

A Report on the Minor Project 1 entitled
**“ELECTRONIC ATTENDANCE REGISTER
SYSTEM BASED ON RFID”**

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ABSTRACT

IoT is one of the topic which is growing very popular now a days. “ELECTRONIC ATTENDANCE REGISTER SYSTEM BASED ON RFID” is based on IoT(Internet of things) application. The Educational Institutions or any other organisations need to monitor the movements of individuals within their boundaries. This task cannot be handled manually on a consistent basis. In order to assist the human force, we can use the technical systems. We have the attendance monitoring systems based on face recognition, biometric, Bluetooth, RFID and many more. We proposed the RFID based attendance monitoring system which can help the teaching staff. This project uses RFID reader which reads when the RFID tag is brought nearer. Then the reader processes and sends the data to the micro-controller. The micro controller sends the data to the server through the Wi-Fi device (ESP8266), it stores data in the spreadsheet. Main motive of this project is to aid teachers in managing the attendance of the students.

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1. INTRODUCTION

1.1 INTRODUCTION OF PROJECT

Nowadays, there are many universities in our country and each of this university consists of student up to 10 thousand. To handle a large amount of student may be problem specially to get the attendance. Now, process to get attendance in majority universities still used the manual process. The manual process means that when the class (or lecture) starts, lecturer will give a piece of attendance paper and students will check their name and then will sign on it. At the end of class, lecturer will take back the attendance paper and keep it as a record. Students also forget to sign that attendance and they are assumed absent for that class. The problem also will happen when lecturer forget to bring the attendance paper to class.

RFID (radio frequency identification) is a new technology that incorporates the use of electromagnetic or electrostatic coupling in the radio frequency (RF) portion of the electromagnetic spectrum to uniquely identify an object, animal, or person. RFID tags are not an "improved bar code" as the proponents of some technologies would like you to believe. An RFID system consists of three components: an antenna and transceiver (often combined into one reader) and a transponder (the tag). The antenna uses radio frequency waves to transmit a signal that activates the transponder. When activated, the tag transmits data back to the antenna.

1.2 MOTIVATION

Manually marking the attendance is a time-consuming process and so in this automated era, we decided to work on the attendance system that would be easy to use and time saving. We have read many research papers and tried to come up with the best system that would use low-cost technology and already available soft-wares and hardware's to connect various systems that would manage student attendance effectively.

1.3 ADVANTAGES

- Data Collected is Accurate and Secured
- We can maintain large data of student's attendance.
- It results digitalized form of attendance.
- Quick and Easy process.
- Environment and user friendly.

1.4 AREA OF UTILITY

Here we are discussing the security system based on Radio Frequency called electronic identifier are needed to ensure high security in sensitive areas such as school and colleges , health care centre, companies, government organizations and even the financial sectors.

2. PROJECT MODEL

2.1 LITERATURE SURVEY

In [1] Attendance Management System through Fingerprint [2018]

This paper proposed an idea of recording attendance using biometrics (fingerprint) for tracking attendance and storing the data using Local Area Network (LAN). In this system the data is fetched from the individual in the form of fingerprint .Finally the database is also obtained. This method provides high accuracy results but it consumes more time and it is not cost-effective.

In [2] Attendance monitoring and management using QR code [2019]

In this paper, attendance monitoring and management using QR Code is introduced which is based on sensing with cloud based processing. This proposed technique solves the problem of deceptive attendance and the trouble of faculties in uploading daily attendance on ERP (Enterprise resource planning). Use of this technique gives less accuracy compared to biometric.

In [3] Student attendance system in classroom using face recognition technique [2016]

Here this paper gives an idea of recording attendance using face recognition technique. Also this paper provides a detailed description about the results and its analysis obtained from this method. Faces are recognized using cameras and the verification is done. Then the attendance is marked. This method is suitable only for moderate number of people and the results obtained are nearly 87% accurate. This method fails to recognize people in bulk quantity and causes error in results.

2.2 PROBLEM STATEMENT

We came to know that lecturers and class coordinators need to use papers to get the student attendance. This questionnaire showed us that there were a lot of problems when using paper for student attendance. Some of these problems are cheating, bulkiness of the papers, time consuming, stressful and cost full after a long period.

To overcome the drawbacks of the existing system, the proposed system has been evolved. This project aims to reduce the paper work and saves time to generate accurate results of student's attendance.

2.3 OBJECTIVES

The main aim of this project is to:

- Digitalization of the attendance taking and recording method.
- To come up with the best system that would use low-cost technology.
- Save the time and enhance the teaching hour.
- Provides best user interface.
- To reduce workload on teacher.

2.4 BLOCK DIAGRAM

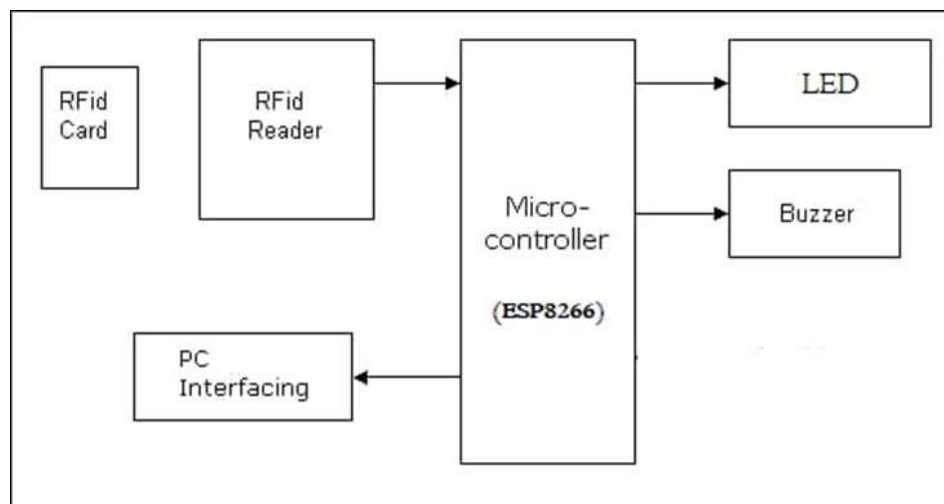


Figure 1 Block diagram of attendance register system

3. METHODOLOGY

3.1 FLOW CHART

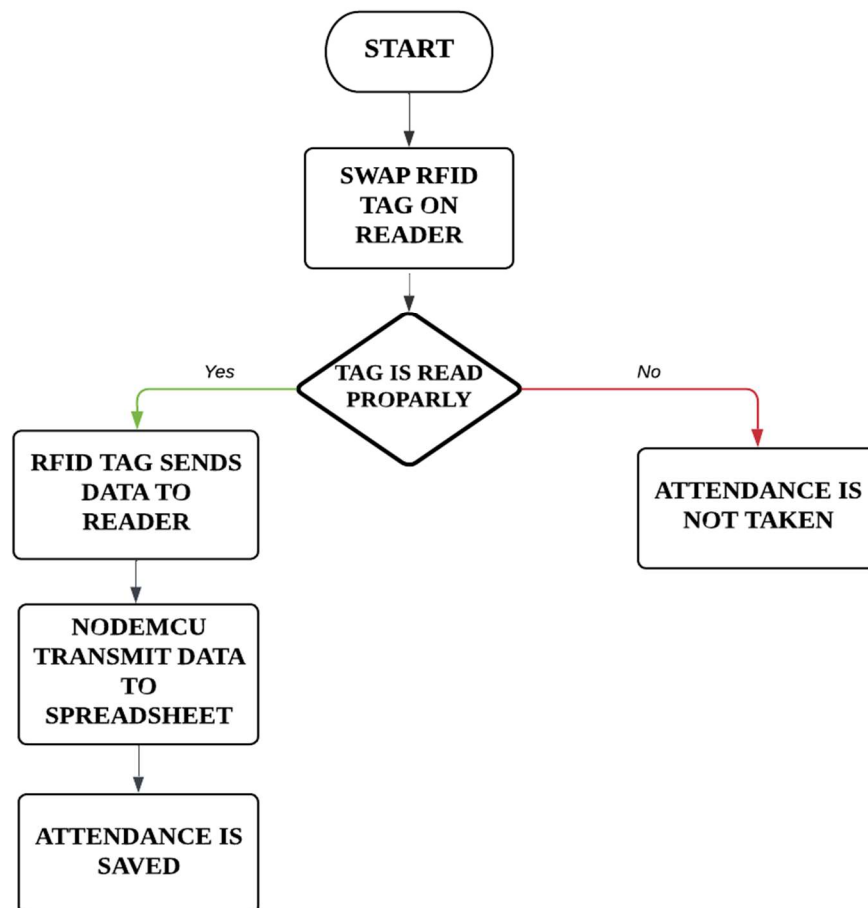


Figure 2 flowchart of attendance register system

3.2 CIRCUIT DIAGRAM

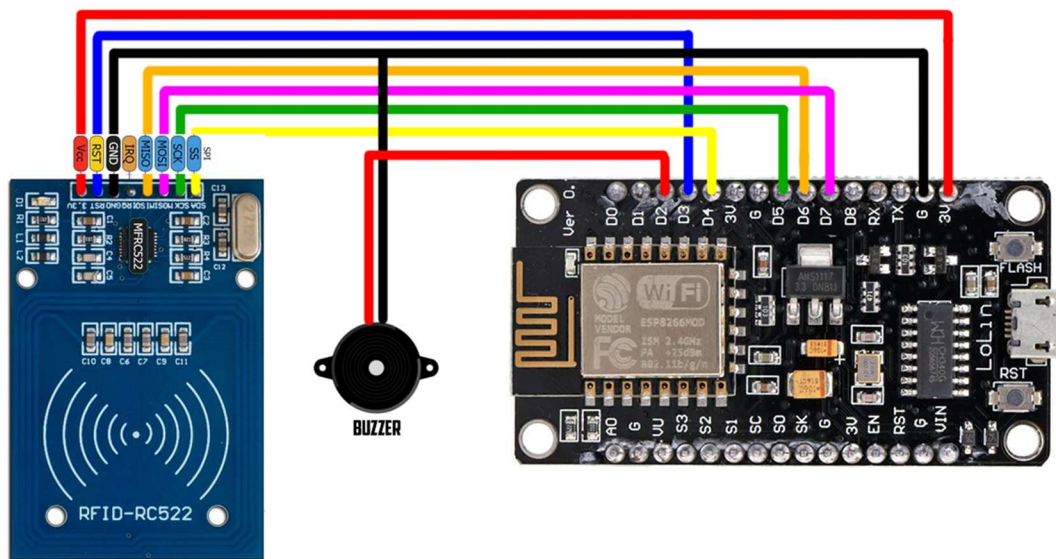


Figure 3 Circuit diagram of model

3.3 WORKING

This project is developed by using Radio Frequency Identification (RFID) system and student card to get student attendance. Firstly, we need to fill student's information like student name or student ID in RFID card, through write_data code which is written in Arduino IDE. Next we have to connect the Wi-Fi module and PC. To transfer the data from microcontroller to spreadsheet we upload send_data code to NODEMCU. send_data code contains wi-fi name and password which should be connected to NODEMCU and it also contains URL of the spreadsheet where attendance is registered. When student swaps their card on the reader. Then the reader processes and sends the data to the micro-controller. The micro controller sends the data to the server through the Wi-Fi device (esp8266). It stores data transmitted in the spreadsheet. It's indicated by beep sound. In that sheet, all information such as student name or student ID and time will be saved in the database of the server. This project will help lecturer taking the student attendance more easily and automatically. As a conclusion, RFID technology can be used in student attendance application.

3.4 COMPONENTES

3.4.1 HARDWARE TOOLS

NodeMCU (ESP8266):

NodeMCU is a low-cost open source IoT platform. It initially included firmware which runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which was based on the ESP-12 module. ESP8266 which can connect objects and let data transfer using the Wi-Fi protocol. In addition, by providing some of the most important features of microcontrollers such as GPIO, PWM, ADC, and etc, it can solve many of the projects.

- Processor: L106 32-bit RISC microprocessor
- 17 GPIO pins
- Memory:
 - 32 KiB instruction RAM
 - 32 KiB instruction cache RAM
 - 80 KiB user-data RAM

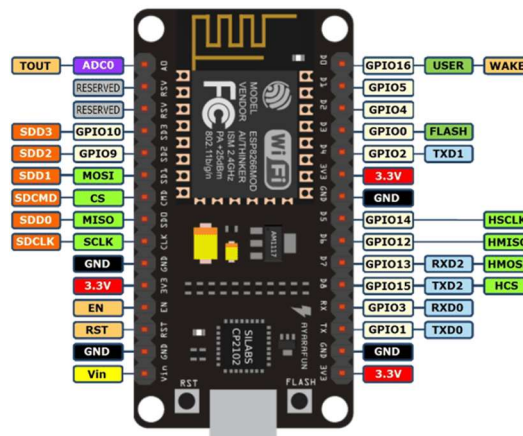


Figure 4 NodeMCU (ESP8266)

RFID Tag:

The tag, also known as the transponder, holds the data that is transmitted to the reader when the tag is interrogated by the reader. Chip less tags are more effective in applications where simpler range of functions is all that is required; although they can help achieve more accuracy and better detection range, at potentially lower cost than their Integrated Circuit-based count.

- Range: 5-10 cm
- EM4001 ISO based RFID IC 125kHz
- Carrier 2kbps ASK Manchester encoding
- 32-bit unique ID and 64-bit data stream



Figure 5 RFID Tag

RFID-RC522 READER MODULE:

The RFID reader is a device which is used in collecting the information or data from the RFID card or RFID tag. It is used for individual object and transfers the data from the RFID tag to RFID card reader through radio waves.. The RFID technology allows several items to be scanned quickly and fast identification of the specific objects.

features:

- Operating frequency: 13.56MHz.
- Supply Voltage: 3.3V.
- Read Range: Approx 3cm
- SPI Interface.
- Max Data Transfer Rate: 10Mbit / s.

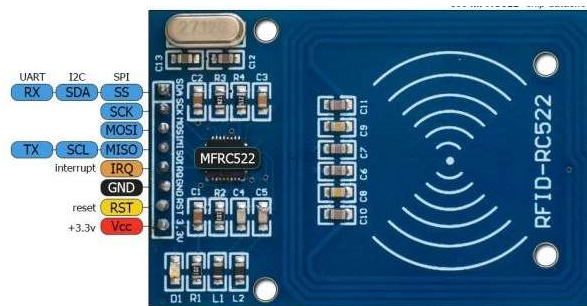


Figure 6 RFID reader

BUZZER:

A buzzer is an audio signalling device which may be mechanical electro or piezoelectric. Typical uses of buzzers Include arm devices, timers, and Conformation of user input such as mouse Click or key stroke.

Supply Voltage:5V



Figure 7 Buzzer

JUMPERS:

A jump wire is an electrical wire or group of cables with a Connector or pin at each end which is normally used to interconnect the components of a bread board or the Other prototype or test circuit internally or with other Equipment or components without soldering.



Figure 8 Jumper wires

BREAD BOARD:

A bread board is a construction base for prototyping of electronics. Originally the word referred to a literal bread board a polished piece of wood used slicing bread.

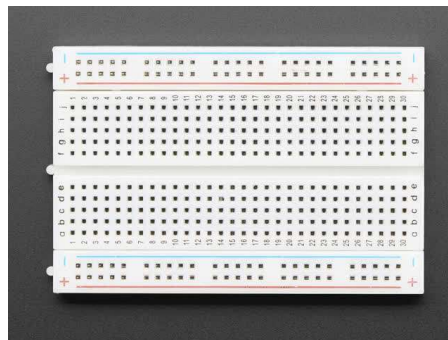


Figure 9 Bread Board

3.4.2 SOFTWARE TOOLS

GOOGLE SHEETS:

Google Sheets is a spreadsheet program included as part of the free, web-based Google Docs Editors suite offered by Google. Documents can be shared, opened, and edited by multiple users simultaneously. Changes are automatically saved to Google's servers.. Google Spreadsheets makes it really easy to format your data however you'd like by using custom JavaScript functions transmit.



Google Sheets

Figure 10 Google Sheets Logo

Arduino IDE:

The Arduino IDE is an open-source software, which is used to write and upload code to the Aduino boards. It connects to the hardware to upload programs and communicate with them. The IDE application is suitable for different operating systems such as Windows, Mac OS X, and Linux. It supports the programming languages C and C++.



Figure 11 Arduino IDE Logo

4 PROJECT PROGRESS

4.1 WORK DONE

1. Detailed research was done on Attendance registration system.
2. The model has designed and tested.
3. Student detail is stored in RFID card using write_data code through Arduino IDE software.
4. Similarly data_transmission code is uploaded to transfer RFID data to spread-sheet
5. Expected outcomes are verified.

4.2 FUTURE SCOPE

- We can also use it to note down the exit and entry time of vehicles with little bit of modification.
- This system can be made even smarter by using face recognition and other developed software to analyze the student attendance

4.3 RESULTS

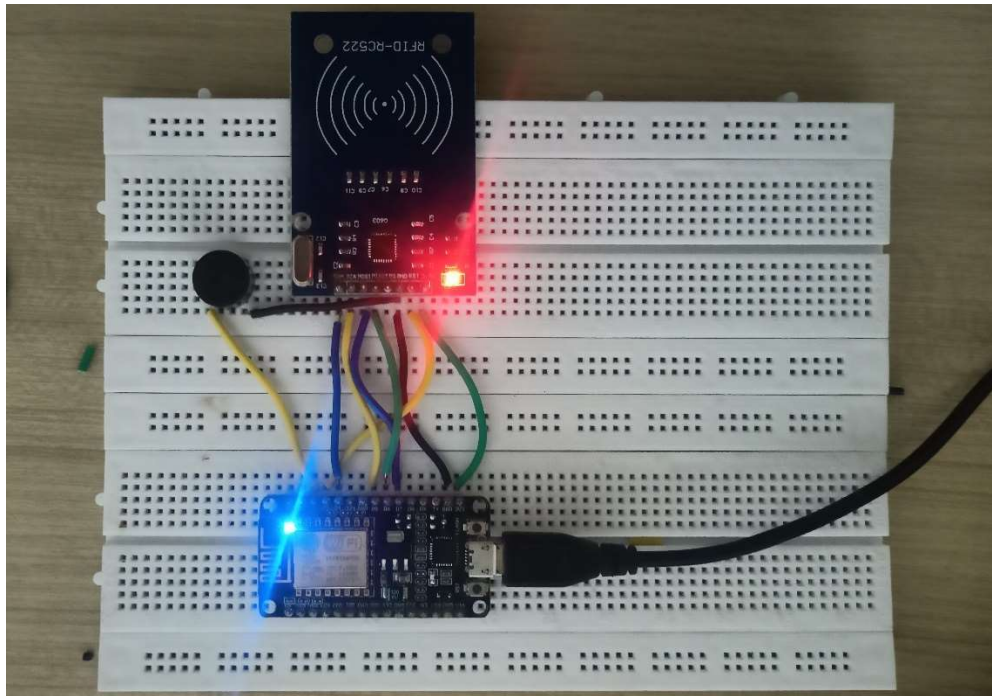


Figure 12 Model implemented on Bread Board

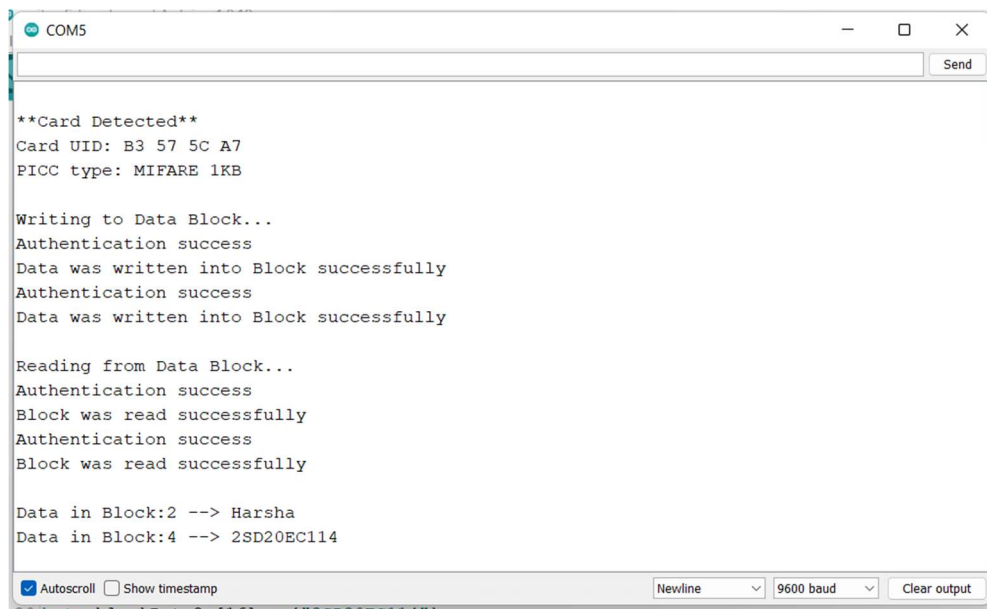


Figure 13 Storing data in RFID card/tag

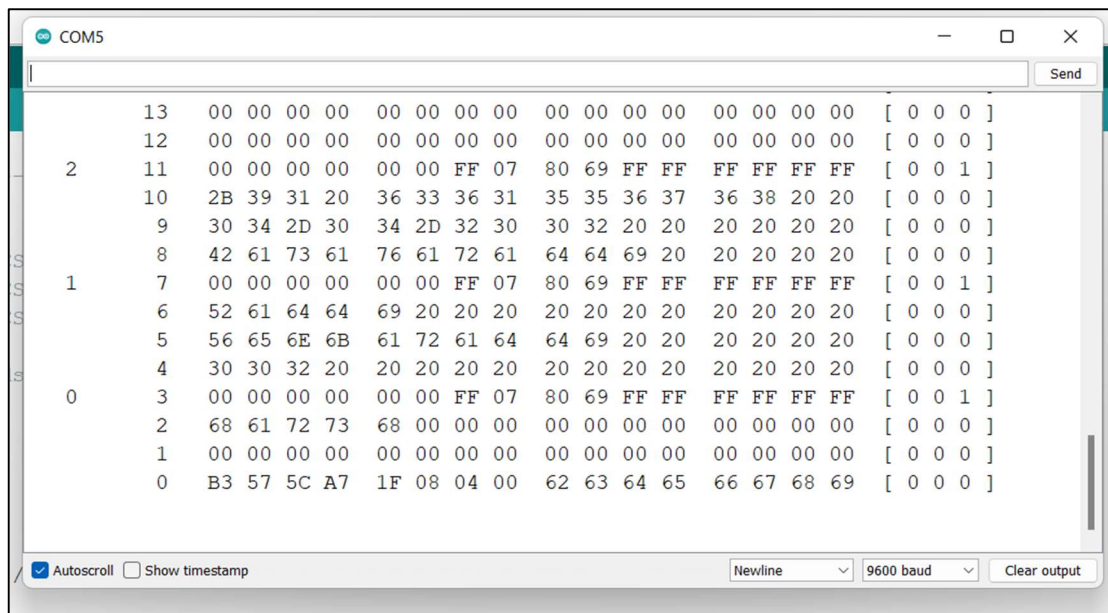


Figure 14 Blocks of RFID card

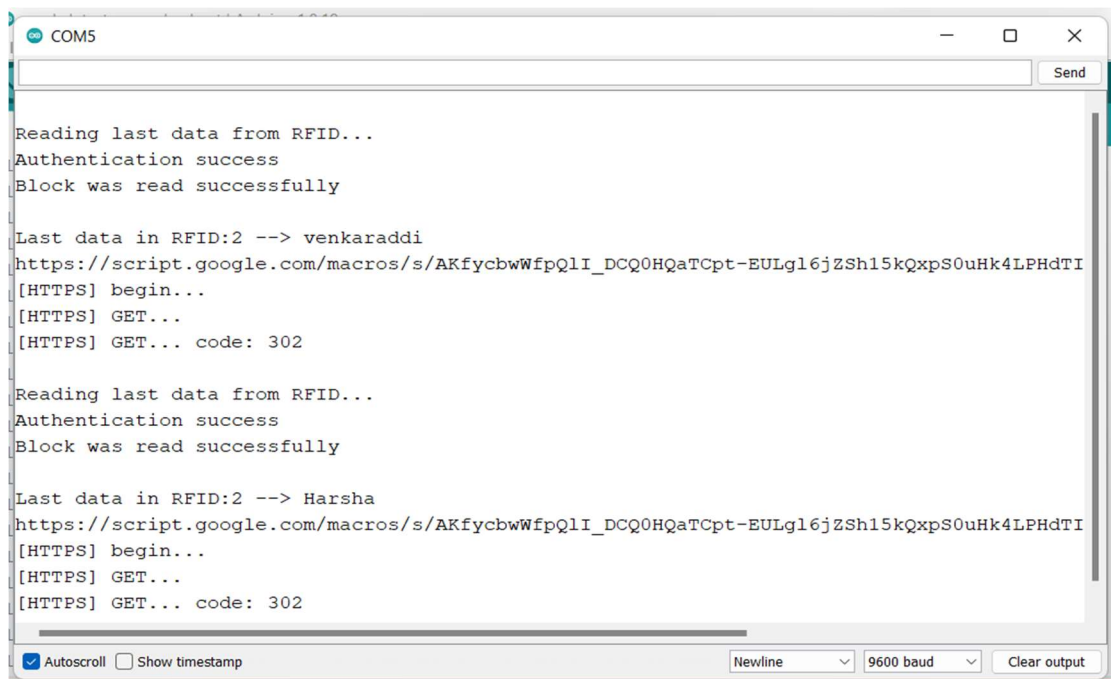
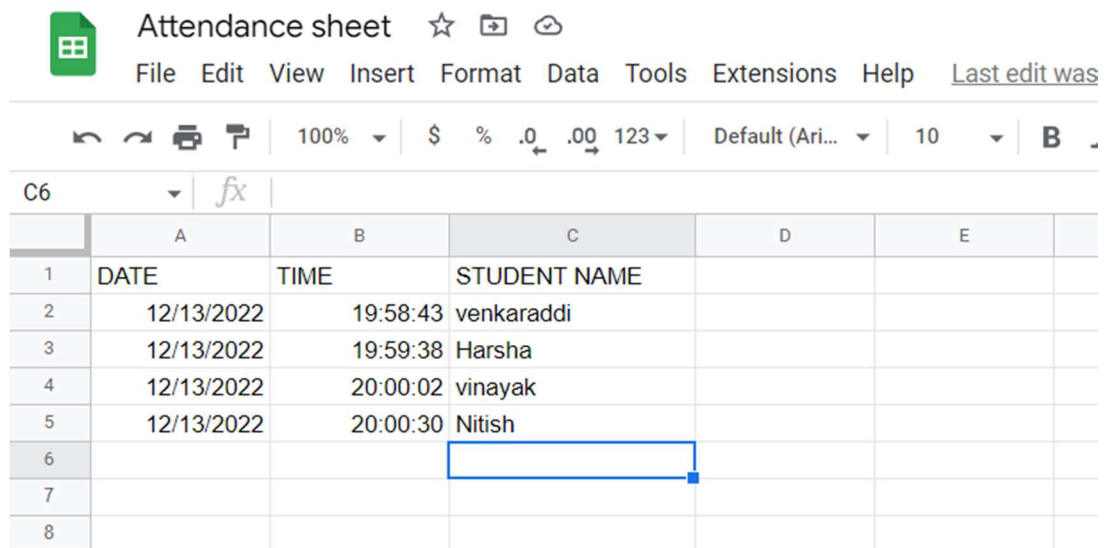


Figure 15 View of serial monitor after scanning card



The screenshot shows a Google Sheet interface with the title 'Attendance sheet'. The menu bar includes File, Edit, View, Insert, Format, Data, Tools, Extensions, and Help. The toolbar shows various icons for undo, redo, print, and formatting, along with a formula bar. The spreadsheet data is as follows:

	A	B	C	D	E
1	DATE	TIME	STUDENT NAME		
2	12/13/2022	19:58:43	venkaraddi		
3	12/13/2022	19:59:38	Harsha		
4	12/13/2022	20:00:02	vinayak		
5	12/13/2022	20:00:30	Nitish		
6					
7					
8					

Figure 16 Stored attendances list

4.4 CONCLUSION

We have successfully implemented the model and achieved high proportion of accuracy. The objective to build an attendance system based on RFID was successfully achieved. In terms of performance and efficiency, this project has provided a convenient method of attendance marking compared to the traditional method of attendance system (that is paper attendance). At the end of the session we can generate the report automatically. By using databases, the data is more organized. If the strength of the class is more, manual attendance taking consumes the time .it also reduce work load on teacher. Thus, it can be implemented in either an academic institution or in organizations.

5. REFERENCES

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