

# ZIGBEE BASED SMART AUTHENTICATION AND STUDENT ATTENDANCE SYSTEM

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**Abstract**—Student attendance is one of the important issues for colleges, because many colleges evaluate students' attendance and while giving the final grade, professors consider their total number of appearances on classes during the whole semester. Some colleges prefer to use paper sheet for controlling attendance, whereas some colleges prefer to use paper sheet for checking students' attendance and after this, fill out these information into a system manually. Generally students' performance in studies is depending on the attendance. There is a need to develop system that reduces burden in analyzing the attendance and enhance smooth functioning of schools, colleges and colleges and to help the parents. Thus, this paper describes a brief introduction to application of attendance system and reviews some application of attendance system and techniques of data retrieval such as smart card, biometrics and RFID itself. This system would be applicable in collecting student attendance in classroom using passive RFID technology. Our project is Monitoring of Student using RFID. RFID stands for Radio Frequency Identification and Detection. In this we are using RFID reader and contactless smart card. Reader is located on fixed location sends signal to passive RFID chip detected in range of reader. Chip re-transmits the acknowledgement signal with its unique Identifier code, hence chip is identified. Also, a single reader can identify many no of chips in very short period of time. So, we are using these properties of RFID reader monitor the student. Also included module to make system better like in biometrics thumb detection for security and send message to parent if with respective student absent in class.

**Keywords**—RFID; RFID Reader; ZIGBEE; GSM; MATLAB

## 1. INTRODUCTION

An RFID system comprises three components that is an antenna, a transceiver and a transponder the antenna uses radio frequency waves to transmit a signal that activates the transponder. When activated, the RFID tag with unique ID transmits data back to the antenna. Using the RF the RFID tag can be read by the RFID reader. Biometric is used to scan the fingerprint for uniquely identifying a student. Fingerprint matching is done by a fingerprint matching algorithm using both ridge features and minutiae features. In this system we will a template of the student fingerprint in the database with a specific RFID tag ID and when this fingerprint is verified once then his attendance will be finalized and stored in the database so that student cannot fool the system by giving his ID card to his friends in their absence to college. If the student's fingerprint is not identified he will be sent a warning SMS to student if he is not verify within time then guardian will be informed that the student was not present and was trying to cheat the system. This additionally to implement in our system. The Zigbee and GSM to help the sent message to the particular person parents and the Zigbee used to store the particular person detail to the system. Mat lab use to capture the person picture and sent the email for HOD and parents

## 2. EXISTING SYSTEM

In most universities, teachers take attendance by calling out the names and surnames of students, and the marking them, while, in others, teachers pass around a sheet of paper, asking students to sign in attendance sheet just next to their surnames. Both practices have the drawbacks. In the first

case, if numerous groups attend the lesson, checking all of these students by name and surname might take about 10 minutes out of each lesson; in the second case, friends of absent students may write down their names and surnames. These practices plan university teachers and their institutions at considerable disadvantages when it comes to taking attendance. Old fashioned student attendance system was a tedious task to perform and maintain and also time consuming barcodes are less secure because can be easily reproduced .barcode technology is method to identification which is used to retrieve in shape of symbol generally in bar, vertical, space, square which have different width and height each one reader can identify data that are represented by using light beam and scan differently but during scanning more data are lost.

## 3. PROBLEM STATEMENT

The traditional method of monitoring has some drawbacks. This method obviously not efficient as it wastes the user's energy and quite slow in term of completion. For example, a class that uses attendance sheet method requires the Students to pass the sheet to each other to sign up the monitor. If there is a large amount of students, it will take time in order to complete the monitoring. Besides that, there is possibility that some students might miss their turn to sign the attendance as they did not receive the attendance sheet. Also in barcode system during reading symbol most of the data are lost and it is a time consuming system.

#### 4. PROPOSED SYSTEM

We developed automated student attendance system RFID through SMART CARD system we improve the student monitoring system. Use RFID and smart card. With the help of that improve security. There will RFID transponders installed in every classroom. And when a student enters any of them the transponder will detect and store the student's last known position in the database. The complete process will be automated and no one needs to be monitoring the system. As every tag has its own unique ID, it is easy to differentiate every tag holder. This is uniquely student identify. We manage attendance database. If student are not present then send the message to guardian. This system uses individual RFID tags for each user identification. For the security purpose, we are used thumb detection of the user similarly we can monitor the student from one place. This system use to send the email and message due to the GSM, Zigbee and Mat lab.

#### 5. HARDWARE REQUIREMENT

**RFID:** RFID Reader read contain of smart card, There are three types of RFID an RFID system comprises three components that is an antenna, a transceiver and a transponder the antenna uses radio frequency waves to transmit a signal that activates the transponder. When activated, the RFID tag with unique ID transmits data back to the antenna. Using the RF the RFID tag can be read by the RFID reader. **Biometrics:** Biometric is used to scan the fingerprint for uniquely identifying a student. **Smart card:** Smart card build by with wide verity of chip, it is used in wide range application.

**GSM Modem:** GSM modem allows the computer to communicate over the mobile network through calls, SMS and MMS messages. It consists of a SIM card and operates over a subscription through a mobile network. It is a highly flexible plug-and-play device capable of connecting to a PC or any microcontroller's serial port through MAX232IC. This IC is used to convert the TTL logic levels of the microcontroller to a RS232 logic level for enabling serial communication.

**ZigBee Module:** ZigBee is a wireless communication technology developed by Zigbee Alliance as an open global standard to address the unique needs of low-cost, low power, wireless sensor networks. ZigBee modules are a family of nice little radio devices that use the ZigBee or 802.15.4 protocol. Zigbee is the standard based technology designed to address the unique needs of low cost, low power wireless sensor. Zigbee can be used at almost anywhere and it is easier to implement and needs little power to operate. They send and receive the data via the 2.4GHz or 900 MHz band at a relatively low power and used to set up simple point-to-point links or complex self-healing networks spread over quite large areas. The higher power devices are used as telemetry solutions over the long ranges, but the applications are really extremely varied. Interfacing of a device with a Zigbee module is also easy. The technology defined by the Zigbee is intended to be simpler and less expensive than others such as a Bluetooth. Zigbee is targeted at radio frequency (RF) application that

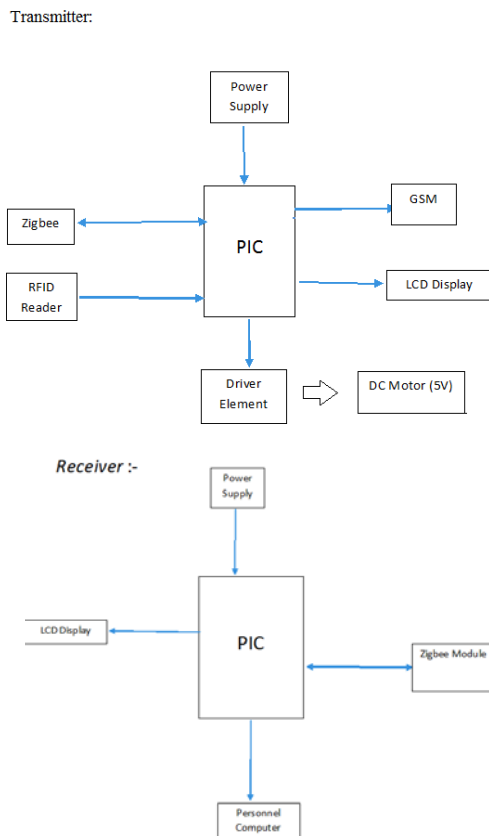
requires a low data rate, long battery life and secure networking. Zigbee is basically a transceiver module.

**Voltage Regulator:** The voltage regulators are designed to automatically maintain a constant voltage level. A voltage regulator is a simple "feed-forward" design or may include negative feedback control loops. It may use an electromechanical mechanism, or electronic components. Depending on the design, it may be used to regulate one or more AC or DC voltages. Voltage regulator ICs are available with fixed (typically 5, 12 and 15V) or variable output voltages. The maximum current they may pass also rates them. Negative voltage regulators are available mainly for use in dual supplies. Most regulators includes some automatic protection from excessive current (over load protection) and over-heating (thermal protection). Many of fixed voltage regulator ICs has 3 leads. They include a hole for attaching a heat sink if necessary." **Liquid Crystal Display (LCD):** LCD (Liquid Crystal Display) is an electronic display module and has found a wide range of applications. A 16x2 LCD display is a very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being LCDs are used in place of others are economical **COMMUNICATION:** The home automation network is established and maintained by ZigBee technology. It receives commands from microcontroller and forwards them to other Zigbee devices. The setup of network consist of system initialization, network topology update

#### 6. SYSTEM WORKING

In this we are using the RFID (Radio Frequency Identification Technology) reader read the retrieve information and send the information to the receiver section. If the person is wear the Identifying card this system will allow the person to the other sides is used to send the message that the person is entered and an automatic attendance taken in a period manner. Hence is used to connect the people within the range. LCD is included because if the person is entering with RFID the displays show the he is In and if the person doesn't wear the ID then it shown as OUT. So the transmitter is to transmit the information the receiver section with the help of the GSM module. Hence while implementing this projects each and every member in a class should wear the ID. This system used Mat lab help sent the mail to the HOD and parents. Zigbee use to send the particular person detail to the system and this use d to help the college management to control the student on during the class hour the student no leave the class room to any unnecessary time on period time .if any one leave the class room to intimate the our department HOD and particular student parents

7. BLOCKDIAGRAM



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8. ADVANTAGES AND DISADVANTAGE

Advantages:

- It saves time for taking attendance during the class.
- More authentic attendance system.
- Reduces paper based system.

Disadvantage:

Biometrics: Sensor is that the image capturing capabilities are affected by the skin quality of figure. For example dirty figure is difficult to be capture properly.

9. RESULT

Multifunction smart ID cards with RFID offer several easy and cost-effective ways for campuses to raise the level of protection and quality of education. Today’s smart access card technologies provide superior range and read performance so that educational institutions can improve efficiency and security at multiple levels.

10. CONCLUSION

This paper introduce a smart, Zigbee based time and attendance tracking system using android application and computer system which use GSM and Zigbee as the core component of attendance message using smartphone and computer. The RFID depicts that student is present in the college. We developed this system for android platform, but we are focusing on developing this system for IOS platform as well in neat future.