SMART ATTENDANCE SYSTEM

Mohini Jadhav[1], Nishigandha Nihate[2], Neha Solanki[3] || Prof. Keshav Purswami[4], Prof. Kavita Namdev[5]

Student[123], Professor[4] and Sr. Assistant Professor[5] [12345]

Department of Computer Science and Engineering[12345]

Acropolis Institute of Technology and Research, Indore-453771, Madhya Pradesh[12345]

1. ABSTRACT

Now a days there have been rise in the number of applications based on the application have been successfully functional to different areas and fields such as transportation, health care, agriculture, hospitals and industries etc. Also, Internet of Things is parallelly blooming with radio frequency identification system. Therefore, using this application, an attempt has been made to solve the attendance management and monitoring problems in schools and institutes and in another fields. Using IoT technology facilities we can automate the system with wireless identification using electronic passive and active tags readers. In this paper the efforts are made to the problem of monitoring attendance in regular lectures in developing countries using direct GSM with IoT Technology. Attendance Management system is the implementation of Internet of Things to reduce the time consumed by the traditional system of recording attendance in schools and institutions daily.

2. KEYWORDS

Decision support systems, Computational intelligence, Controlled Indexing, Fingerprint identification, Message authentication, Biometric fingerprint sensor.

3. INTRODUCTION

In the early days and even now, the attendance registers are used to record the attendance manually by calling the names of students in rural and urban areas. Wastage of time and more human efforts are required in these processes. For example, in educational institution, the teacher calls students name one mark their presence after they answer. This

system consist of a fingerprint sensor is used to detect the person's identification. A portable device is designed, where in each lecture the student can feed his/her attendance. The fingerprint module is used for the verification of students and the data of every student is already feed in the fingerprint module. Once successful recognition of fingerprint pattern is finished after that the student's attendance is prepared to be pushed to the web server. This data is sent to the Arduino through the serial interface. Arduino provides a data sequence, which is a combination of the student ID, teacher ID and device ID a unique number of the hardware, so that the attendance cannot be forget. After that by using Wi-Fi Module this combination is sent to web server, where it will be decoded.

4. LITERATURE SURVEY

In an educational system the conventional attendance system is followed where the teacher calls out the names of each and every student and marks the presence of the students due to which the wastage of time occurs during lecture time. This becomes more and more severe especially in the current scenario where the number of students in each class is very large. Due to such large groups of students, managing the attendance data of the students is also very difficult. Another disadvantage of this present system is the chance of marking fake attendance of the students. Fingerprint based devices are being used in corporate environments. These devices use computer to store data and verify fingerprints of student. It can be ported to academic environment with modifications.

5. METHODOLOGY

In this section, the following will be briefly discussed such as main block diagram, hardware, software and algorithm.

5.1 Main Controller

This is the circuit that contains the main microcontroller which is the heart of the whole project and a microcontroller contains one or more than one processor. This circuit is responsible for the implementation of the device commands and to receives the inputs from the switches, buttons and sensors and in this project fingerprint sensor is used for the acceptance of the data from the controller, reads time information from the timer chip, through keyboard it gets the input text and keypad decoder circuit, writing and reading data and information from the external EEPROM, then according to the software written the data is processed and after that it display the information on the graphical LCD and also sends the information to the PC or any Bluetooth enabled device for permanent storage or printing.

5.2 Fingerprint Reader

This is the module which is responsible for reading the information of fingerprint images. There is the communication between the main microcontroller and fingerprint sensors that the fingerprint reader accepts the command to read the fingerprint of the students. Also stores the data in the memory, delete fingerprint and compare the current fingerprint images with that fingerprints which are already stored in the memory etc. After that the result is send back to the main microcontroller and makes decisions to mark the attendance of the students or reject their attendance. Therefore, the further processes take place in microcontroller.

5.3 Keyboard and Keypad Input Circuit

This circuit contains 4x4 multiplexed keypad and PIC16f88 which is responsible for decoding keyboard scan codes and converting the code to ASCII characters for the main controller. The need of this circuit is to support the work which is performed by the main microcontroller. It meant to make the work easy of the main microcontroller, the micro controller reads the time, reads the fingerprints module by fingerprint reader and send the data to LCD for displaying simultaneously, so adding the Keyboard to it will make the whole job slower.

5.4 Android

An Android Application is developed to access the system from any remote location and also the e cord of each student can be checked. Through this Android Application(app) the location of students, faculties and members can also be detect from anywhere inside the campus. Online SMS services is used to inform the parents about students attendance that they are attending the classes or not.

5.5 GSM Module

GSM/GPRS TTL – Modem is worked with SIMCOM Make SIM900 Quad-band GSM/GPRS motor, takes a shot at frequencies 850 MHz, 900 MHz, 1800 MHz and 1900 MHz The Modem is planned with 3V3/5V TTL interfacing hardware, which enables you to specifically interface to 5V Microcontroller. The baud rate can be configurable from 9600-115200 through AT order. At first Modem is in Auto baud mode. This GSM/GPRS TTL Modem is having interior TCP/IP stack to empower you to interface with web by means of GPRS. It is appropriate for SMS and in addition DATA move application in M2M interface. The standard explanation behind the GSM in endeavours is to send and get the messages. Regardless, not simply that we can make a call and would we have the capacity to moreover examine using the GSM.

5.6 Connecting Wires

The Connecting wires are used for connecting the fingerprint sensor to Arduino and from Arduino to the bread board. Only through these connecting wires, the power is supplied to the system and simultaneous operations are performed.

5.7 Bread Board

A breadboard is the platform which is used to test the electronic circuits. There is a bunch of holes in which we can easily insert electronic components to prototype and we can also say that it is construction base for prototyping of electronics. In the 1970s the solder-less breadboard (a terminal array board, AKA plug-board) became available and nowadays the term "breadboard" is commonly used to refer to these. "Breadboard" is also a synonym for "prototype".
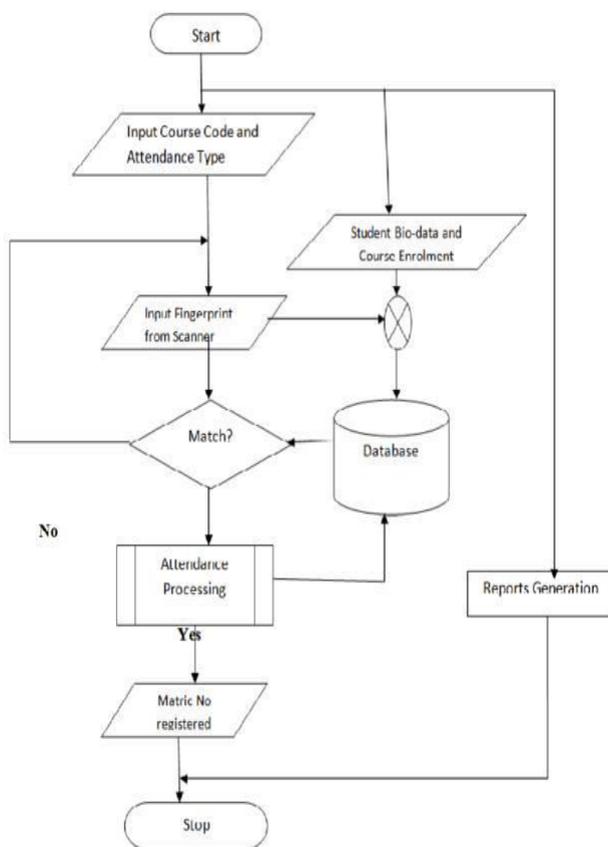
6. PROCESS DIAGRAM

Fig.1 System Block diagram

7. FINGERPRINT AQUISITION PROCESS

A fingerprint can be defined as an impression made by human finger because of the patterns created on the skin of our palms and fingers ever since birth. The marks on our finger will never change rather it becomes prominent with age. For their unique and permanence nature, they have been used since long in criminal and forensic cases.

The process of fingerprint acquisition can be divided into three parts, there are:
1. The enrolment process
2. The verification process
3. The data collection process

7.1 Enrolment

The enrolment process is done once for each student. Each person would be required to register their fingerprint pattern by placing his thumb finger on the fingerprint scanner. The scanner takes the image of the finger and determines the unique characteristics of the fingerprint image. The fingerprint contains ridges and valleys which have different kinds of breaks and discontinuities. It is the various ridges and valleys that form the basis for the loops, arches, and swirls that are easily seen on fingertips. After the capturing of the ridge pattern of the fingerprint, a template is created, and the fingerprint is encrypted into series of numbers. For each fingerprint pattern there will be different number of series. After the completion of process, the fingerprint scanner sends the result of the encryption to a memory location or database.

3.2 Verification Process

The second process is the verification process. This is the most repeated process. It is done each time the user wants to make use of the fingerprint-controlled device. When he/she places his/her finger on the fingerprint scanner surface, the fingerprint would be scanned by the fingerprint scanner. The fingerprint pattern that has been obtained from the person would be compared to the stored enrolment template that is already stored in the database or main memory where the enrolment process was executed. When the fingerprint pattern passes the comparison process, it shows an acknowledgement in its display and grants the user access.

7.2 Data Collection Process

The last process that will be done is the data collection process. The data about the fingerprint is collected by the fingerprint device usage or records after a period of time, to check attendance of a person or to know the number of times a restricted.

8. RESULT

Wireless attendance system is implemented on a particular time and then students are started to mark their attendance and results are displayed which is shown following steps.

A. Device on
The device shows when the device is ON the LCD display shows the present date and time with welcome note.

B. Student enter Student ID and Name
It is displayed when the student placed his/her finger on the fingerprint sensor.

C. Existing Systems
The figure 2 shows that when the student again placed his/her finger on the fingerprint sensor the LCD display that the attendance is already fed up.

Fig 2.ID result already exists

D. Unknown Student ID
The figure 7 shows that when the unknown student placed his/her finger on the fingerprint sensor the LCD display unknown student Id.

Fig. 3. Unknown Student ID

9. CONCLUSION

Attendance system could not only speed up the process taking attendance of the students but also reduce the error rate and wastage of time and produce faster verification process of authenticating student attendance. This system calculates the attendance of students and sends alert message for the absence students to relevant guardian's mobile phone. This system can also store the data of each students for long time. This framework will straightforwardness is school and montage to screen the understudy. The framework can diminish labour. Despite the fact that there are distinctive strategies for following understudy yet our framework is anything but difficult to handle and extremely advantageous for school and college level.

This framework gives efficient, simple control and dependability. To overcome the limitations of conventional system, we have developed this smart attendance system. The proposed system is user friendly, easy, portable due to GSM; data can be sent to parents. Due to use of IOT the web page can be easily managed by the automation process by authorized person.

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