AUTOMATED WIRELESS FINGERPRINT ATTENDANCE SYSTEM

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ABSTRACT

The Traditional wired attendance systems or paper based attendance system a automated wireless fingerprint attendance system based on ZigBee technology is proposed. The system includes independent fingerprint acquisition module and attendance management module in computer. System realizes various functions such as information acquisition of fingerprint, processing, wireless transmission, fingerprint matching, and attendance management. Automatically considering topology of ZigBee network, the system uses wireless local area network. System comprises various wireless fingerprint attendance functions, which could be used for public/private institutes or schools.

INTRODUCTION

Biometrics fingerprint recognition is universally applied. The student attendance system is very relevant in an institute like ours since it aims at eliminating all the hassles of roll calling and malpractice and promises a full-proof as well as reliable technique of keeping records of student’s attendance. Once student attendance is scan by finger print scanner, it is recognized. ZigBee network, the system uses wireless local area network for transferring finger image via ARM7 LPC2138 (Jilin et al., 2010; Shoewu and Idowu, 2010 and Talaviya et al., 2013) microcontroller and LCD. LCD is used for viewing fingerprint success or fail. All students make use of Fingerprint time attendance. Finally daily and monthly student attendance is created by using Microsoft excel sheet. Defaulter student parent’s gets SMS from college uses ZigBee network. Keyword Fingerprint time attendance, ZigBee network, ASCII value of that key is provided to the microcontroller via software.

Systems Implementation

System is fully automatic gives various outputs like database is created, Daily attendance monthly attendance created and SMS is sent to parent mobile no.

Block Diagram Description

Keypad

Keypad is used to provide the input to the microcontroller. The keypad consists of micro switches which are connected to the microcontroller pins in a matrix format. Each key is assigned with the special character or symbol or digit. When user presses the key the respective assigned Keypad is used to provide the input to the microcontroller. The keypad consists of micro switches which are connected to the microcontroller pins in a matrix format. Each key is assigned with the special character or symbol or digit. When user presses the key the respective assigned

Liquid Crystal Display

We have used 16x2 LCD which indicates 16 columns and 2 rows (Zatin Singhal Rajneesh Kumar Gunjal, 2012 and Anne Marie Dunphy, 2010). So, we can write 16 characters in each line. So, total 32 characters we can display on 16x2 LCD. LCD can also used in a project to check the output of different modules interfaced with the microcontroller. Thus LCD plays a vital role in a project to see the output and to debug the system module wise in case of system failure in order to rectify the problem. LCD is used in a project to visualize the output of the application.
Liquid Crystal Display

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Memory

The FM24C256/C256L/C256LZ devices are 256 Kbits CMOS nonvolatile electrically erasable memory. These devices offer the designer different low voltage and low power options. They conform to all requirements in the Extended I'C 2-wire protocol. Furthermore, they are designed to minimize device pin count and simplify PC board layout requirements. The entire memory array can be write disabled (Write Protection) by connecting (Shoewu and Idowu, 2010) the WP pin to VCC. Functional address lines allow up to eight devices on the same bus, for up to a total of 2 bit address space. The I'C communication protocol uses CLOCK (SCL) and DATA I/O (SDA) lines to synchronously clock data between the master (for example a microprocessor) and the slave EEPROM device(s). Fairchild EEPROMs are designed and tested for applications requiring high endurance, high reliability, and low power consumption.

Contact factory for CSP package availability the various features that we are going to develop along with various Technologies that we will learn to develop the Project are here I use VB6 based software control, for serial communication between Finger Print Module and PC, PCB Making and Assembling, 230 V Power Supply Designing, Serial Communication Protocol. Interfacing LCD with Microcontroller.

Here as we can see from the block diagram figure 2.1 & figure 2.2 there are 2 different units:

- Unit in the class room
- Unit on table in HOD’s cabin

Unit in the class room

Following are the different section of above mentioned hand held unit. Here the classroom unit is placed in the classroom (Jilin et al., 2010; Atmel, ?). The teacher will enter the teacher ID first then the subject ID. Then microcontroller will display the teacher name and the subject name on LCD. After this the students have to press the finger on fingerprint unit.

Finger print reader unit

This unit is interfaced to the microcontroller and is situated in the classroom of the school or college. As soon as the student presses the finger the reader will recognize the fingerprint and store the attendance record on serial memory. All the attendance records will be stored in the memory.

At the end of lecture the microcontroller will send the attendance records to PC via ZIGBEEE based RF module. For wireless transmission we are using Zigbee module which works at 2.4 GHz and a range of 30 meters. The fingerprint can recognize up to 200 fingerprint ID’s. All these ID’s are stored in the fingerprint module. This unit or setup is placed in classroom or worker room. Consist of various components like power supply used for supplying the power 5 volt to supporting IC and 3.3 volt to (Jilin et al., 2010; Mohd. Helmy
Abd and Wahab, Zarina Tukiran, 2010 and Smit, ?) ARM LPC2138 Microcontroller, LCD device for display the student information to read the figure print information like pass or fail, Zigbee transmission is used for transmitting micro controller information to unit placed in Manager’s or HOD’s cabin also Zigbee work as trans receiver means it can work as receiver it also receives information from unit placed in Manager’s or HOD’s cabin, finger print controller and finger print module. Finger print module is the sensor which senses the student finger and gives output to finger print controller and finger print controller converts this output in digital form and gives output to ARM7 LPC2138 microcontroller. Memory and Key board.

The PC received the Fingerprint information wirelessly from classroom unit from the student compares it with the database of the students stored in the PC. It then sends an SMS to the concerned parents that the particular student has entered the school premises with in time of entry. Similarly this unit will send a SMS as soon as the student exits the school. In this way the parents get intimation during in time and out time of the respective student. Thus every parent will get an SMS that the student has reached the school in time. In case any parent doesn’t get the SMS in time they can enquirer about student.

### About GUI

Visual basic software version 6 is used in my project. Here Visual Basic software is taken as front end and excel sheet taken as back end. Other details use of visual basic is shown in figure 4.1 and 4.2.

Figure 4.1 shows visual basic attendance function windows on pc in HOD cabin. In this figure we can upload student information, make defaulter of student, make student mark list, add new student and clear or delete student information. All these functions are making possible with the visual basic software in PC. Here upload button is used for filling the student information in the flux grid. Student information is filling the student name, his/her ID, in date and in time. Add new button is used for filling or updating new student information like student name and his/her ID is shown in figure 4.2. Daily attendance button is used for taking student attendance for particular date and stored in excel sheet; Monthly attendance button is used for same. Clear button is used for removing the student information in the flux grid.
Start

Includes Different Variables

Unsigned UART1 & Timer 1

Unsigned Interrupt and EDC 1

RTC Set Month, Time & Second using case Algorithm

Write into EEPROM

Read EEPROM & Send Via UART0

Status = 1

YES

LCD Clear Display String I2C FLASH PASS

Delay 2 Sec.

ELSE

LCD Clear Display String I2CFLASH FAIL

Get all settings read EEPROM

Store Address & Write to EEPROM

Read & Write Booting

Assign PINSEL0 & PINSEL1 = I/O Mode

Assign VIC, Timer0 enable timer set UART0 Write 9600 to PC

Set UART1 & Write 9600 to Finger Print

Delay 1 Sec. & Set Time

Display Time

Delay 1 Sec.
2

Display Flash &
Reset & Set String
Address = 0

Fail

While 1

True

Delay 1 Sec.

Display 1 Sec.

3

NO

1 Sec. Complete

RX Flag = 0

Count = 1

Buffer = #

UART1 = D

YES

RX Flag = 0

Count = 0

Buffer = #

UART0

Yes

UART Buffer = Z

Delay ½ Sec.

Starting address 0

Bit1 = 1

LCD Clear

4

Start

Time Display

Delay ½ Sec.

Starting Address 0

Delete All

Delay 2 Sec.

True

No
Figure 4.3 Flowchart for electronics attendance system functionality
Add new & edit ID, Name & login time & display on LCD & data saved

Click on daily attendance button

Upon filling information output excel sheet is created & we gate detailed report of students

In form 2 click on upload button & edit MS comm. output = #D & data will be saved

Check BOF & EOF click on clear button = #Z & data will be erased

Counter = . field (0) & bit 1 = true

Exit

Exit

bit 1 = false & data will be deleted

Move last

Add new & edit ID, Name & login time & display on LCD & data saved

Start

PC must have VB S/W

Open VB S/W and click on attendance file

Hardware = 1
Mobile = 1

OK

Form 2 opened

OK

Form 3 opened

Exit

Edit form 2
Visible form 2

MS comm. 1 com port = 1

1

2
In form 2 click on monthly attendance button

Upon filling all the information output excel sheet is created & we get required data

For defaulter students
Lect. No. = #  Lect. Conducted = #  % attendance = lect. conducted / lect. no. * 100

% attendance < 75

Yes

Send SMS to the parents mobile no.

Monthly report of students in the following form
Sr. No.  ID  Stu. Name  Login time  Present / Up sent

Attendance displayed on LCD by using Zigbee trans receiver same information goes to ARM7 LPC2138

End

Figure 4.4 Student information receiving flowchart
Clear memory card used for removing the stored student information. Faculty or Staff must fill information about semester is going on, which classroom is used for conducting lecture, Subject name, Lecture number and faculty name. Figure 4.1 and figure 4.2 shows visual basic attendance function windows in class room. In this figure 4.2 we can add details, adding student ID, adding student name etc.

**Flowchart**

Flowchart explains how electronics attendance system as shown in figure 4.3. Initial assign all different variables like UART1, UART 0 , Timer1, Intervisor ADC1, RTC month, day, hour, minute, second using Case statement Write into EEPROM using following command, IFC serial bus and flash pass. And flash fail. IFC is used to. Transmit this string via UART1 though ZIGBEE device to LCD. Check for Master Mode Character 7E in the data buffer and 4 locations in flag register is 1 and 8 location in flag register is 1 then and then master mode is successful. For all other location in flag register master mode is fail. As master mode is successful User is registered Set proper password, set ID, enter ID. Check for Key pressed, if no then cancel out. If yes enter password, verify password, Identify ID, Verify ID. Student information receiving flowchart is shown in figure 4.4.

**RESULTS**

The result of electronics attendance system is shown below. Daily attendance is shown in fig 4.4 which is excel sheet in details. The Daily attendance includes column name like this sr. no, student name, ID No, Lecture No, Student in time, and present/absent. Below these columns we get details of every student Monthly attendance is taken after 30 days excel sheet is show in the fig 4.5 Monthly attendance includes column name like ID, student name, Lecture attended, % attendance. Below 75% attendance or absent student will get SMS to parent mobile number.

<table>
<thead>
<tr>
<th>Sr.No</th>
<th>Student Name</th>
<th>Date</th>
<th>Class</th>
<th>SEM</th>
<th>Subject Name</th>
<th>Time</th>
<th>InTime</th>
<th>Present/Absent</th>
</tr>
</thead>
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<td>1</td>
<td>Kakade Pritee</td>
<td>7.4.14</td>
<td>B</td>
<td>IV</td>
<td>MCN</td>
<td>12.00</td>
<td>11.55</td>
<td>Present</td>
</tr>
<tr>
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<td>Jadhav Prasad</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Jadhav Pankaj</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>charankar shobhraj</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Dange Suraj</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>chavan shubhabgi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>chavan Madhuri</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>9</td>
<td>Bhosle Rohit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>10</td>
<td>bandal Madhuri</td>
<td></td>
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<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
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<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
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<td>Khochare Nikhil</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Desai Pradhnya</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 4.4 Daily attendance details report**

This flowchart giving details like how to work with GUI software. We use visual basic version 6 it works on windows XP or other windows platform. Initial open V.B. software click on attendance file then select Hardware = 1 to 16 and Mobile = 1 to 16 V.B. not support after 16 signals. Click ok then form 2 will open if click on add new button then form 3 opened. This add new button used for filling or updating new student information like student name and his/her ID is shown in figure 4.2 After filling student information if you click on exit button then form 2 will open, So form 2 is main form where click on upload button & edit MS comm. output = #D & data will be saved otherwise check Binging of file & end of file click on clear button = #Z & data will be erased. Take

**Software**

LPC2138 microcontroller is used for programming at base station using visual basic (6.0). It gives advantages like efficient way for attendance monitoring, less time delays, quick response time fully automate system, (Datasheet, 7), (DigiKey, 7) robust system, low power. Applications attendance monitoring system can be used for offices, institutions etc can be used for wireless hazardous areas such as oil rigs, mines etc.
Acknowledgement

I express my deep sense of gratitude to my guide Prof. (Dr.) S. A. Patil [Guide, Head Electronics and Telecommunication Engineering Department] for their impeccable guidance, unflinching encouragement, keen interest, painstaking corrections and constant criticism throughout the course of study. This work would not have taken a desirable shape without their untiring efforts and great pains that they have taken in the conduct of the entire studies. Their truly scientific intuition has inspired me for my work and would be considered for full implementation especially for continuous encouragement and inculcating the right spirit of mind. Without their positive, kind and silent support this work neither has been possible nor could it have been completed. Last but not least, this acknowledgement would be incomplete without rendering my sincere gratitude to all those who have helped me in the completion of this dissertation work directly or indirectly.

Conclusion

It can be concluded from the all above discussion that a secure, fast, reliable and an efficient system has been developed replacing a manual and unreliable system. The fingerprint sensor successfully captured new fingerprints to be stored in the database; fingerprints placed on the device sensor (Digi, ?), (XBee, ?) and compared them against those stored in the database successfully. The system successfully took the attendance both at lectures and examinations. The prototype successfully captured new fingerprints to be stored in the database; scanned 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. Everyone who tested the system was pleased and interested in the product being developed for use in schools.

REFERENCES


Figure 4.5 Monthly attendance details report

<table>
<thead>
<tr>
<th>Date: 30-05-2014</th>
<th>Time</th>
<th>Attendance (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class: 3rd</td>
<td>11.02 am</td>
<td></td>
</tr>
<tr>
<td>Subject: MCN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lecturer Name Mr. Wale S.G.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lectures Allotted 15</td>
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<td></td>
</tr>
<tr>
<td>ID</td>
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<td>Lecture Attended</td>
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<tr>
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</tr>
<tr>
<td>3415</td>
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</tr>
<tr>
<td>3416</td>
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</tr>
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