

Fingerprint based Classroom Attendance System

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Abstract— The main purpose of this project is to solve the problem of existing attendance system. In today's world proper database of recording attendance as well as management is an important aspect. Many of the universities and organisations in developing countries like India make use of pen and paper for attendance. As well as for keeping record we use files and registers, due to this manual process records keep on stacking up, so this method should be replaced by easily available biometric systems. As uniqueness of fingerprint of every person make this attendance system ideal and environment friendly. The currently available systems are using Arduino, raspberry pi, RFID, barcode scanner, etc. So fingerprint based attendance system will be developed which will be used for recording the attendance of students more efficiently and effectively through fingerprint scanning and also it will be used to update the attendance of students throughout the semester. The purpose is to carry out this system and to overcome this current problems in available attendance system.

Index Terms— Biometric, Fingerprint, Portable, Classroom Attendance, optical sensor.

1 INTRODUCTION

Requirement of attendance is necessary in different places like Institutes, various organisations, etc. to mark a person's presence sometimes twice a day. The very usual method of marking student attendance in the colleges is to record manually by signing the sheet of attendance or by calling out the roll numbers. The biggest drawback of existing system is that it takes more time and human efforts. As well as many fraudulent issues can happen when we use this existing system and sometimes teacher can lose the recorded attendance. The solution for the problems that are faced by existing system is to create a system that will store the attendance automatically.

The existing system can be replaced by biometric classroom attendance system that will keep attendance records. There are other biometrics techniques which include fingerprint, face, hand, iris, voice, signature, etc. Out of which fingerprint is most reliable one.

The biometric system consists of fingerprint module because fingerprint of every person is unique. There are many other systems designed for classroom attendance using fingerprint sensors such as ZigBee, LabView, Internetofthings, DSP, Matlab, RFID, Android, etc. All these systems designed have certain pros and cons. Below is the comparative analysis of systems that have been designed so far based on parameters below.

Parameter Technique	Speed	Security	Power Consumption
LabView	High	Moderate	Low
Internetofthings	High	High	Moderate
GSM,Zigbee	Moderate	Moderate	Low
RFID,Android	High	High	Moderate
Zigbee,DSP,Matlab	High	Moderate	Low
Cryptography	High	High	Low
RFID,GSM, .NET	High	High	Moderate

Fig.1. (a). Comparative analysis

Parameter Technique	Cost	Portability	Functionality
LabView	Low	No	Limited
Internetofthings	High	No	Wide
GSM,Zigbee	High	Yes	Wide
RFID,Android	High	No	Wide
Zigbee,DSP,Matlab	Low	No	Limited
Cryptography	Low	Yes	Limited
RFID,GSM, .NET	High	No	Wide

Fig.1. (b). Comparative analysis

This comparative analysis can be used for proper designing and implementation of fingerprint based attendance system.

Hence, there is a need of independent classroom attendance system which is reliable, user convenient, fool-proof and works without any requirement of computer or any wired network. A computer must be used for only storing the database and managing it.

Here, in this project we report for development of such system. The system will take the attendance via fingerprint module and store the data in micro-controller and show the number of present students on LCD Display. The system will have admin login for teacher to select the lecture timing and number. The recorded database of attendance for semester or for a year will be send to the computer by bluetooth module and it will generate an excel sheet for defaulters.

2 DESIGN AND FABRICATION

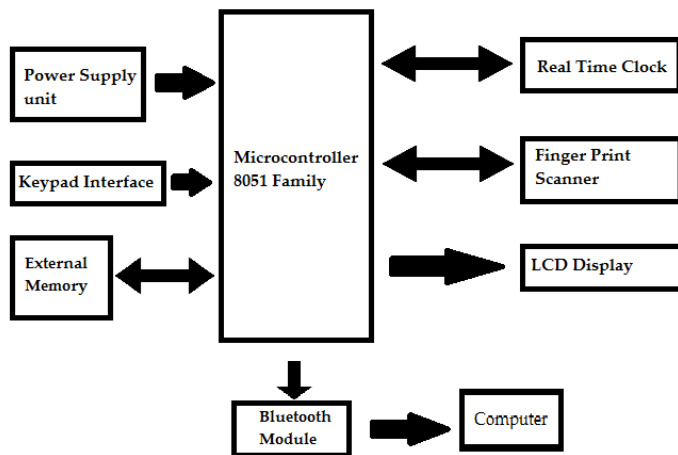


Fig.2.Block Diagram

The Block Diagram depicts the total blue print of proposed project. The whole system is divided into following parts: Fingerprint module, Microcontroller, Power supply unit, Keypad Interface, real time clock, LCD Display, External memory Bluetooth module and computer.

2.1 Fingerprint Module

The Fingerprint module used here is R305(Zhejiang SFG Technology Co) and has inbuilt LED which gives us the indication that fingerprint module is working or not. It has TTL UART interface for direct connections to microcontroller UART. The module is used for enrolling the fingerprints and also to mark the attendance by doing the same.

2.2 Microcontroller

The Microcontroller used here is P89v51RD2 of 8051 family which has 64KB Flash and 1024 bytes of data RAM. The key feature of this controller is its X2 mode option. It also has In-Application Programmable. It is a stand alone unit. It is a device which interfaces the whole components of the system on to single unit.

2.3 Power Supply Unit

The Power supply unit is built with a combinational circuit including filters, rectifiers, transformer and voltage regulators. The power supply which is designed here is 5V because the the controller requires minim 3v supply.

2.4 Keypad Interface

It is 4x4 Hex keypad which performs different operations selected by the user. It has 9 numeric buttons, menu option, USB interfacing option, UP, DOWN, BACK and Attendance marking option. The keypad is interfaced with microcontroller and LCD display.

2.5 Real Time Clock

It is manufactured by Maxim Integrated Products Inc. named DS1307. It is interfaced with microcontroller and works even if the supply is not given. It displays the time and date on LCD.

2.6 LCD Display

The Lcd Display which is used here is 16x2. It displays the information programmed by the user.

2.7 External Memory

The external memory is used to store the data of fingerprints. IC used here is EPROM 24C64 for storing the data. MaxIC is interfaced with PC via RS232 for serial data communication.

2.8 Computer

Computer is used here for transferring the data from Bluetooth module to pc. In computer, software will convert the data in an excel sheet.

3 USER INTERFACE

When the system is turned ON, the LCD displays the current date and time which is controlled by RTC. Then the administrator or admin of the system need to press the menu button on hex keypad, it will ask the admin to type the password to enter the menu options. The admin password will be usually entered by lecturer/teacher. After entering the correct password, the LCD will display the following options: 1) Add new user, 2) Delete user, 3) Change passkey, 4) Add timing, 5) Delete Data.

First of all, the admin need to add the timing by selecting add timing option. It will ask start time and end time after entering it will display add time successfully.

3.1 Add New User

This button will add the new users. After selecting it, system will ask the roll number and then the student need to place the fingerprint on the sensor. For successful enrollment of fingerprint student need to place the finger twice. After enrollment the system will take the fingerprint assigned it with given roll number and store the data. For another student the admin need to again select the add new user button. This way the system stores the data after successful enrollment.

3.2 Delete User

This option deletes the users that are stored previously. This option allows you to change the user roll number if it is added mistakenly.

3.3 Change Passkey

This is the option which is used by the admin if the administrator wants to change the passkey of the system. For changing the password, the admin need to enter the old password. The system will ask to enter the new password twice for successful change. The new password will be then used for selecting the menu options.

3.4 Add timing

It is nothing but similar to the number of lectures. After selecting, system will ask start and end time of the lecture and number of lectures to be taken.

3.4 Delete data

This option is used at the end of the year when fingerprints of

new students needed to be enrolled for fresh academic year.

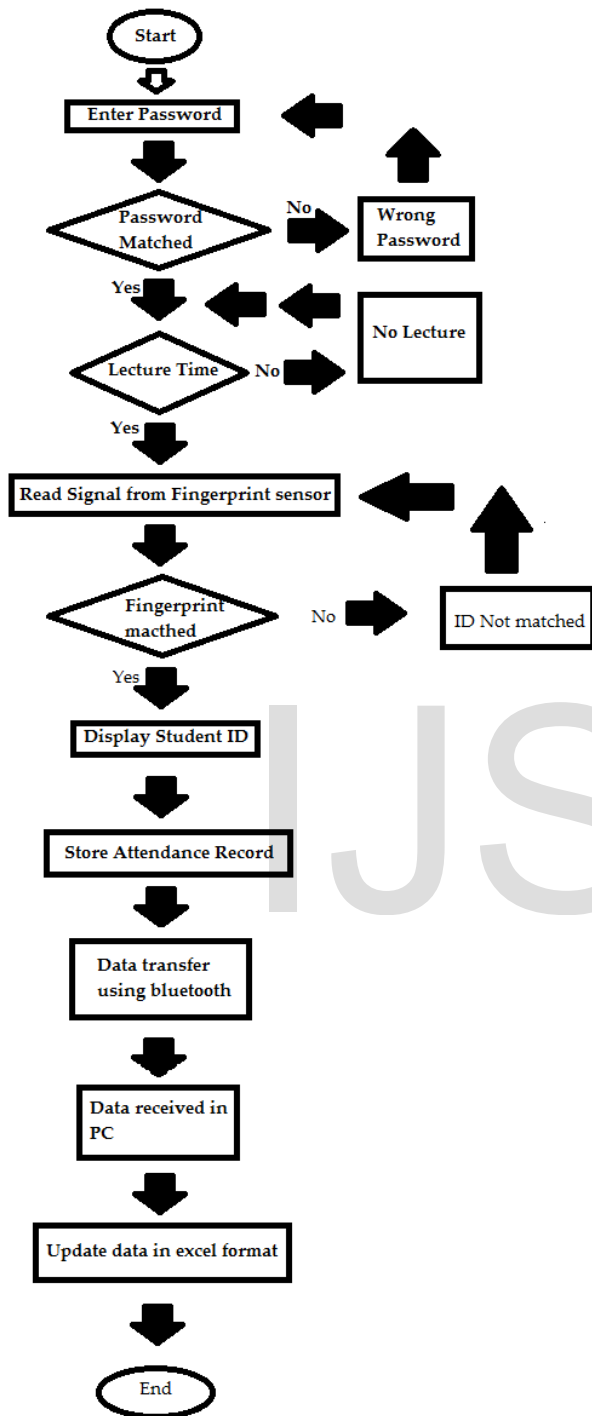


Fig.3.FlowChart of the system

The system stores the data up to 200 days if single lecture is taken per day. If 8 lectures per day are taken, then the system can store the data upto 21 days. For marking the attendance students need to wait till the lecture time starts. After the start of lecture student need to press the mark attendance button on hex keypad for marking. If the student is present, then the display will show the roll number of the student who has

marked the attendance. The stored data can then be transferred to android phone via Bluetooth module HC-08 or to PC by USB serial communicator.

The computer will receive the data from Bluetooth. The software in computer will generate an excel sheet from the data.

4 CONCLUSION

The fingerprint based student recognition system has been developed to replace the traditional system that are currently widely used by many colleges and universities. The system designed here will make the whole attendance process reliable, user-friendly and secure. Future application of this system is that a GSM interface can be added so that the message will be forwarded if the student is not present for the lecture.

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