodeMCU board. This number is unique for each student. Enrolment of fingerprints is performed only once. The student IDs can be changed or replaced. The scanner scan the finger twice and then store the fingerprint in the form of template.

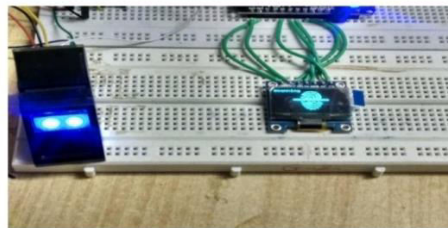


Figure 9: Ready for scan

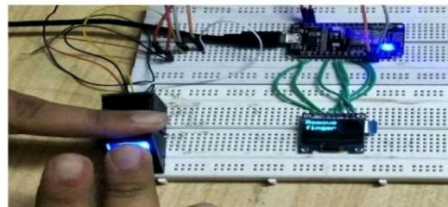


Figure 10: Scanning fingerprint



Figure 11: Fingerprint enrolled

Fingerprint Comparison and Recognition As student will put fingerprint on scanner it will compare and recognized the fingerprint. fingerprint gets lock for few second and at that time scanner will not recognized the fingerprint, as the scanner is ready it will show the finger temple on screen and ready to scan. Welcome and good bye message are show at the time for login and logout.



Figure 12: Fingerprint sensor lock



Figure 13: Invalid input



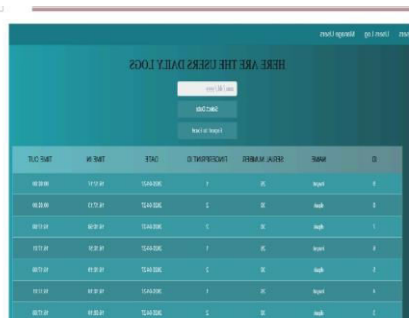
Figure 14: Valid input on login



Figure 15: Valid input on logout

Uploading data on server

If the fingerprint is recognized, the attendance granting process starts. The unique ID number of the student is recognized. The attendance data is logged into server by uploading the student's ID number in it.



| Roll No | Time | Date | Present | Absent | Mark |
|---------|-------|------------|---------|--------|------|
| 1001 | 10:00 | 10/06/2021 | 1 | 0 | 100 |
| 1002 | 10:00 | 10/06/2021 | 1 | 0 | 100 |
| 1003 | 10:00 | 10/06/2021 | 1 | 0 | 100 |
| 1004 | 10:00 | 10/06/2021 | 1 | 0 | 100 |
| 1005 | 10:00 | 10/06/2021 | 1 | 0 | 100 |
| 1006 | 10:00 | 10/06/2021 | 1 | 0 | 100 |
| 1007 | 10:00 | 10/06/2021 | 1 | 0 | 100 |

IV. CONCLUSION

The traditional process of manually taking and maintaining student attendance is highly inefficient and time consuming. The attendance monitoring system based on biometric authentication has a potential to streamline the whole process. An Internet of Things (IoT) based portable biometric attendance system can prove to be of great value to educational institutions in this regard as it proves to be highly efficient and secure. The cost involved in making this system is quite less, when compared to conventional biometric attendance system. The use of cloud computing to store the attendance records makes all the data easy to access and retrieve as and when required by the teachers. The use of fingerprint scanner ensures the reliability of the attendance record. The system, due to its lack of complexity, proves to be easy to use and user friendly.

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