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ATTENDANCE AND ASSESSMENT SYSTEM USING RADIO FREQUENCY IDENTIFICATION

Microprocessor And Interfacing

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FACULTY – Prof. Naresh K.

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DECLARATION

I/We hereby declare that the project entitled **"ATTENDANCE AND ASSESSMENT SYSTEM USING RADIO FREQUENCY IDENTIFICATION"** submitted by me/us to the School of Computer Science and Engineering, VIT University, Vellore-14 in partial fulfillment of the requirements for the award of the degree of **Bachelor of Technology in Computer Science and Engineering** is a record of bonafide work carried out by me/us under the supervision of **Prof. Naresh K, Assistant Professor at School of Computer Science and Engineering.** I further declare that the work reported in this project has not been submitted and will not be submitted, either in part or in full, for the award of any other degree or diploma of this institute or of any other institute or university.

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ABSTRACT

Student attendance using Radio Frequency Identification (RFID) System is an automatic record of student attendance develops especially for university. In this project, we plan to create a device using Arduino which uses a Radio Frequency Identification (RFID) reader and reads the data from the Radio Frequency Identification (RFID) tag embedded in the ID card of the student and it gets stored in the database. So, every time the student gets his/her tag read by the Radio Frequency Identification (RFID) reader on the bus, a Short Messaging Service is sent to the parent to let them know the whereabouts of their children. A similar method is implemented for the attendance of classes in the entrance of the classroom. The teacher could give some sort of remote control mechanism to turn on and off the attendance device so that the students don't tamper with it. The device will show the current status of the student of which class he/she is in and when has the student left the class. All of these data are stored in the cloud storage. Ubidots a cloud computing storage will be used for storing the data and analyzing it and retrieve it via the WiFi module which will be connected to the Arduino board as well.

5. INTRODUCTION

This project is to be developed by using radio frequency identification system and student card to get student attendance. Generally, lecturer needs to use the paper to get the student attendance. There were a lot of problems when using the paper as student attendance such as proxy. This project can help the lecturer to reduce the problem like that by designing automatic attendance using radio frequency identification and student card.

Firstly, the lecturer will need to fill forms in an interface like lecturer's name, subject and subject code. This part is important because we will need the information in this part to use in the next interface.

In the next interface, lecturer needs to choose port and speed to make a connection with radio frequency identification reader. After the reader is ready, the process to get attendant will start. Students need to swap their card on the reader and the code from the card will use to compare with the database. When the code matches with the database, the student information like name and id number will show on an interface and that information will trigger into a list. This list will be used as a student attendance. In that list, all information like student name and id number will be attached, including the lecturer name and subject.

If the code does not match with the database, it means that the student was in the wrong class or not registered yet in that subject. When this happens, the lecturer can register that student by using, registering form and the information of that student will be updated into the database.

This project will help lecturer taking the student attendance more easily and automatically. At the conclusion, radio frequency identification technology can be used in the student attendance application. The message is sent with the help of a cloud storage using Ubidot and parents can receive this message at the end of the day.

6.LITERATURE SURVEY

As expressed over, a radio frequency identification label comprises of an incorporated circuit and a reception device. The tag is additionally made out of a protective material that holds the pieces together and shields them from different natural conditions. The protective material relies on upon the application. For instance, representative id identifications containing radio frequency identification labels are ordinarily produced using tough plastic, and

the tag is implanted between the layers of plastic. Radio frequency identification labels arrive with an array of shapes and sizes and are either passive or active.
Passive labels are the most generally utilized, as they are smaller and more affordable to execute. Passive labels must be "fueled up" by the radio frequency identification per user before they can transmit information. Not at all like passive labels, active radio frequency identification labels have an on-load up power supply (e.g., a battery), accordingly empowering them to transmit information at all circumstances.

Smart labels, contrast from radio frequency identification labels in that they consolidate both radio frequency identification and standardized tag advancements. They're made of a cement mark installed with a radio frequency identification label, decorate, and they may likewise include a standardized identification and additionally other printed data. smart labels can be encoded and imprinted on-request utilizing desktop name printers, while programming radio frequency identification labels is additional tedious and requires more advanced equipment.

Radio frequency identification frameworks can be arranged by the sort of tag and per user. An uninvolved per user dynamic label (prat) framework has an inactive per user which just gets radio signals from dynamic labels (battery worked, transmit as it were). The gathering scope of a prat framework per user can be balanced from 1–2,000 feet (0–600 m), permitting adaptability in applications, for example, resource security and supervision.

A dynamic per user aloof tag (arpt) framework has a dynamic per user, which transmits cross examiner signals and furthermore gets validation answers from latent labels. A dynamic per user dynamic tag (arat) framework utilizes dynamic labels awoken with a cross examiner motion from the dynamic per user. A variation of this framework could likewise utilize a battery-helped detached (bap) label which acts like an aloof tag yet has a little battery to control the label's arrival detailing signal.

Repaired per users are set to make a particular cross examination zone, which can be firmly controlled. This permits an exceedingly characterized perusing region when labels go all through the cross examination zone. Versatile per users might be hand-held or mounted on trucks or vehicles.
Today the current system is taking attendance manually by calling the roll numbers by the instructor himself and marking the student's attendance. The most widely recognized methods for student attendance in the classroom is by implementing the students to manually sign the attendance sheet, which is typically passed around the classroom while the instructor is giving lectures. For example, lecturers with a vast class may find the bother of having the attendance sheet being passed around the class and the manual marking of attendance by students are difficult and in all likelihood occupy them from educating and getting complete attention from the students.

Furthermore, as the attendance sheet is passed around the class, a few students may incidentally or deliberately sign another student's name. The first case prompts a student missing out their name, while the latter leads to a proxy attendance record. Another issue of having the attendance record in a printed version frame is that an instructor may lose the attendance sheet. As far as attendance analysis, the instructor likewise needs to perform manual calculations to acquire the students' attendance rate, which normally consume a considerable amount of time. Even the lecturers have to physically check if any mistake has been done. it becomes highly difficult to analyze this by a single instructor.

There has also been introduced to the local server based where the data is stored in a database within the local server which is located in a nearby location. This made the attendance and analysis of student's performances a bit easier. Then again, for any access to these data, the user must be in the systems which are physically connected to the server, making it difficult for the lecturers if they wish to do the work on their home or anywhere in their comfort.

7.PROPOSED MODEL

7.1. OBJECTIVE

This application has been intended to guarantee a computer security for the students going school. The raising setback and diverse mishap emerge a through to guarantee an abnormal state security. This system cover's each perspective in which the student is secured: Student in and out action is to be followed by time stamp and this information is kept up in the school database. Student month to month participation report is kept up at school and is educated to a particular parent by means of android application.

Advantages for Students: SHORT MESSAGING SERVICE for attending or bunking class. Automatic attendance on reaching school. Advantages for guardians: SHORT MESSAGING SERVICE delivery to guardians. On student reaching school and on attending classes. [7] Parents can look into student attendance in Real Time. Advantages for School Management: Automatic attendance of the student. Geo fencing for additional security.

7.2. SYSTEM ARCHITECTURE

Each student is equipped with RADIO FREQUENCY IDENTIFICATION tag into his ID card or school bag which will be scanned at whatever point a student enters and leaves the class. Student's entrance and leave sections are kept up into the school administrator database alongside its

time stamp. RADIO FREQUENCY IDENTIFICATION tag is used at the same time to keep up the attendance of a student by identifying the RADIO FREQUENCY IDENTIFICATION tag with a reader kept up at the classroom's entrance. Each student's parents are allowed to access the current class attendance alongside survey the month to month attendance report by means of an android application. They will be given separate log in credentials.

7.3. ALGORITHM

ALGORITH FOR TAKING ATTENDENCE

```
                MFRC522 (initialized pins)
        if(mfrc522 == detected)
                gets("card UID")
                roll_number = first_digit("card UID")
                if(roll number !=0 and count ==0)
        for (i=0;i<number_of_students;i++)
           gets(student_roll_number)
           if(student_roll_number == database)
              count_duration_in_class+=1;
           end
        end
                end
                if(count_duration_in_class>= required_duration)
        mark = present;
                end
                else
        mark = absent;
                end
        end
end
```

ALGORITHM FOR SENDING DATA USING WIFI

```
        WIFI_MODULE(initialized)
           if(mark = present)
              send_message_ubidot = student_present
           end
           else()
              send_message_ubidot = student_absent
           end
        end
```

7.4. TIME COMPLEXITY

For first Algorithm Read from the RADIO FREQUENCY IDENTIFICATION module maximum time complexity is given by the loop worst case condition provides us with O(n)

From second Algorithm for ASCII/Hex conversion Maximum time complexity is given by loop 1 and loop 2 and its worst case condition is given by O (n) as they are not nested.

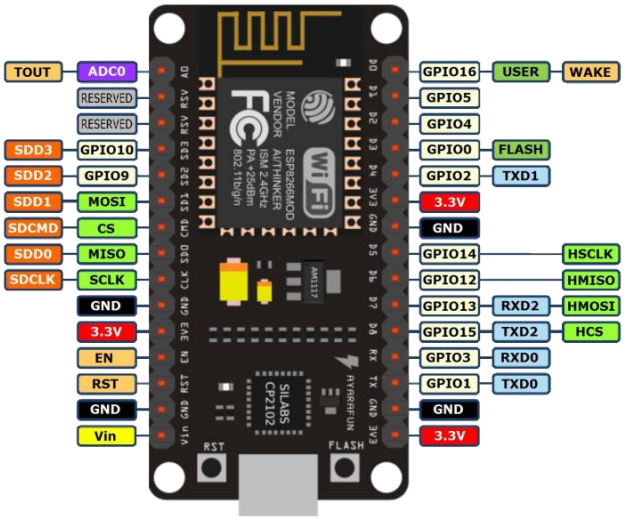

Figure1. Nodemcu ESP8266-12 hardware component

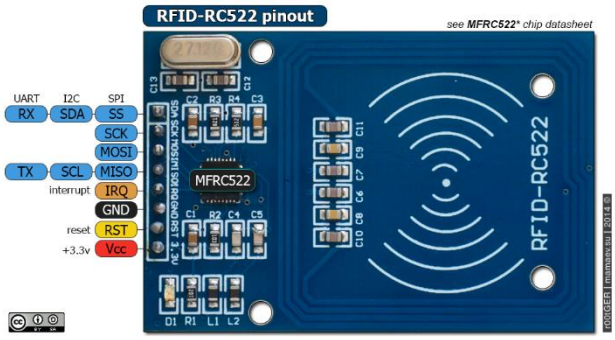

Figure2. RC522 RFID reader

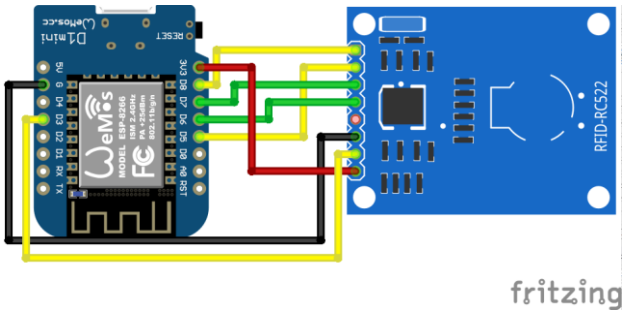

Figure3. connecting rc522 rfid reader to nodemcu microprocessor

8. CODES

```
/* wiring the MFRC522 to ESP8266 (ESP-12)
RST     = GPIO5 (D1)
SDA(SS) = GPIO4 (D2)
MOSI    = GPIO13 (D7)
MISO    = GPIO12 (D6)
SCK     = GPIO14 (D5)
GND     = GND
3.3V    = 3.3V
*/

#define TOKEN  "ubidotstoken"  // Put here your Ubidots TOKEN
#define WIFISSID "wifissid" // Put here your Wi-Fi SSID
#define PASSWORD "wifipassword" // Put here your Wi-Fi password

#include <ESP8266WiFi.h>
#include <SPI.h>
#include "MFRC522.h"
#include "UbidotsMicroESP8266.h"

Ubidots client(TOKEN);

#define RST_PIN  5  // RST-PIN für RC522 - RFID - SPI - Modul GPIO5
#define SS_PIN  4  // SDA-PIN für RC522 - RFID - SPI - Modul GPIO4
int count=0, calc=0;
int rollno[4]={37,198,59,102};
int token[4]={0,0,0,0};
int roll, ID, T=10;
byte i=0;
byte j=0;

MFRC522 mfrc522(SS_PIN, RST_PIN); // Create MFRC522 instance

void setup()
{
  Serial.begin(9600);    // Initialize serial communications
  delay(250);
  //Serial.println(F("Booting...."));

  SPI.begin();           // Init SPI bus
  mfrc522.PCD_Init();    // Init MFRC522

  client.wifiConnection(WIFISSID, PASSWORD);
}

void loop()
{
  /* Temporary loop counter */
  char rx_byte = 0;
  int value;
  char context[25];
```

```
if (calc != 0)
{
  goto yolo;
}

// Look for new cards
if ( ! mfrc522.PICC_IsNewCardPresent())
{
  delay(50);
  return;
}

// Select one of the cards
if ( ! mfrc522.PICC_ReadCardSerial())
{
  delay(50);
  return;
}

// Show some details of the PICC (that is: the tag/card)
Serial.print(("Card UID:"));
dump_byte_array(mfrc522.uid.uidByte, mfrc522.uid.size);
Serial.println();

yolo:
if (Serial.available() > 0)
{
  calc = 1;
  value = roll;
  rx_byte = Serial.read();
  if (roll == 0)
  {
    Serial.print("No card detected");
  }
  else if (count == 0 && roll != 0)
  {
    Serial.print("Roll no ");
    Serial.print(roll);
    Serial.println(" has NOT REGISTERED to the subject");
  }
  //Serial.print("Enter the time of class (in sec) : ");
  //T = rx_str.toInt();
  else if (count >= T)
  {
    token[j] = 1;
    Serial.print("Roll no ");
    Serial.print(roll);
    Serial.println(" has been marked PRESENT");
    sprintf(context,"my-key=PRESENT");
    client.add("PRESENT_LIST", value, context);
    client.sendAll(true);
  }
```

```
    else
    {
      Serial.print("Roll no ");
      Serial.print(roll);
      Serial.println(" has been marked ABSENT");
      sprintf(context,"my-key=ABSENT");
      client.add("ABSENT_LIST", value, context);
      client.sendAll(true);
    }

    for (i=0;i<4;i++)
    {
      if (token[i] == 0)
      {
        value = rollno[i];
        sprintf(context,"my-key=ABSENT");
        client.add("ABSENT_LIST", value, context);
        client.sendAll(true);
      }
    }
  }
}

// Helper routine to dump a byte array as hex values to Serial
void dump_byte_array(byte *buffer, byte bufferSize)
{
  ID = buffer[0];
  //Serial.print(buffer[0], DEC);
  Serial.print(ID);
  for (i=0;i<4;i++)
  {
    roll = ID;
    if (rollno[i]==ID)
    {
      j = i;
      count++;
      goto last;
    }
  }
  last:
  Serial.println();
  delay(1000);
}
```

9. RESULTS

Figure4. Graph representing the record of an event in Ubidots server

Date	Value	Context
2017-05-03 15:31:58 +05:30	102	my-key: ABSENT
2017-05-03 15:31:55 +05:30	59	my-key: ABSENT
2017-05-03 15:31:53 +05:30	198	my-key: ABSENT
2017-05-03 15:31:49 +05:30	37	my-key: ABSENT

Figure5.absentee's data list being sent to Ubidots server

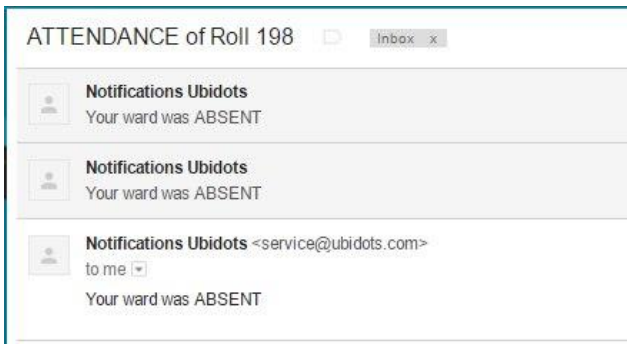

Figure6. Message being received over e-mail service for sending messages.

We were able to reduce the time required for attendance for a significant amount of time. Automated attendance system allowed us to reduce human error and there for ultimately taking the first step towards proxy. Cloud computing enabled us to analyse data and allows us to have a better understanding of the overall data form these sensors

10.CONCLUSION

The final target of achieving an attendance system unmonitored was successfully achieved with an additional feature to send a Short Messaging Service. Overall, we could have made the system more robust for future development along with additional features. This research showed that Radio frequency identification, tracking technology is a practical option for monitoring the children about their whereabouts from the parent's perspective and saves an ample amount of time for the faculty for attendance purposes and for assessment as well. In addition, the cost associated with tagging of materials is relatively low.

11. SCOPE FOR FUTURE

Future work, including combining RFID tracking with an information management system will result in detailed children tracking that will provide different application to the users. A hex key pad can be interfaced to microcontroller board by which user can enter his password then only the lock can be opened. This ensures even if someone has card then also without the password he can't get access. Connection to PC and development of PC side software to read from microcontroller. Implementing the security systems with different levels by using different types of mifare cards. Cryptanalysis of the link between the card and reader and study of other RFID techniques for better service and security can be done. We can also interface the system with a GSM so that data can be transmitted through messages.

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