IoT Based Smart Attendance System Using RFID and Google Sheet

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Abstract - *The traditional manual attendance system is very time-consuming, It is insecure and this system can lead to human errors. This system is ineffective as our valuable time and work get wasted in organizing attendance on pen and paper. Hence to overcome this problem we have used a relational database system to store the real-time data of the students. For this project, we used RFID tags and readers to record the attendance of the students. To manipulate and represent the data based on the unique RFID tags, which get fast and easily scanned on the RFID reader [1].RFID technology is an automatic wireless identification system. This particular system works with active and passive RFID cards and a reader. In this work, we have tried to erase the problem of manually taking attendance with the use of RFID technology. This system is used to help the authority manage the attendance of students in a more organized, efficient, and time-saving manner. This particular system has been implemented in a prototype system that uses RFID tags and a reader to calculate attendance which proves its effectiveness over the normal attendance approach. The design of the system is simple, not expensive, and portable to use which makes it good for candidates and also for commercial and academic purposes. [2]*

Key Words: Attendence, RFID, Google Sheet, Node-MCU,IoT.

1. INTRODUCTION

This paper focuses on the implementation of a smart atten-dance management system using Radio Frequency Identifica- tion (RFID). In recent times technologies have min- imized the time-consuming process which improves the fast response with high reliability. Hence the idea of RFID emerged to compensate for the requirement in terms of automation in real-time applications. The conventional methods are old enough and are still used in taking student attendance in many institutions and schools. This particular type of attendance system has many loopholes like a student can give fake attendance to friends. If the list is missed they have to take re- attendance, which is a very inefficient method. Right now most of the researchers basically concentrating on RFID systems. The main advantage and utility feasibility of RFID is access control. This could be working in miscellaneous environments. All

the engineers who are working towards developing their innovative products for real-time applications focus their work on RFID. The conventional methods can also create interrup- tions as a result of passing a sheet of papers around during academic lectures, conferences presentations, or workshops. It disturbs both students' and the teachers' attentiveness and concentration. This in turn reduces the effectiveness of such sessions.[3]

2. LITERATURE REVIEW

This paper introduces a new approach to utilizing RFID (Radio Frequency Identification) to track student attendance that is based on the Internet of Things (IoT). Educational institutions are concerned about student absences. The general academic achievement of a pupil may suffer from truancy. It takes a lot of time and is ineffective to take attendance the old-fashioned way, by calling names or having people sign their names on paper. One of the answers to the issue is an RFID-based attendance system that uses an IoT system. The two most well-liked technological research trends—IoT and RFID—are included in the suggested study [4]. If we look at the state of our educational system right now, we can see that although there are many technologies available, we are still using the conventional system. When it comes to the university and school attendance systems, professors handled that work manually. The database was manually updated by lecturers using the attendance data. When it comes to technology, there are several solutions available that can be used to lighten the load of lectures. One illustration of such is the use of RFID. If RFID and IoT (Internet of Things) are used together, they can be done automatically without the need for lectures. For improved speed, we intend to use the Cloud as storage in this case. We can access it at any time and from any location via IoT and the cloud, giving us greater proficiency and flexibility [5].Students are required to be present. The lecturer or teacher cannot evaluate a student's participation without the attendance procedure. However, the current procedure still involves physically taking attendance on paper. The use of excessive paper is the first issue, and it is challenging for the administration to summarize student attendance data that is the second issue. This is due to the administration having to review a large number of attendance records. Therefore, a system for tracking students' attendance that can gather data

quickly, effectively, and precisely is required. By doing data collecting, system analysis, system design, and system implementation, this student attendance system is carried out. The programming languages PHP and Java Android were used to construct this system. Ibeacon is also used by the system to identify classrooms. The goal of this project is to create student attendance system applications and class schedule alerts based on BEACON. It is anticipated that by doing this, the attendance process would be more effective and simpler for lecturers and the central administration to monitor[6].This paper mainly tries to describe the implementation of RFID based smart attendance monitoring system. This RFID system uses RFID cards (tags) to identify student IDs. This particular system monitors attendance using both hardware and software using the Internet of things (IoT). The hardware components include an RC155 RFID reader and RFID tags. The software components include GUI which is mainly used for viewing the students' attendance and data which is hosted on a server[7].

3. PROPOSED WORK

Existing systems for attendance are very time-wasting, Not efficient, and ineffective because the lecturers have to take attendance using traditional and manual pen paper work which is also not a secure attendance option. In this project, we have developed a model which is a secure option for attendance. In this project, we have used RFID tags and readers for taking attendance of students Existing systems for attendance are very time-wasting, Not efficient, and ineffective because the lecturers have to take attendance using traditional and manual pen paper work which is also not secure attendance option. In this project, we have developed a project which is a secure option for attendance. In this project, we have used RFID tags and readers for taking attendance of students

COMPONENT USED

A. ESP8266 NodeMCU

Fig. 1. ESP8266 NodeMCU

In this project, we have used NodeMcu which is an open-source platform. NodeMcu is based on ESP8266 which can be used to connect objects and transfer data using Wifi. In this project, the NodeMCU is used to send the attendance on the spreadsheet via the wifi module. Whatever the google

spreadsheet code has generated the deployment link, we have to copy that link and paste it into the code and with the help, nodeMCU will send the data on the spreadsheet.

B. RFID Tags and Cards

Fig. 2. RFID Tags and Cards

The RFID tags are differentiated as passive and active tags. If the device doesn't have its power supply it is called a passive RFID tag. Thus, The passive tags have to be in very close range of an RFID reader and make use of the radio waves which are broadcasted by the reader to power the response alternatively if the device has its battery power to perform entire operations which are called active RFID tags.

C. RFID Reader

Fig. 3. RFID Reader

An RFID reader consists of an antenna and a Radio frequency module which basically generates a high-frequency electromagnetic field. As we all know an RFID tag is a passive device which means that it doesn't have a power supply or a battery. An RFID reader has a microchip that is used to store and process the information. And also it has an antenna that is used to receive to transmit a signal. To read the information on the RFID tag it needs to be placed in very close range of the reader. An RFID reader basically generates an electromagnetic field that causes electrons to move through the tag in the antenna and it powers up the chip.

D. Buzzer

Fig. 4. Buzzer

This buzzer also has an important role in this module. Whenever the user will scan his/her card then this buzzer beeps for a few seconds so that the one who scanned the card will know that his card is scanned properly. Without a buzzer, one can only assume the card has been detected but he/she will not be sure so the buzzer is important here.

OVERALL COSTING

Components used	Quantity	Price
ESP8266 NodeMCU	01	350
RFID Tags and cards	10	25
RFID Reader	01	150
Buzzer	01	40
Breadboard	01	100
Connecting Wires	10	50

Fig. 5. Overall Costing of the components

HOW ATTENDANCE IS RECORDED (CODE)

This system consists of 3 codes. 1) First one is the spreadsheet code which is written on the back end of the spreadsheet 2)Second one is the code in which we will register the card by loading his/her information. That means that the card will be permanently assigned to the student/employee. 3) The third code is the code through which we will scan our id card and then the attendance will be marked on the spreadsheet via NodeMCU. In the second code, we will write the information which we want to save in the new fresh card. When the information is written in the code we simply have to upload the code. When the uploading is done we have to take our new fresh card close to the RFID-RC522 module once the information is loaded in the card the serial monitor will show that "The Block is successfully Read" and "Data is stored in Block No 2". With this we have registered one card, same process is repeated to create the remaining cards, just change the information in the code,

upload the code take a new fresh card, and scan. After that in the third code, we have pasted a link to the google spreadsheet which is deployed/generated when we run the google spreadsheet code. So after registering the card we have to just simply upload the third code when the code is successfully uploaded we have to take our "Registered Card" close to the RFID-RC522 module once the card has scanned the buzzer will immediately beep for a few seconds and the serial monitor will give us the link and the HTTPS code. If the HTTPS code is 302 that means our data is successfully read on the spreadsheet.
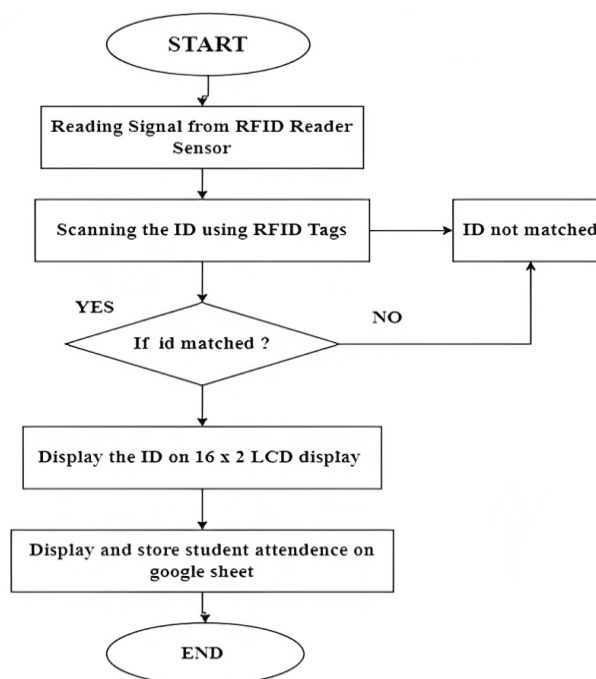

Fig 6 . Flow Chart

METHODOLOGY

The following fig shows the block diagram for our project Smart attendance system using RFID. Which mainly consists of Node-Mcu (ESP-8266), RFID Cards RFID readers, A breadboard,16 x 2 LCD display. Here Node-Mcu acts as a Cen- tral processing unit (CPU) for controlling all the input/output components. For this project, we have used a 5v power supply to power up the node MCU and other components.RFID reader module is interfaced with Node-Mcu to read the data from RFID cards/tags.16 x 2 LCD display is used to display the real- time attendance of the students /employee and the permanent attendance is stored on a google sheet using IoT. In this system, a student or employee has to place /put his card on an RFID reader. When the RFID reader reads the data it directly transfers the data to Node-Mcu and the real-time attendance will be displayed on a 16 x 2 LCD display and the permanent attendance is stored on a google sheet.
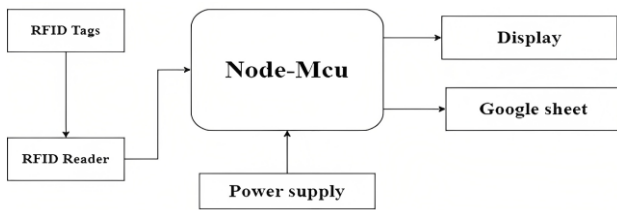
Fig. 7. Blog Diagram of the proposed system

4. RESULT AND DISCUSSION

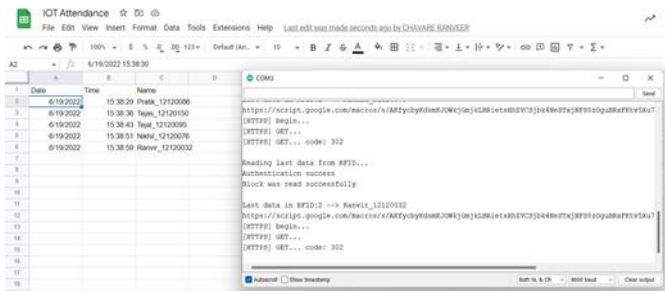**Fig. 8. Hardware implementation**

Fig. 9. Attendance Marked On Google Sheet

5. APPLICATION

The designed system is flexible to implement on any of the below applications.

1.   Recording Attendence

2.   Used in Security systems

6. CONCLUSIONS

We aimed to get effective and efficient time-saving automated computerized attendance in real-time with a ready excel sheet to maintain attendance records we conclude that this user-friendly proposed system can be proved to be easy to use and implement, cost efficient, time-saving, less tedious, and portable. To overcome all the drawbacks, unreliable and inaccurate manual work, this proposed system gets improved with very minimal effort and yet generates the results with maximal accuracy and qualitative.

Ultimately, the system improves academic performance which encourages time saves and accuracy in attendance

7. FUTURE SCOPE

Nothing is perfect in this world. We all are also no exception. Although, we have tried to present the system in modern technology in small scale and smart way. In further future, there can be more enhancement by developing a mobile app. To send SMS for alert notifications, we can also use GSM modules according to the hardware need. Thingspeak can be used for data analysis. To reduce the misuse of RFID tags, biometric technology like iris sensors or fingerprint sensors or image processing can be used for unique identity to improve authorization.

8. REFERENCES

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Link For Google Drive

https://drive.google.com/drive/folders/ 15U-ix2a8yXDgEztukVh85B0ITeAmM9fa