

Wireless Fingerprint Based Attendance System Using Zigbee Technology

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Abstract- An effective information system needs to support a set of activities, which enable human beings to achieve effectively the objectives of the organization, supported by computer-based information(CBI) technology. Traditional styles of attendance management include hand-written signatures, RF card attendance machines, magnetic card etc. Apart from traditional wired attendance systems or paper based attendance system an automated wireless fingerprint attendance system based on ZigBee technology is proposed, named as “Wireless Fingerprint Based Attendance System Using Zigbee Technology(WFBASZT).”WFBASZT is Biometrics based technology, supposed to be very efficient personal identifiers as it can keep track of characteristics believed to be unique to each person. WFBASZT provide various facilities such as students information and its fingerprint acquisition, wireless transmission, fingerprint matching, attendance management, report generation and data analysis in Microsoft excel format, at any where any time. This system offers effectiveness through its functions in capturing data, minimizing time-constraint, and saving effort to write/collect/check attendance slips. WFBASZT provides effectiveness and efficiency in administering and managing the attendance procedure; hence improving productivity and staff development.

Index Terms- Biometrics, CBI, Fingerprint, WFBASZT, Zigbee Technology

I. INTRODUCTION

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 a better attendance management system for students so that records be maintained with ease and accuracy and faster one too many identification that manages records for attendance was an important key. This 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 [1]. Image processing and Fingerprint recognition are very advanced today in terms of technology. The unique and exclusive characteristic of individual human body led to the field of biometrics and its application in ensuring security in various field. It’s a well known fact that every human being is born with a different pattern on the fingers and this feature is exploited to identify and differentiate between two different persons Even identical twins have unique finger-prints[1]. That makes them ideal for personal identification. A fingerprint is made of a series of ridges and furrows on the surface of the finger. The uniqueness of a fingerprint is determined by the pattern of ridges and furrows as well as the minutiae points [2].

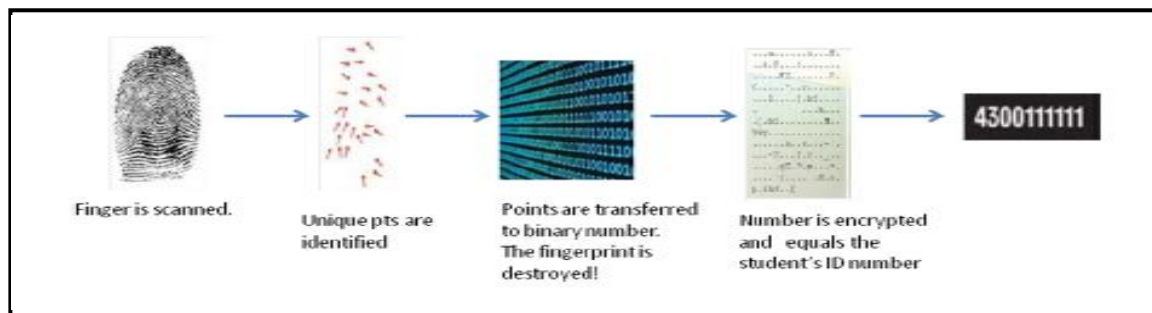


Fig.1 Conversion of fingerprint into digital

For attendance, the student places his/ her finger over the fingerprint device and the student's matriculation number is sent to the database as having attended that particular lecture [1]. Once the finger is placed on module it is converted into digital number as shown in above Fig.1.

II. SYSTEM DESCRIPTION

Our WFBAS mainly divided in two sections.

1. Transmitter
2. Receiver

The transmitter comprises controller and fingerprint-module section, LCD, keypad and PC is the receiver.

These works as follows:[2]

- **Fingerprint module**:-It is used to scan the fingerprint of individual student & save as a record.
- **Keypad**:- It is used to set the Lecture time and subject code.

- **LCD**:- display will be displaying rolls and name of those whose attendance is marked
- **Zig Bee**:-. Used to transmit data wirelessly between classroom and server/PC
- **89C52 Microcontroller**:- This Master controller is interfaced with all above modules which helps to to processes the input/output and controls the working of the entire system.

WFBAS take fingerprint as input, will process it and extract features of fingerprint for matching. After matching, it will update database attendance records of the students. It is fully automatic system gives various outputs e.g. registration data which is stored in excel sheet automatically, Daily attendance and monthly attendance, defaulter list. The LCD, fingerprint module, keypad, ZigBee, EEPROM are interfaced with Microcontroller with "C" programming language. Microsoft Visual Studio provides a user interface for the Attendance Management System.

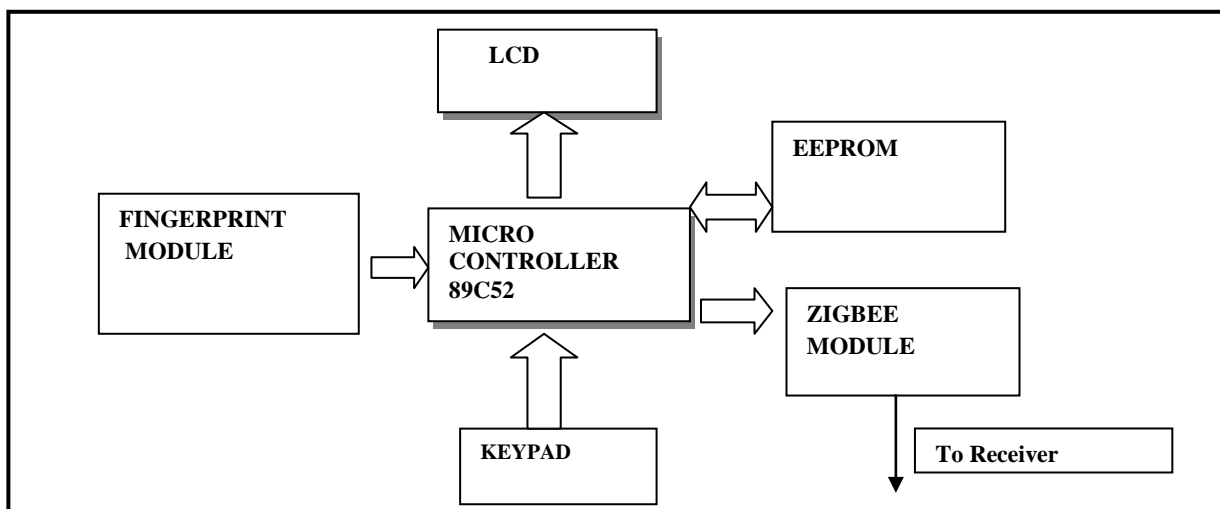


Fig.2 WFBAS transmitter

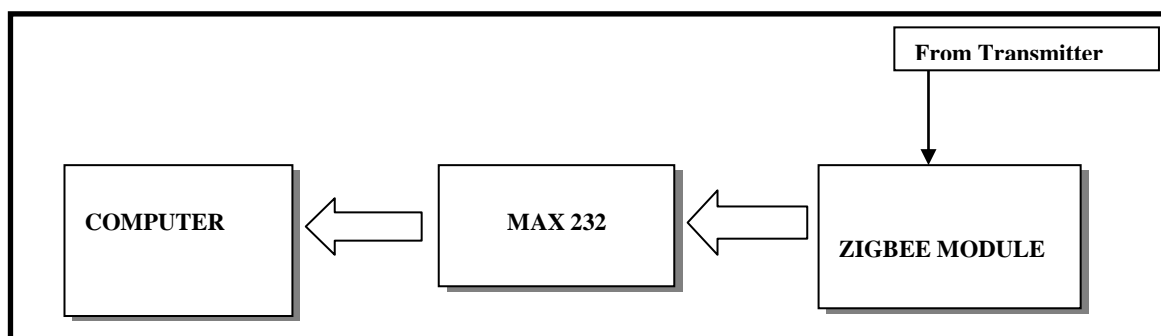


Fig.3 WFBAS receiver

The transmitter section as shown in fig.2 is placed in the class room where at start the teacher will enter the time of lecture and subject ID. Then microcontroller will display the lecture time and the subject code on LCD. After this the students have to press the finger on fingerprint unit. As soon as the student presses the finger, module 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 ZIGBEE based RF module. For wireless transmission we are using Zigbee module which works at 2.4 Ghz and a range of 100mtrs [3]. 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. That data is available in the Microsoft office Excel format from which teacher can maintain daily and monthly attendance for individual student. At the end this WFBAS provides information about defaulter student.

III. RESULT DISCUSSION

To All sections of the system were tested starting with the administrative part of the attendance. At start the student fingerprint, roll number and other bio data is stored into the database for student registration. The subject code and lecture time are also registered at this phase. All data and information required for the proper recording of attendance are enrolled. It fingerprints being enrolled and same time databases is created as shown in Fig.4.



Fig.4 Fingerprint enrolment

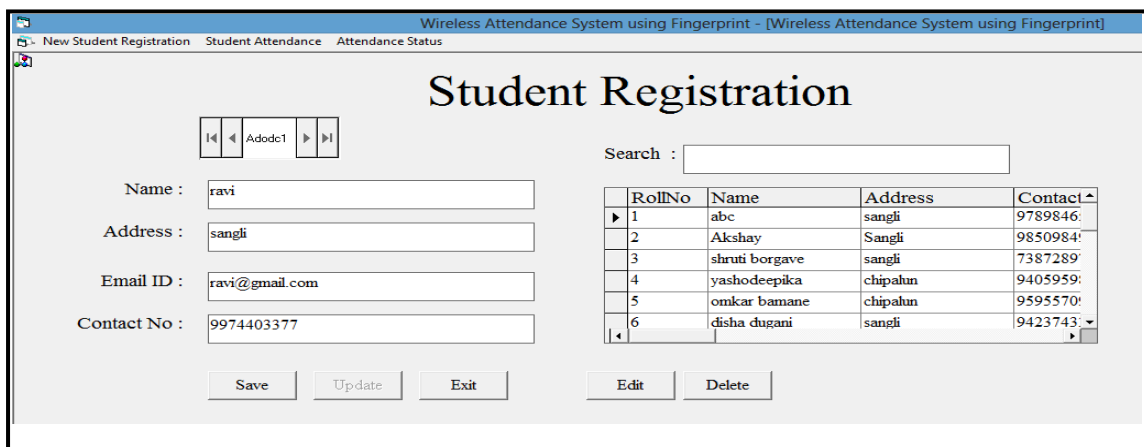


Fig. 5 Student registration form

If entered finger is matched with previously stored database, the user is automatically recorded for that particular lecture and message is displayed on LCD. as shown in fig6. Below



Fig.6 Match of fingerprint and attendance enrolled

But if the user is not accepted for attendance then failure message, is displayed on LCD as shown in Fig7, This process is repeated for all students present. Hence at the end of lecture, teacher can recognise how many students are present and absent as shown in fig.7

Fig.7 Daily attendance student status result form

The attendance record of one day dated 30th March 2015 for subject code 3 allocated to Operating system, which is automatically available in excel format is as shown in fig.9 similarly attendance record on 12th April 2015 is as shown in fig.8 and 9.

rec_no	roll_no	subject_no	attendance	attendance
1	6	3	30-03-2015 01 To 02	Present
2	3	3	30-03-2015 01 To 02	Present
3	1	3	30-03-2015 01 To 02	Absent
4	2	3	30-03-2015 01 To 02	Absent
5	4	3	30-03-2015 01 To 02	Absent
6	5	3	30-03-2015 01 To 02	Absent
7	7	3	30-03-2015 01 To 02	Absent
8	8	3	30-03-2015 01 To 02	Absent
9	9	3	30-03-2015 01 To 02	Absent
10	10	3	30-03-2015 01 To 02	Absent
11	11	3	30-03-2015 01 To 02	Absent
12	12	3	30-03-2015 01 To 02	Absent
13	13	3	30-03-2015 01 To 02	Absent
14	14	3	30-03-2015 01 To 02	Absent
15	15	3	30-03-2015 01 To 02	Absent
16	16	3	30-03-2015 01 To 02	Absent
17	17	3	30-03-2015 01 To 02	Absent
18	18	3	30-03-2015 01 To 02	Absent
19	19	3	30-03-2015 01 To 02	Absent
20	20	3	30-03-2015 01 To 02	Absent
21	21	3	30-03-2015 01 To 02	Absent
22	22	3	30-03-2015 01 To 02	Absent
23	23	3	30-03-2015 01 To 02	Absent

Fig.8 student attendance excel sheet

rec_no	roll_no	subject_no	attendance	attendance	attendance	Add New Field
1	3	2	12-04-2015	01 To 02	Present	
2	4	2	12-04-2015	01 To 02	Present	
3	1	2	12-04-2015	01 To 02	Absent	
4	2	2	12-04-2015	01 To 02	Absent	
5	5	2	12-04-2015	01 To 02	Absent	
6	6	2	12-04-2015	01 To 02	Absent	
7	7	2	12-04-2015	01 To 02	Absent	
8	8	2	12-04-2015	01 To 02	Absent	
9	9	2	12-04-2015	01 To 02	Absent	
10	10	2	12-04-2015	01 To 02	Absent	
11	11	2	12-04-2015	01 To 02	Absent	
12	12	2	12-04-2015	01 To 02	Absent	
13	13	2	12-04-2015	01 To 02	Absent	
14	14	2	12-04-2015	01 To 02	Absent	
15	15	2	12-04-2015	01 To 02	Absent	
16	16	2	12-04-2015	01 To 02	Absent	
17	17	2	12-04-2015	01 To 02	Absent	
18	18	2	12-04-2015	01 To 02	Absent	
19	19	2	12-04-2015	01 To 02	Absent	
20	20	2	12-04-2015	01 To 02	Absent	
21	21	2	12-04-2015	01 To 02	Absent	
22	22	2	12-04-2015	01 To 02	Absent	
23	23	2	12-04-2015	01 To 02	Absent	

Fig. 9 student attendance excel sheet

From this record we can automatically get the attendance status of particular student as shown in fig.10. Suppose we want to check the attendance status of roll no. 2, enter it and we automatically get its result that he/she is defaulter or not and hence he/she is applicable for detention.

Wireless Attendance System using Fingerprint - [Subject]

New Student Registration Student Attendance Attendance Status

Student Attendance Status

Roll No :

Student Name :

Contact No :

Subject :

Total Presenty	Total Absent	Percentage	Detained
1	0	2.5	Yes

Fig. 10 Student attendance status result form

IV. CONCLUSION

Because of the revolution in biometric science, we try provide an efficient and reliable wireless fingerprint attendance system, which is the best example of portable biometric recognition device. WFBAS successfully stored student information ,captured new finger prints to be stored in the database , scanned and compare them against those stored already in database successfully and help to generate student attendance record daily and monthly in excel format. Thus WFBAS is a secure, fast, and reliable and an efficient system has been

developed replacing a manual and unreliable system for enterprises and institutions.

V. ACKNOWLEDGEMENT

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