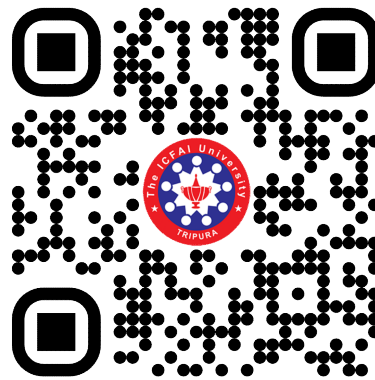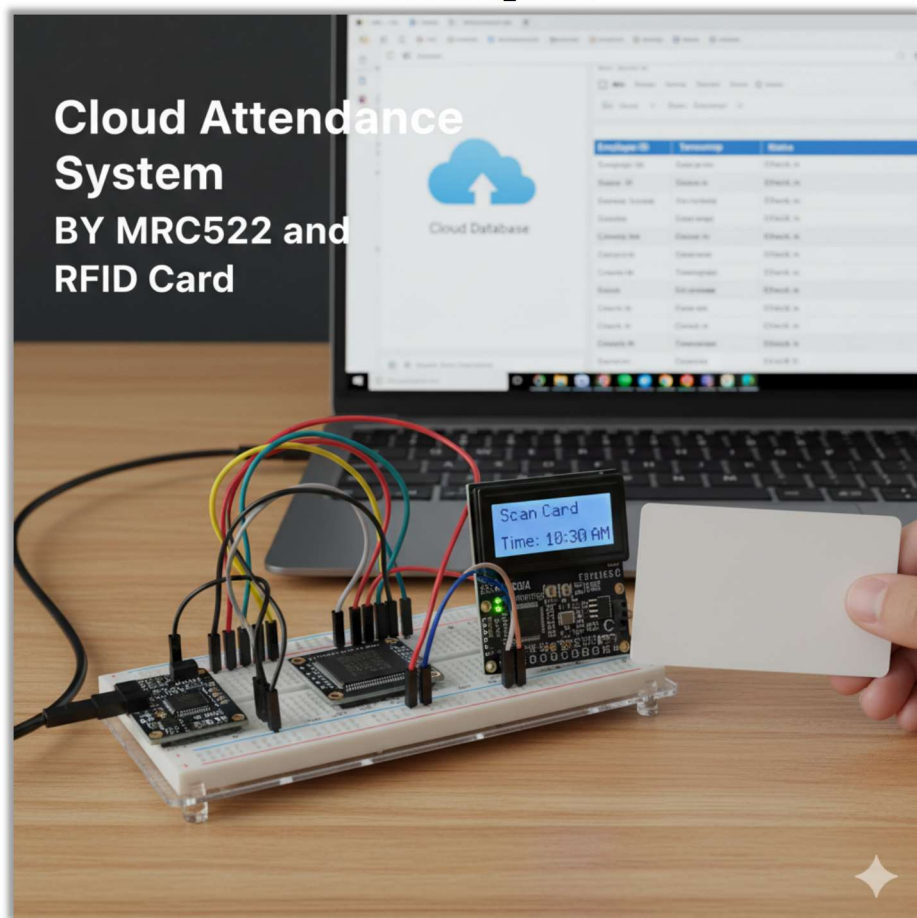# PROJECT

CLOUD ATTENDANCE SYSTEM (IoT)

By Rohan Sen

Attendance_Sheet

Description :

A Cloud Attendance System is a modern digital solution used to record, store, and manage the attendance of students or employees through cloud technology. Instead of keeping manual registers or local databases, the system sends attendance data (collected through devices like RFID cards, biometric scanners, or mobile apps) to a secure cloud server.
From the cloud, the data can be accessed in real time by administrators, teachers, or managers from anywhere using the internet. It ensures accuracy, easy tracking, centralized storage, and automated reporting.

Key Features:

1. Uses IoT devices (RFID, biometric, mobile apps) to mark attendance.
2. Stores data securely on the cloud.
3. Provides real-time access and monitoring.
4. Reduces chances of proxy or manipulation.
5. Generates reports and analyse easily.

► How this Project Works…?

1. Switch on the gadget first,
2. Then a green light glow which indicates the gadget is running ..ok.. ,
3. When any person/student   scan the RF ID card   successfully on the MFRC522 sensor,
4. If the card holder's data is preloaded into the micro-controller's program, on the system the red led glows up also with a beep sound of buzzer for 2 second only,
5. The data or attendance system updates the data into the Google spreadsheet.

► Hardware components needed for this Project …

1. Red ,Green LED light

2. Buzzer

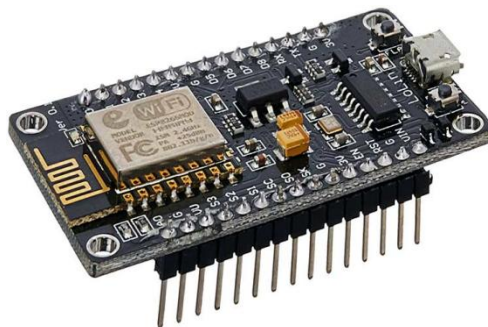3. Lithium ion rechargeable battery

4. Charging module TP4056

5. MFRC522 RF-ID reader

6. RF-ID Card

7. Nodemcu ESP8266

8. Jumper wires

9. Switch
10. Frame

➢ Circuit Connections…

MFRC522 pin		NodeMCU ESP8266 pin
SDA	–	D4
MOSI	–	D7
MISO	–	D6
IRQ	–	No Connection
GND	–	Gnd
RST	–	D3
3.3V	–	vcc
SCK	–	D5
BUZZER_PIN	–	D5
GREEN_LED_PIN	–	D6
RED_LED_PIN	–	D7

➢ Is the Project efficient for Commercial Use… !

It's a great prototype for educational or small-scale institutional projects but in its current form is not yet efficient for commercial use.

Reasons:

Limited Scalability :
Only supports few students stored in code.
For commercial use (hundreds of users), you need a database backend (like Firebase, MySQL, or Google Sheets API with dynamic fetch).

Security Concerns :
Uses client.setInsecure() → disables SSL certificate verification.
This makes it vulnerable to data interception (unsafe for commercial environments).

Reliability of Network :
Depends heavily on WiFi + Google Apps Script, which can fail under poor connectivity.
Commercial systems require offline caching or local database backup.

Performance & Latency :
Each scan sends an HTTP POST request to Google Script, which may take a few seconds.
Not efficient if multiple users scan cards simultaneously (possible data lag).

No Admin Panel or Cloud Database Integration :
Commercial attendance systems need real-time dashboards, data export, and user management, which this project lacks.

Hardware Limitations :
Uses ESP8266, which is low-power and suitable for prototypes but not for large concurrent operations or high-speed processing.

No Error Recovery or Duplicate Handling :
If WiFi or script fails mid-post, attendance data may be lost or duplicated, with no retry logic.

Advantages :

Automatic Attendance Marking :
No manual entry — attendance is recorded automatically when an RFID card is scanned.

Cloud-Based Storage :
Data is directly uploaded to Google Sheets, allowing real-time access from anywhere.

Cost-Effective :
Uses low-cost components (ESP8266 + RFID module), making it budget-friendly for small institutes.

Time-Saving :
Speeds up attendance recording; each scan takes only a few seconds.

Easy to Implement :
Uses WiFiManager for quick WiFi setup and Google Apps Script for cloud integration — no need for complex databases.

Accurate Identification :
Each student has a unique RFID tag, reducing the risk of attendance fraud.

IoT-Based and Expandable :
Demonstrates practical use of IoT technology — can be expanded for smart classrooms or workplace access control.

Disadvantages :

Limited Scalability :
The system supports only a few hard-coded users — not suitable for large institutions.

No Real Database :
Data stored in Google Sheets; not secure or efficient for handling thousands of records.

Weak Security :
Uses client.setInsecure() (no SSL certificate verification), making it vulnerable to data breaches.

WiFi Dependency :
Requires a constant internet connection; if WiFi fails, attendance cannot be recorded.

No Offline Mode :
Cannot cache attendance locally when offline — data is lost if the connection breaks.

Slow Response :
Sending data to Google Script can cause delays (1–3 seconds per scan), unsuitable for heavy traffic.

Hardcoded Student Data :
Adding or updating students requires re-uploading code, which is inefficient for practical use.

No Admin Interface :
Lacks a dashboard or interface for managing, editing, or viewing attendance records conveniently.

Hardware Limitations :
ESP8266 has limited memory and processing power, restricting advanced features or analytics.

► **Source_Code of the project ....**
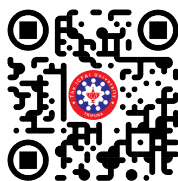
Link : https://github.com/Rohan7-sen/Cloud_Attendance_System.git