A Survey on: Smart Attendance Management System using RFID

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Abstract - *In this Smart Attendance System we are providing the RFID ID cards to students. In that RFID Cards we had stored a Unique ID of that card. So, whenever student taps that card on RFID reader module reads that card and gets an id. Then this id will be sent to server for verification purpose. If valid id exists with the unique id then with the PHPs time script based algorithm will run and adds the attendance of that particular student on specific Attendance table in MySQL database. If any student came late or absent to specific lecture then with the help of SMS server we are sending the SMS to their parents about the absence of student. With this server-side dashboard staff can extract the student's data sheet in various formats like PDF for further processing purpose. RFID also can be used to take attendance for workers in working places. Its ability to uniquely identify each student based on their RFID tag type of ID card make the process of taking the attendance easier, faster and secure as compared to conventional method. Students only need to place their ID card on the reader and their attendance will be taken immediately. With real time clock capability of the system, attendance taken will be more appropriate since the time for the attendance taken will be recorded.*

Keywords:- **Microcontroller, RFID, Database, Ultrasonic Sensor, Attendance Management System, Server.**

1. INTRODUCTION

Smart Attendance Management System is developed for daily student attendance in schools, colleges and institutes. It provides to access the attendance information of a particular student in a particular class with the help of IoT. Due to student's interest in classrooms, and whose the largest union in the study environment of university or institution, so recording absence at a department having a large number of the students in a classroom is a difficult task and time-consuming. So the process takes much time, and many efforts are spent by the staff of the department to complete the attendance important issue which is used for various purposes. These purposes include record keeping, valuation of students. The process of recording attendance for students was in the form of hardcopy papers and the system was manually done.

2. RFID TECHNOLOGY:

RFID systems can be classified as short or long read range, low or high power consumption level, large or small hardware size[1].

RFID tag: RFID tag includes a coupling circuit and an integrated circuit for storage and communication. There are three types of RFID tags active tag ,passive tag and semi-active tag among these passive tags have no dedicated power supply as well as the ability to initiate communication. Instead, they operate solely on the energy of the electromagnetic field of the reader's antenna [5]. The passive tags are cheaper to manufacture and they have longer lifetime than active or semi-active tags. These features make passive tags well suitable to access control.

3. SYSTEM ARCHITECTURE:

This Smart attendance management system consists of various electronics, Hardware and software components. As described in main system block diagram shown in fig.3.1.
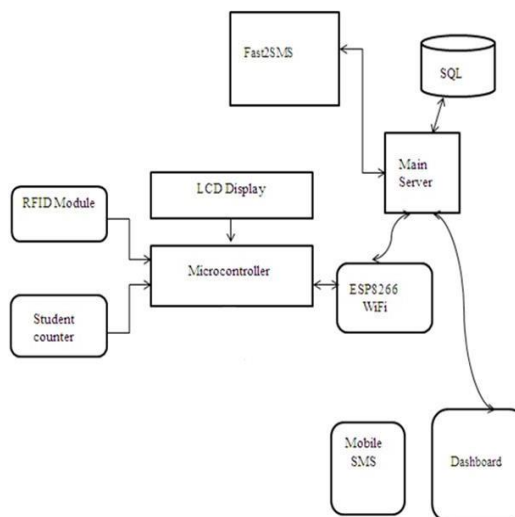

Fig.3.1 Proposed System Architecture.

4. SYSTEM HARDWARE DESIGN:

A. Microcontroller:

In this project we have used the Atmega 328 microcontroller. Microcontroller communicates with all input and output devices. The high-performance Microchip Pico Power 8-bit AVR RISC-based microcontroller combines 32KB ISP flash memory with read-write capabilities, it has 1024B EEPROM, 2KB SRAM,

23 general purpose I/O lines, 32 general purpose working registers, three flexible timer/counters with compare modes. It has internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, SPI serial port, a 6-channel 10-bit A/D converter programmable watchdog timer with internal oscillator, and five software selectable power saving modes. The device operates between 1.8-5.5 volts. The most common implementation of this chip is on the popular Arduino development platform, which is namely the Arduino Uno and Arduino Nano models.

Fig.4.1. Atmega 328 Microcontroller

B.   RFID Module:

This RFID kit includes reader module which having frequency 13.56MHz, which use the RC522 IC, plus 2 S50 RFID cards help to learn and add the 13.56 MHz RF transition. The MF RC522 is a highly integrated transmission module for contactless communication at 13.56 MHz [9], this transmission module utilizes an outstanding modulation and demodulation concept completely integrated for different kinds of contactless communication protocols at 13.56 MHz. This RF reader uses Serial Peripheral Interface to communicate with microcontroller such as Arduino.

Fig.4.2.RFID Module

C.   Ultrasonic Sensor:

Here we used HC - SR04 sensor to count students inflow and outflow.It work on real time. Ultrasonic sensor provides non-contact measurement function and having

range between 2cm – 400cm, the ranging accuracy can reach to 3mm. The modules includes ultrasonic transmitters, receiver and control circuit. As shown above the HC-SR04 Ultrasonic (US) sensor is a 4 pin module, these are Vcc, Trigger, Echo and Ground respectively. This is very popular sensor used in many applications where measuring distance or sensing objects are required. The module has two main parts ultrasonic transmitter and Receiver. The sensor works with the simple formula that,

Distance = Speed × Time

The Ultrasonic transmitter transmits an ultrasonic wave, this wave travels in air and when it gets objected by any material it gets reflected back toward the sensor this reflected wave is observed by the Ultrasonic receiver module as shown in the Fig.4.3.
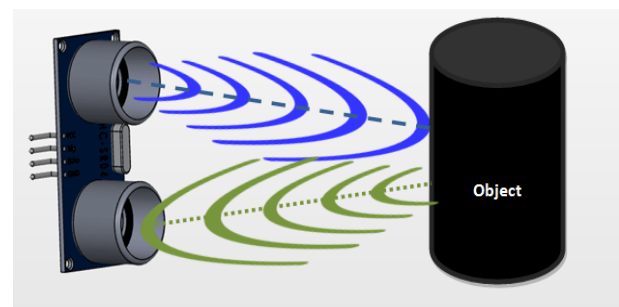

Fig. 4.3 HC-SR04 Ultrasonic Sensor
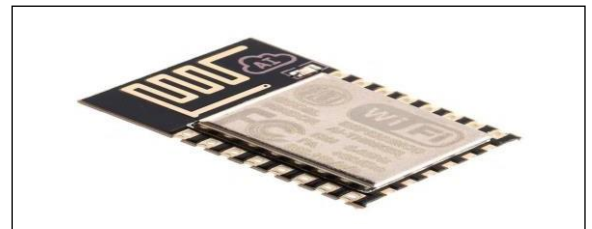
D.   Wi-Fi Module:

Fig.4.4 WiFi Module

Core processor ESP8266 in smaller sizes of the module encapsulates Tensilica L106 integrates industry-leading ultra-low power 32-bit MCU micro, with the 16-bit short mode, it has Clock speed support 80 MHz, 160MHz, it has to supports the RTOS and integrated Wi-Fi which on-board antenna.The module supports standard 802.11 b agreement and complete TCP/IP protocol stack [12]. Users can use the add modules to an existing device networking, or building a separate network controller.ESP8266 is high integration wireless SOCs, it designed for space and power constrained mobile platform designers.

5. SYSTEM SOFTWARE DESIGN :

A. NetBeans IDE (PHP Website):

To design the Website for server side algorithm. PHP (Hypertext Preprocessor) is a widely-used .It is open

source general-purpose scripting language that is especially suited for web development and can be embedded into HTML. PHP is a general-purpose scripting language that is suited to server-side web development, in which case PHP generally runs on a web server.

B. Arduino IDE:

To Program the Atmega328 Microcontroller we used this IDE. Arduino microcontroller are pre-programmed with a boot loader that simplifies uploading of programs to the on-chip flash memory. The default boot loader of the Arduino UNO is the boot-loader. Boards are loaded with program code via a serial connection to the another computer.

C. FileZilla Web Client:

We use the FileZilla Web client for uploading our website to the Server of the 000Webhost. With this client side software it is easy to upload the all contents of our local website file in one click.

D. Fast2SMS:

Fast2SMS is a popular SMS service provider in India. In this project by using Fast2SMS we can send SMS to parents when student is absent.
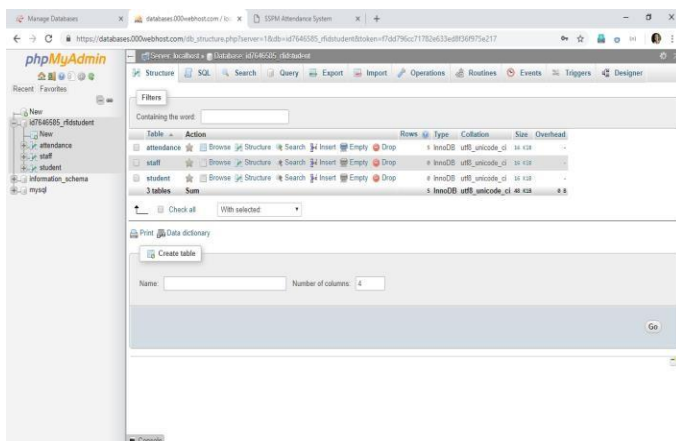
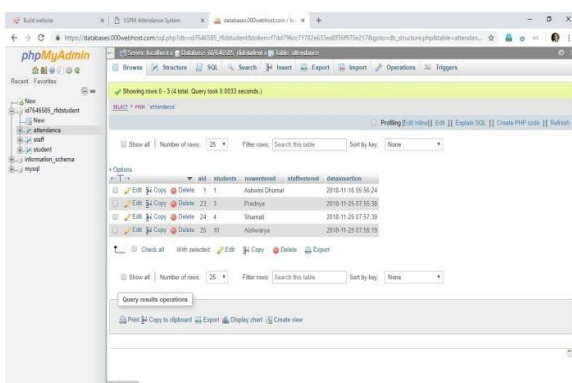## 6. RESULTS:

Fig.6.1. **Database**

Fig.6.2. Attendance Table

For the purpose of Data storage, we have used My SQL Database in our System. For that we created the one database in our main Apache Website Server. In that databases we have created various tables like Student table, attendance Table. We can see in Fig-6.1 the database in PHP My Admin page by selecting proper table we can see the entries of students in database ,the entries are created by admin. with the Help of PHP APIs which are created for data Insertion purpose.

7. CONCLUSIONS:

A Smart Attendance Management System using RFID prototype has been successfully developed. The prototype of the system provides many advantages over conventional method of taking attendance in class.

Attendance can be stored and retrieved easily. Another advantage of these system is it has high identification and verification speed. This system can be applied not just in the classes but also in working areas with the feature total working hours can be recorded.

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