

SMART CLASS BASED ON FINGER PRINT ATTENDANCE SYSTEM AND SMART TV

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Abstract - Fingerprint attendance system aims the automated attendance procedure of an educational institution using biometric technology. It allows the monitoring of student attendance to class is a true electronically by using biometric recognition. It can reduce the fraudulent students who are mostly making their fake presence. It is more secure to use and unique for every person which does not change in one's lifetime. Identifying an individual from a set of fingerprints is a time taking process. Smart class is a digital initiative which is rapidly transforming the way teacher teach and student learn. Smart class as a modernized method provides the quality education to student. Without use of CPU, processor or computer, it requires only a pen drive is plugged to a smart TV. Smart TV is used for Bluetooth, WI-FI connection, casting, audio system and network connection. The uniqueness of the fingerprint supported by technology can automatically identify or recognize a person using fingerprint sensor. The existing fingerprint sensor can only do fingerprint identification on one machine. For the mentioned reason we need a method to be able to recognize each user in a same fingerprint sensor with high accuracy. The purpose of this research is to build fingerprint sensor system for fingerprint data management to be centralized so that identification can be done in short interval of time. The result of this research shows that by using Arduino and Raspberry Pi, data processing can be centralized so that fingerprint identification can be done in fingerprint sensor with 98.5% success rate of centralized cloud storage recording. Human beings have something unique that only belongs to them.

Key Words: Fingerprint sensor, smart TV, cloud storage, Arduino, data management.

1. INTRODUCTION

Classroom is a space for teaching and learning. A general a classroom usually has a black board, a lecture, tables and chairs. To make a classroom activity more efficient, educational institutes have been continuously developing electronic products such as microphones, projector, video camera and a computer into classroom during the last few decades. The next step for educational institutes is to enhance the functionality of a classroom. Conventional

attendance system followed in an educational system where the teacher calls out the name of each student and marks the attendance causes the time wastage during lecture time. This becomes more severe especially in current scenario where number of students in a class is very large. Managing the attendance data such as large group is also very difficult also it has chance of a student to make fake attendance. Fingerprint devices use computer to store and verify fingerprints in corporate environments. It can be ported to academic environments with modifications. The entitled student attendance monitoring system is to update student's attendance automatically and sent to the HOD of the corresponding department, it will display the class faculty lecturing the classroom and send the alert message to the corresponding faculty member. The students entering the classroom place their finger on the biometric sensor. The digital output from sensor received by Arduino controller compares with digital data of various students already registered. If any mismatch occurs, it gives invalid finger else the data is stored. When the entire student thumb is received then we switch on a button on biometric system.

2. EXISTING SYSTEMS

2.1 RFID system

The website is a social networking site that, records various information about each action performed by its members or users. This technique is a popular wireless identification technique for monitoring attendance. So this system can save time than manually charging the absent and more appropriate attendance allocation of score. Automated information systems play a role in a growth, progress and modernization of daily work process and with attendance performance graphs delineate consistency with student attendance. Research says that one of the attendance systems of students based on the radio frequency technology is Radio Frequency Identification (RFID) which aims to monitor student progress. Also, RFID-based attendance could make the process simple, provide a well- structured report and can analyze student attendance pattern and time management so that resource allocation in the organization can be maximally utilized.



Fig -1: RFID system door control

RFID technology focuses on scalability and security and explained that employee discipline and staff performance could improve on an integrated RFID attendance system with database. This research aims to build a system which facilitates the administration of attendance and the attendance of logging employees effectively, using the descriptive scheme method, interviews and analysis of documents related to the attendance employees. So that it can build a RFID based attendance system, which can help facilitate the attendance logging and it can provide an assessment of the company for the progress of the company. This research was conducted because of earlier studies more discussion about the benefits of RFID. Tag collision occurs when many tags are present in a small area.

2.2 Face recognition

Its easier for vendors to develop systems and accidentally switch details and end up with false entry of data or in images. Techniques for automatic face recognition have been developed over the past three decades. A wide range of applications, including law, applications of civil, and systems of surveillance are there in facial recognition. For better interactive communication between human and machines, the recognition of the human face and expression is used.



Fig -2: face recognition system

From a number of subjects, face images are enrolled into the system as gallery data in a typical face recognition system, and using a one- to-one or one-to-many scheme, the test subjects face image is matched to the gallery data. Various techniques from different research fields are required in automated face recognition such as

- Computer vision
- Machine learning
- Pattern recognition
- Image processing

2.3 Projector

Nowadays, classrooms have changed intensely with the advent of new technology. All the new technology equipments are used to improve the teaching and learning process more prolonged and interactive. There are several advantages such as

- Easier note taking
- A better interactive learning experience
- Better use of class time
- Greater teaching versatility



Fig -3: Projector

By using projectors, teachers can use videos, slides and image examples to clarify all doubts to the students in their subjects. The projector can also be used to display the web content to access all the information on an individual computer. By using projectors, teachers can use less time repeating the same content once again rather than rewriting all the information. A projector is a powerful tool to take all lessons more easily and helps to prepare all notes prior to the class.

3. PROPOSED SYSTEM

The fingerprint is the oldest known biometric identifier that has been used for authentication and identification purposes. In olden days, in order to protect against forgery, parties to a legal contract would impress their fingerprints into a clay tablet on unique, difficult to alter, durable over the life of an individual, making them very suitable as long term markers of personal identity. It is therefore natural and high security applications and for

the automated identification of individuals. There are various strengths of fingerprint recognition:

- Its maturity provides high level of accuracy.
- The growing market of low cost small-size acquisition devices, allowing its use in a broad range of applications.
- The use of easy-to-use, ergonomic devices, not requiring complex user-system interaction.

The main modules of a fingerprint verification system are:

- Fingerprint sensor, in which the fingerprint of an individual is acquired by a fingerprint scanner to produce a raw digital representation.
- Pre-processing, in which the input fingerprint is enhanced and adapted to simplify the task of feature extraction.



Fig -4: Fingerprint impression

3.1 Fingerprint Sensor

A fingerprint sensor is an electronic device used to register a digital image of the fingerprint pattern. The fingerprint sensor captures the relevant fingerprint features for the further processing and is therefore one of the most central elements of the fingerprint recognition system, the others being the image processing/feature extraction and the matching algorithms used. It has two parts fingerprint enrollment and fingerprint matching. When enrolling user needs to the finger two times. When matching, user enters the fiber through optical sensor and system will generate a template of the finger and compares it with specific library. Here, R305 sensor is used. This is the most advanced sensor which has a wide range of accuracy even in a large number of students are enrolled.

3.2 Global system for mobile communication

The GSM means Global System for Mobile Communication used to interact with the Subscriber Identification Module

(SIM). The GSM and biometric based attendance system using Arduino is about enrolling attendance using fingerprint and broadcasting message to the registered mobile number using GSM module. A Graphical User Interface application in the host computer helps the faculty to manage the device. Here GSM SIM 800 module is used.

3.3 Arduino

Arduino is a software company, project, and user community that designs and manufactures computer open-source hardware, open-source software and microcontroller-based kits for building digital devices and interactive objects that can sense and control the physical devices. The Arduino UNO module is supplied with less than 7V, however the pin may supply less than five volts and the board may be unstable. If using more than 12V, the voltage regulator may overheat and thus damage the board, the recommended range is 7 to 12 V.

The main purpose of the microcontroller is to enroll and search the fingerprint. In enrolling, this controller read template from the fingerprint sensor and enrolls the ID number. This displays the ID number on serial monitor. And then, this controller checks the fingerprint with the stored template in the searching process. If the fingerprint is correct, the display valued are shown in excel. Otherwise, the controller doesn't give any output.

3.4 Up down counter

An up counter counts events in increasing order. A down counter counts events in decreasing order. An up down counter is a combination of an up counter and down counter. It can count in directions, increasing as well as decreasing. By creating an array of Booleans large enough to hold one flag for each fingerprint and initialize all them to false. As each fingerprint is scanned and can check its ID in the array. If it is false set it to true and increment the counter. If it is true, then set it to false and decrement the counter. It is used in attendance system because any fraudulent occurs after the attendance entry using fingerprint sensor, the up down counter shows the number of counts inside the class using a LCD display. By comparing the attendance entry and the counter output, we can make verification for each class.

3.5 Smart TV

Smart TVs have features of online interactive media, internet TV, demand streaming media, and home networking and access the traditional broadcasting media and set top boxes. These devices allow viewers to search and view videos, movies, photos and other content on the web, on a satellite TV channel or on local device storage. Bluetooth technology uses 2.4 GHz frequency thus proximity to Wi-Fi access streaming. The term HDMI means High-Definition Multimedia Interface which is used

for delivering of uncompressed audio and video data between devices such as AV receivers, DVD players, DVR, Blue-ray disc players to the ports. USB means Universal Serial Bus is used to watch the movie or play music from flash disk or external devices. Smart TV includes several applications such as YouTube, Amazon, Netflix and other apps can be downloaded from the play store or marketplace.

3.6 working of proposed system

Fingerprint module and Arduino UNO are used to take and keep the attendance. The system consists of fingerprint acquisition module and a GSM modem. Fingerprint acquisition module is used for capturing the fingerprint and pre-treatment. GSM modem is used to send the attendance of the students to their parents in the form of SMS. For capturing the fingerprint, a fingerprint scanner is used. After capturing the fingerprint by the fingerprint scanner, system matches this captured data with the data stored in the memory chip. If it matched, attendance is marked of that student and the ID number of that student is displayed on the LCD screen. When the attendance of a student is marked enrollment number of that student is displayed on the LCD screen. In this system, there are three main parts: enrolling, searching and displaying the attendance. This simple device starts with the connection of Arduino and fingerprint sensor to the LCD Display and the GSM for enrolling and displaying.

In searching phase, when the user presses the fingerprint sensor, it reads the users fingerprint and related users information are display on the LCD display depending on the instruction written in. for this system, scanning time, date, username and ID number are displayed on the LCD display and sends the presence of the students to the GSM device. The main purpose of the microcontroller is to enroll and search the fingerprint. In enrolling, this controller read the template from the fingerprint sensor and enrolls the number. This displays the ID number on a serial monitor. And then this controller checks the fingerprint with the stored template in the search process. An optical fingerprint sensor is used in this system. This sensor read the fingerprint pattern. The scan image is converted as template and saved in a memory. GSM is the Global System for Mobile Communications. It is called 2G or second generation technology. SMS is a bidirectional service for short alphanumeric (up to 160 bytes) messages. For point to point SMS, message can also be stored in the SIM card for later retrieval. After that, weekly attendance is send to the parent mobile through the GSM module.

4. CONCLUSION

The proposed system scanned the fingerprints placed on the device sensor and compared them against those stored in the database successfully. The performance of the

system was acceptable and would be considered for full implementation especially because of its short execution time and reports generation, this system takes the attendance of the student and sends this attendance to their parent's mobile through GSM. Fingerprint Attendance system could not only speedup the process of taking attendance but also reduce the error rate and produce faster verification process of authenticating student attendance. This system calculates the attendance of students and sends an alert message for the absence students to relevant guardian's phone. This system can also store data of students for long time. The smart TV installment can replace the drawbacks of projectors and speakers in the classroom. It also enhances the digital and internet learning of students in classes.

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