Digital Shuttle System

Presented by Team ShuttleTech Squad

Department of CSE, United International University

Course Title: Microprocessors and Microcontrollers Laboratory
Course Code: CSE 4326
Section: C

Course Faculty: Md. Jahidul Hoq Emon
Lecturer, Department of Computer Science and Engineering, United International University

Group Information

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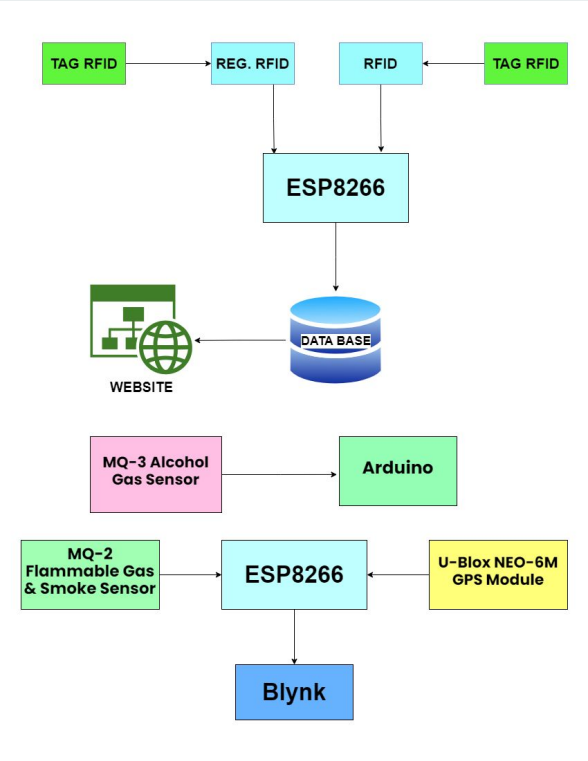
Introduction

The Digital Shuttle System addresses the challenges prevalent in traditional student transportation systems. The conventional systems suffer from inefficiencies, lack of transparency, and safety concerns, leading to delays, disarray, and potential risks. These shortcomings have prompted the need for an innovative solution that can revolutionize student transportation by integrating advanced technologies. The motivation behind this project stems from the pressing need to enhance the overall student transportation experience. Existing systems often lead to congestion, prolonged boarding times, and a lack of real-time passenger information. Moreover, safety hazards like alcohol presence, smoke, and gas in the shuttle environment pose risks to passengers. Thus, our project aims to create a seamless, efficient, and secure transportation ecosystem for students, improving accessibility, transparency, safety, and operational management.

Block Diagram



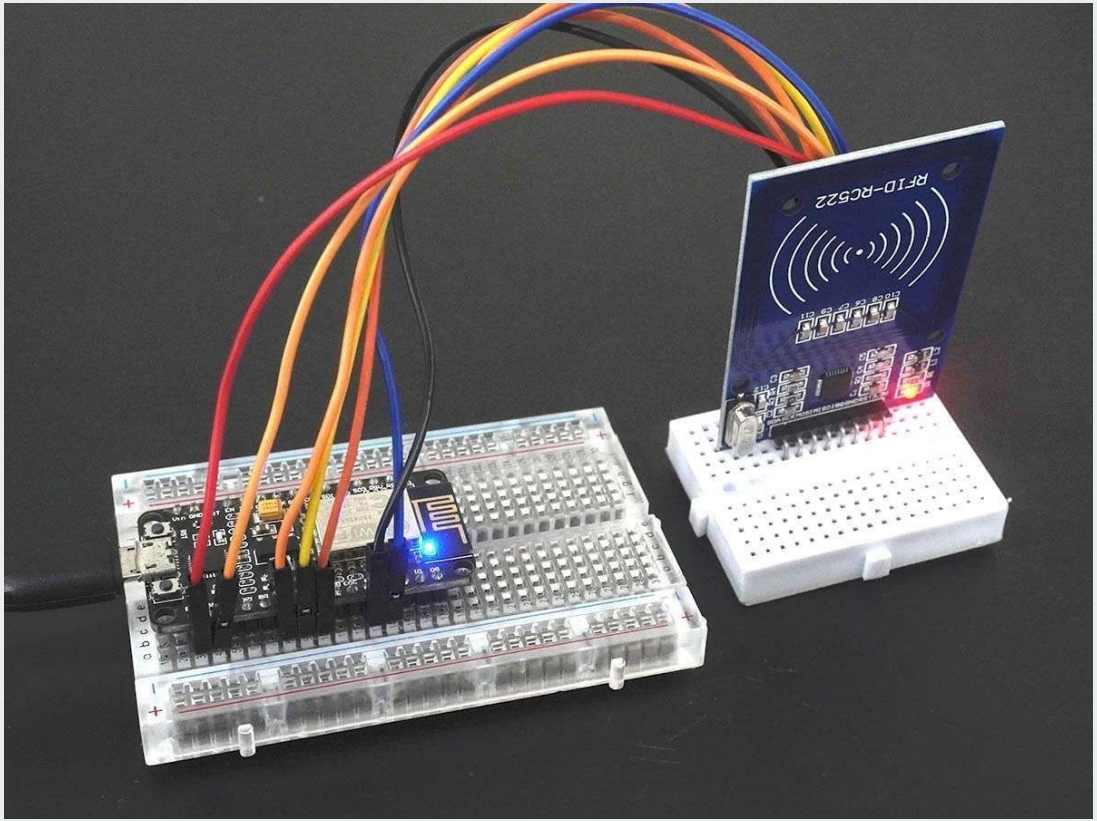
List of hardware components

- NodeMCU (ESP8266 WiFi Module).
- Arduino Microcontroller.
- RFID Readers.
- Alcohol, Smoke, and Gas Sensors.
- Servo Motors.
- Buzzers.
- Lights.
- GPS Module.
- Breadboards.
- Jumper Wires.

List of software environments

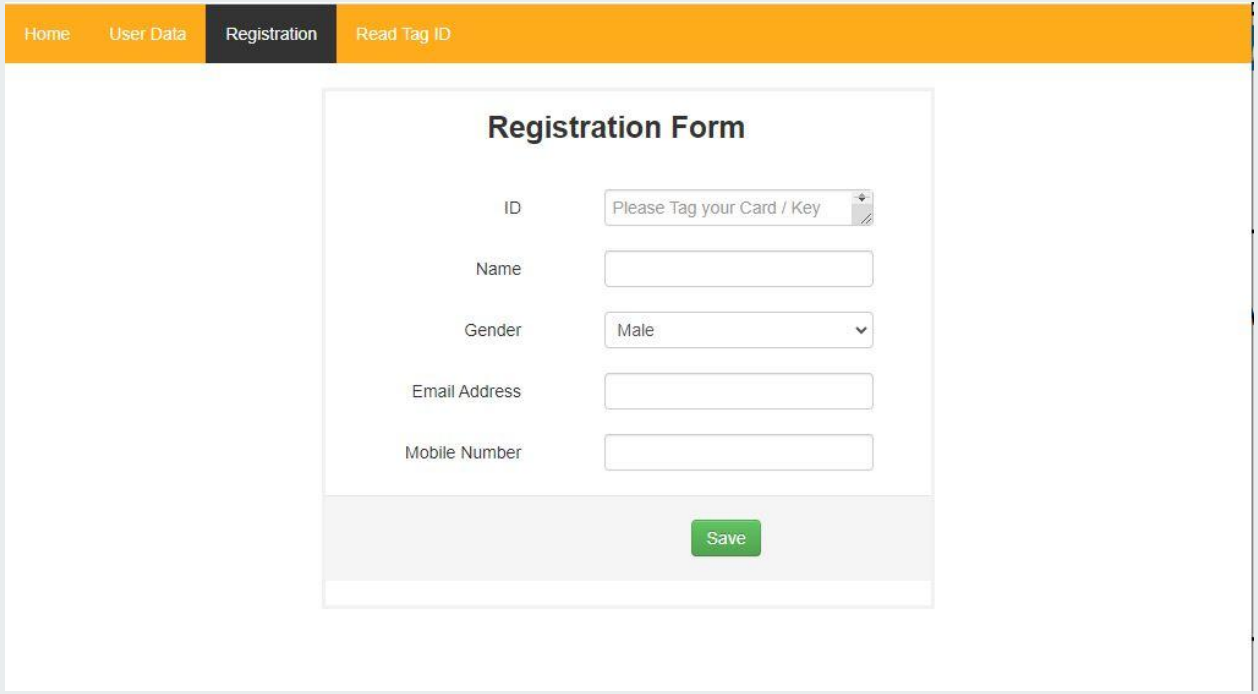
- Arduino IDE for Microcontroller Programming.
- Node.js for Web Server Setup.
- HTML/CSS/Bootstrap/JavaScript for Web Interface.
- RFID Library for RFID Reader Integration.
- GPS Libraries for Location Tracking.
- Sensor Libraries for Alcohol, Smoke, and Gas Detection.
- Blynk IoT Platform for Real-Time Data Exchange.
- MYSQL Relational Database.

Feature no. 01



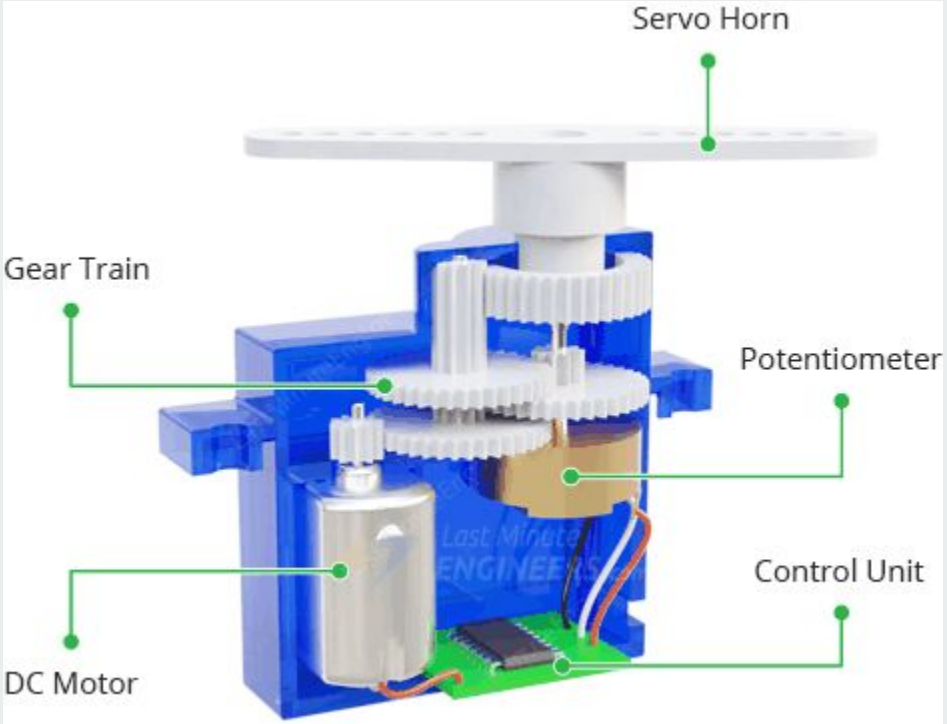
RFID RC522 Hardware Connection with NodeMCU

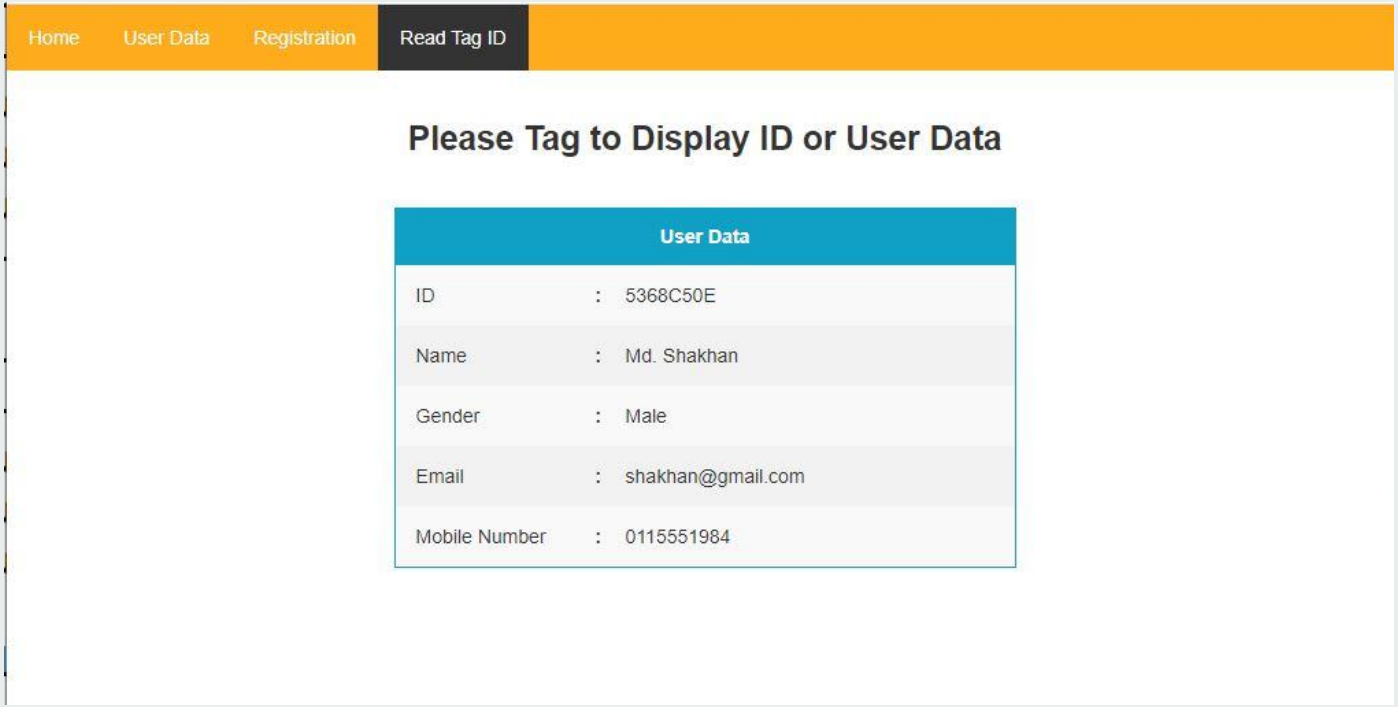
RFID Key Chain



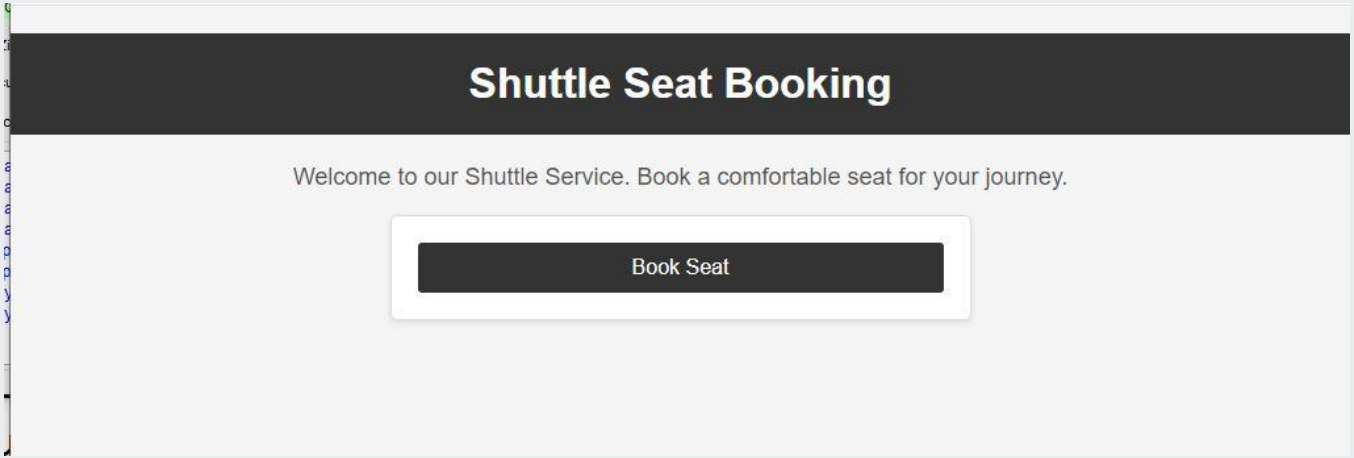
After registration, database table will be updated.

Servo Motor needs to open to door and close the door .

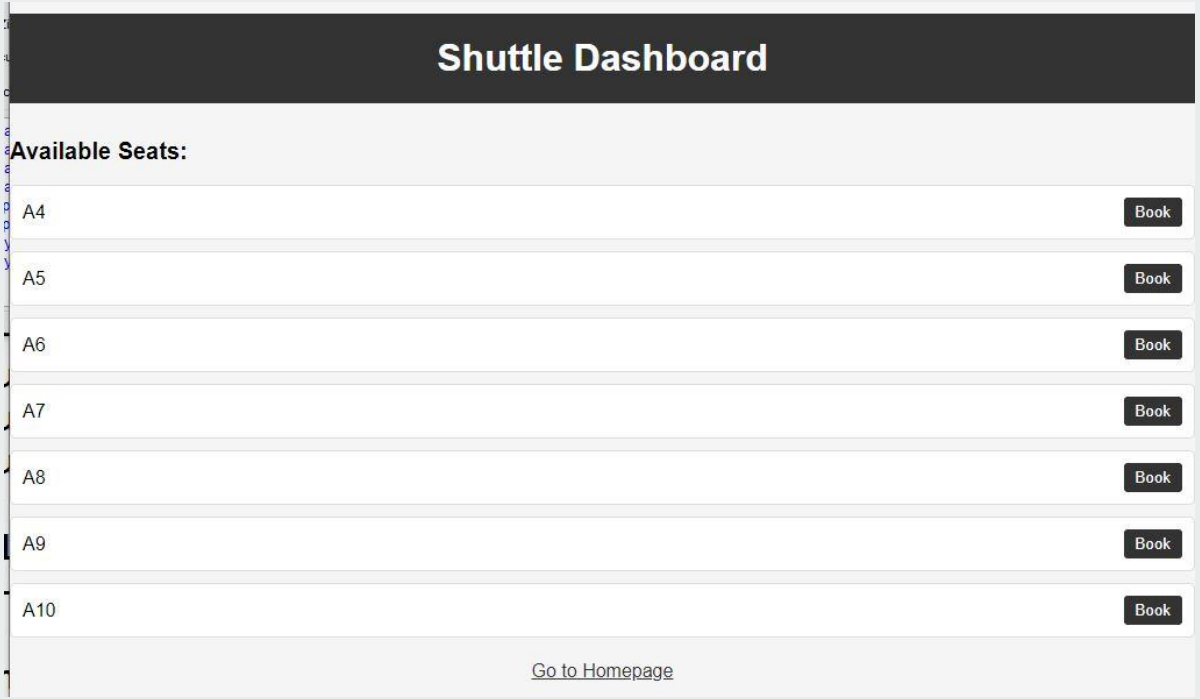



Home
User Data
Registration
Read Tag ID
Please Tag to Display ID or User Data
User Data
ID : 5368C50E
Name : Md. Shakhan
Gender : Male
Email : shakhan@gmail.com
Mobile Number : 0115551984

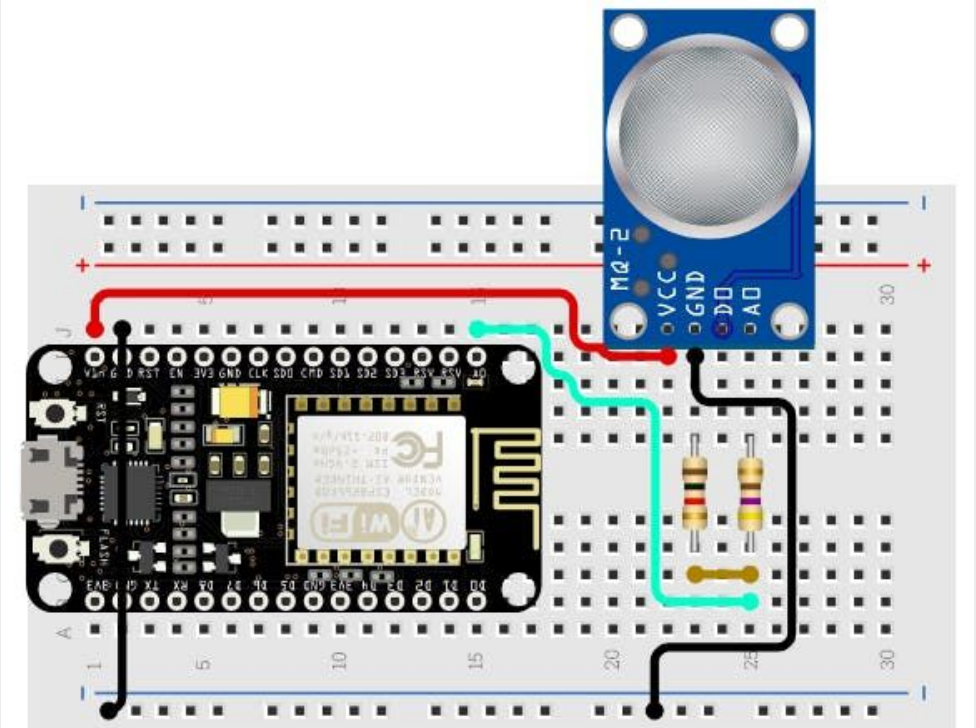
Seat booking homepage for student.



Used API/AJax to fetch data in JSON format and update the booked status in the website.

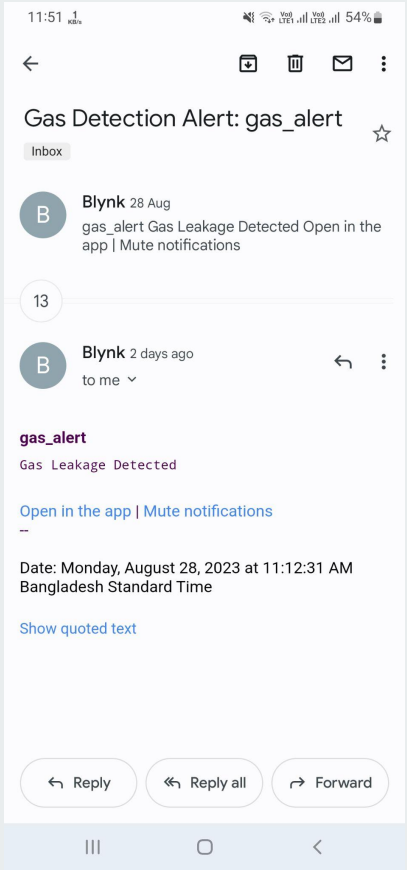


Feature no. 02

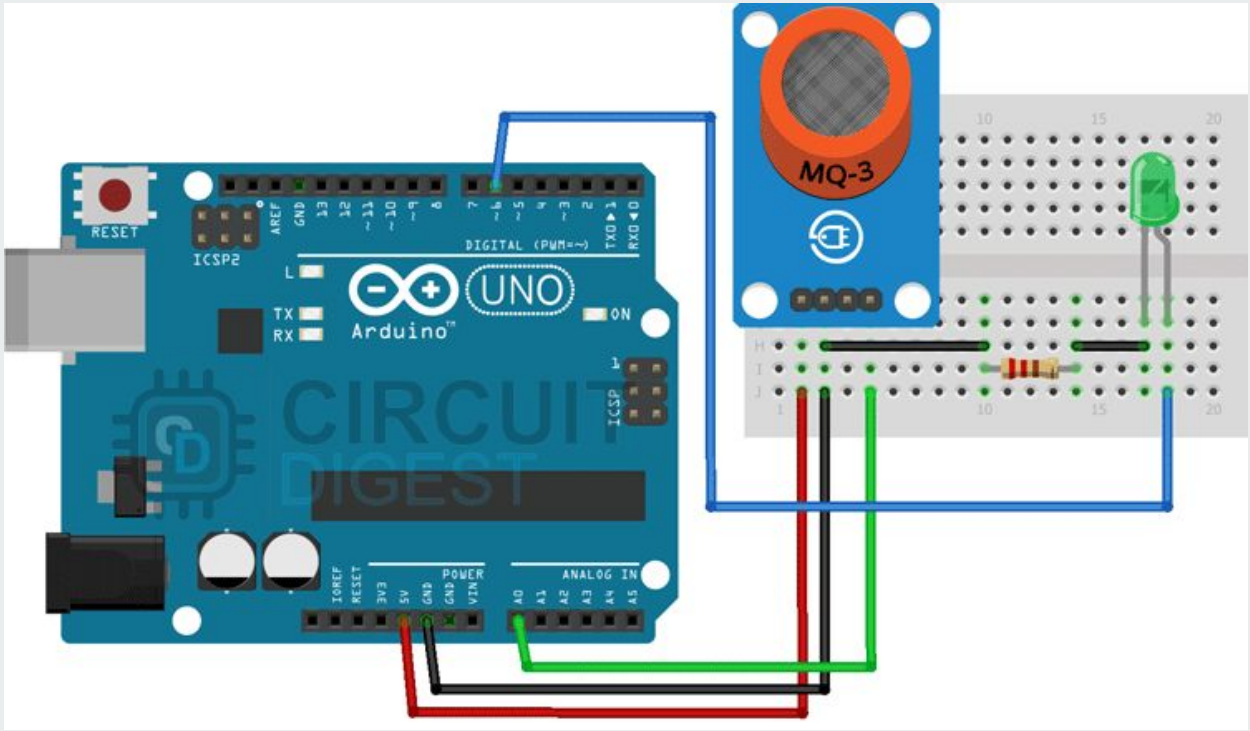


IoT Smoke & Gas Detector using ESP8266 & Blynk

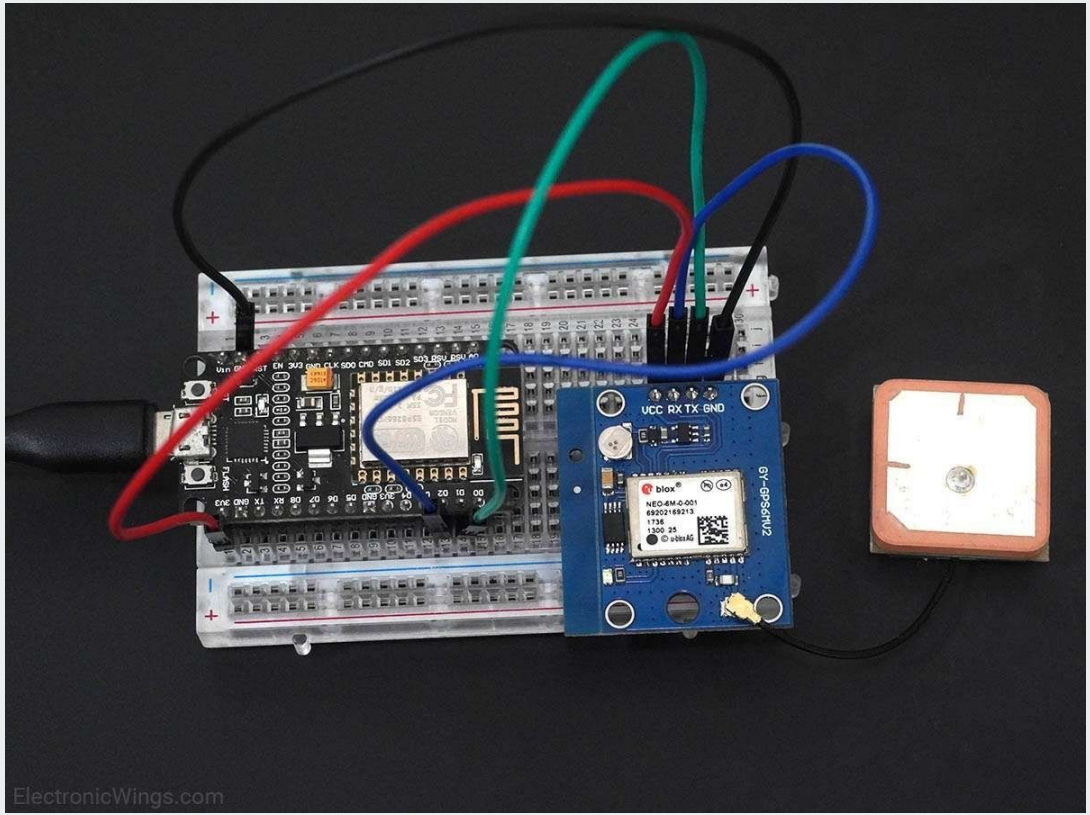
Alert notification is sending to the student mail.

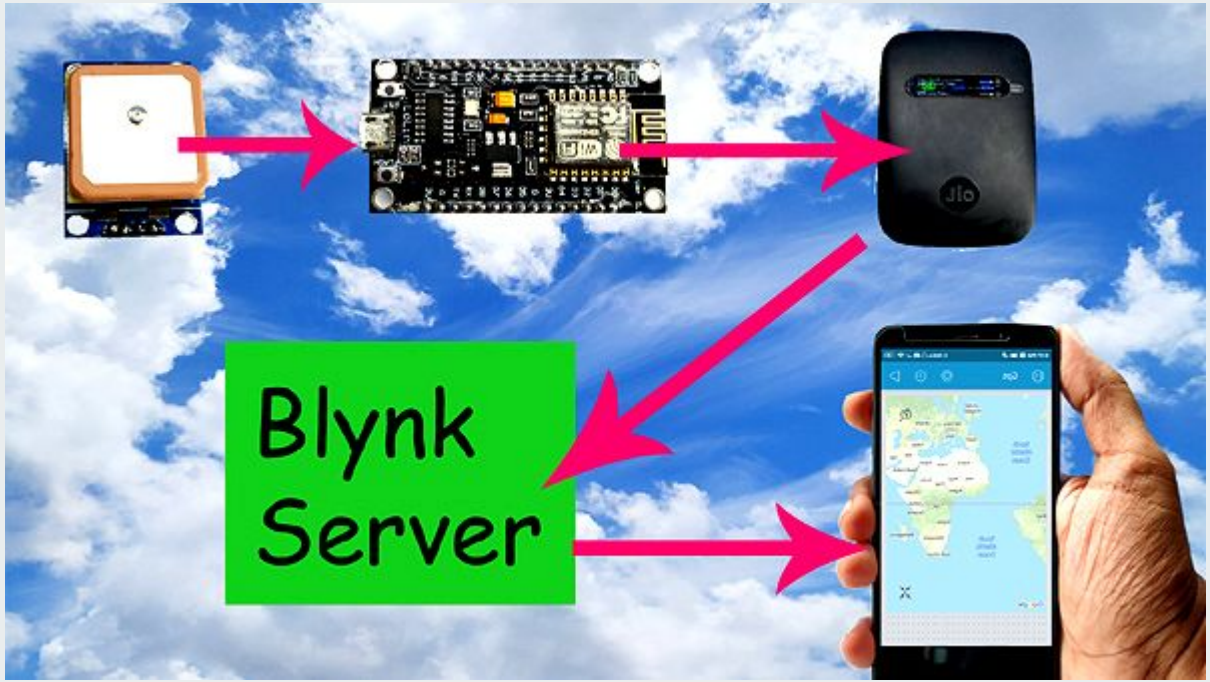


Feature no. 03

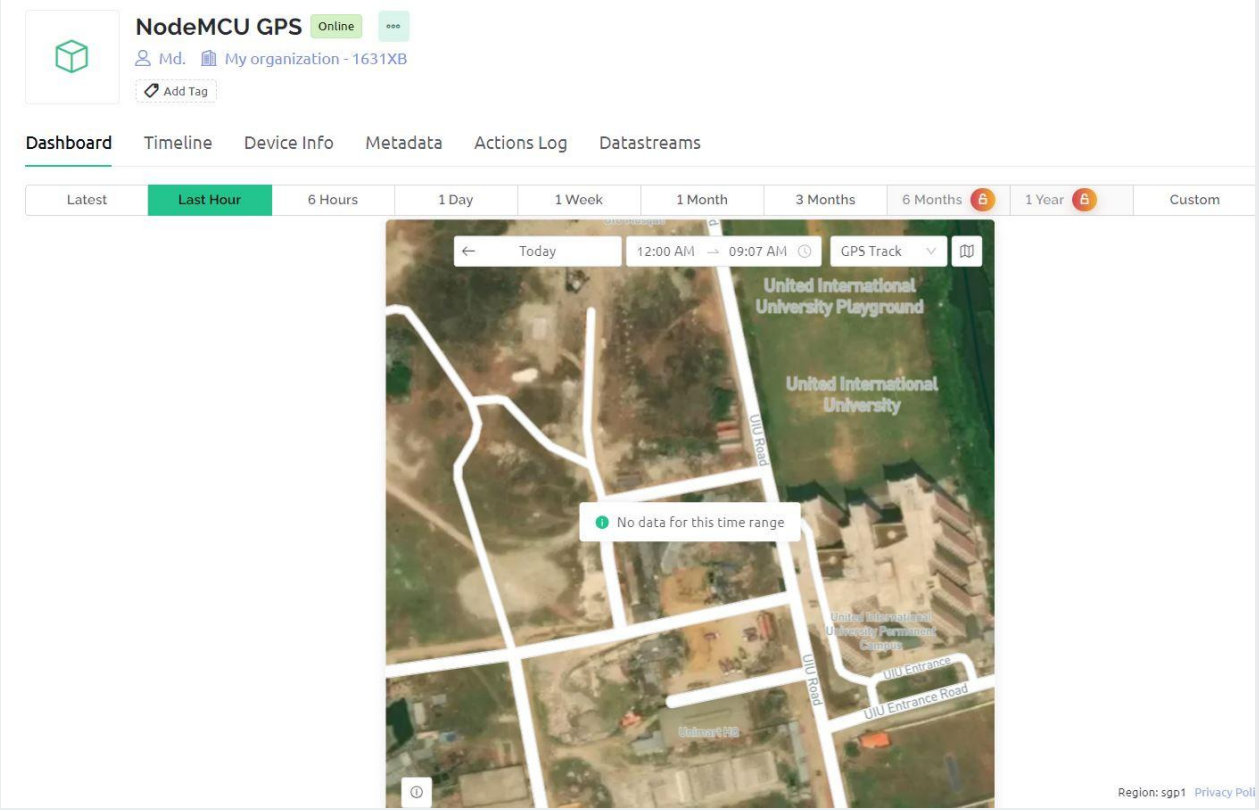


Feature no. 04

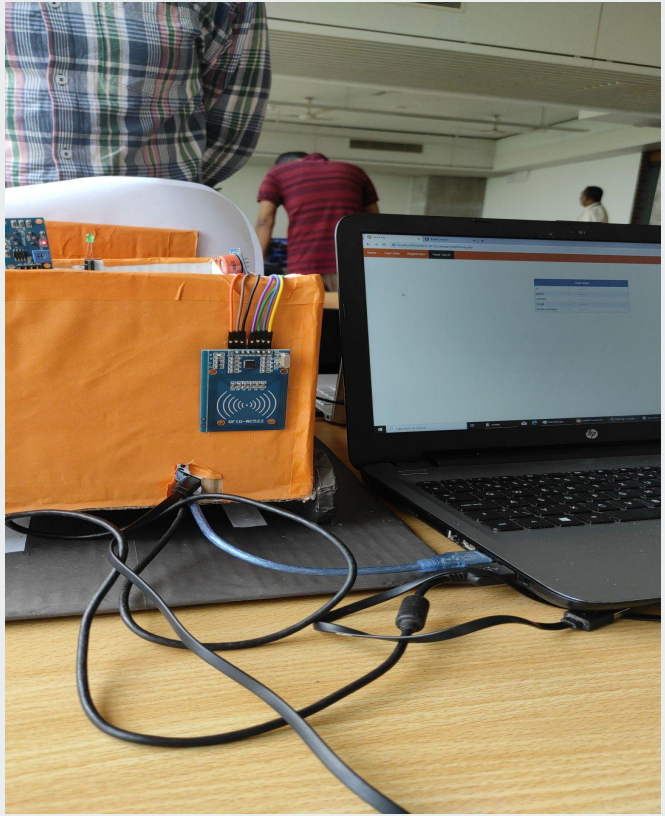


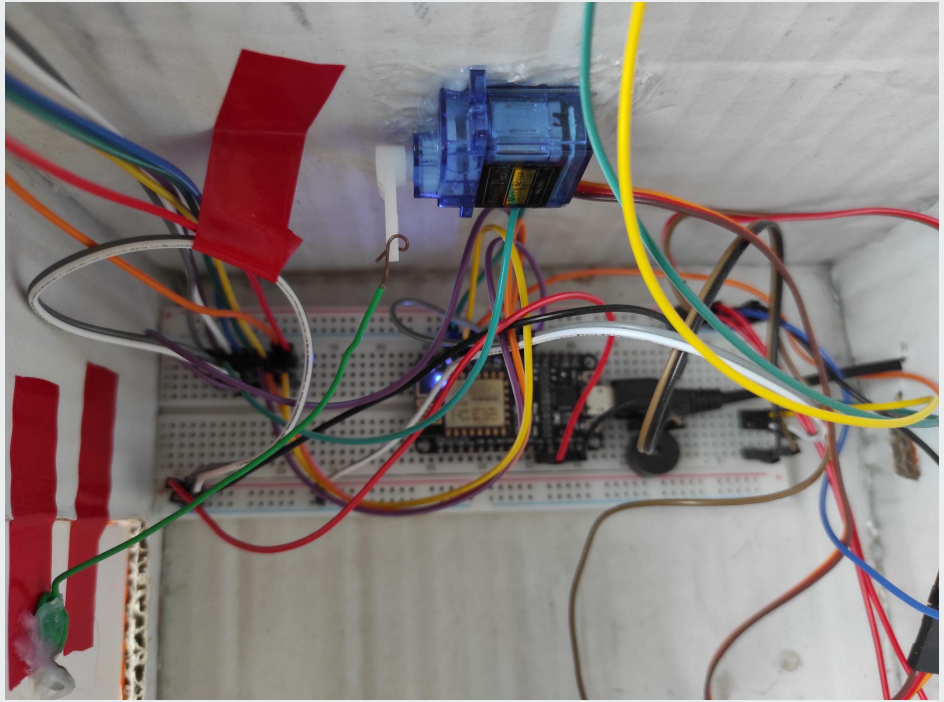

Blynk
Server

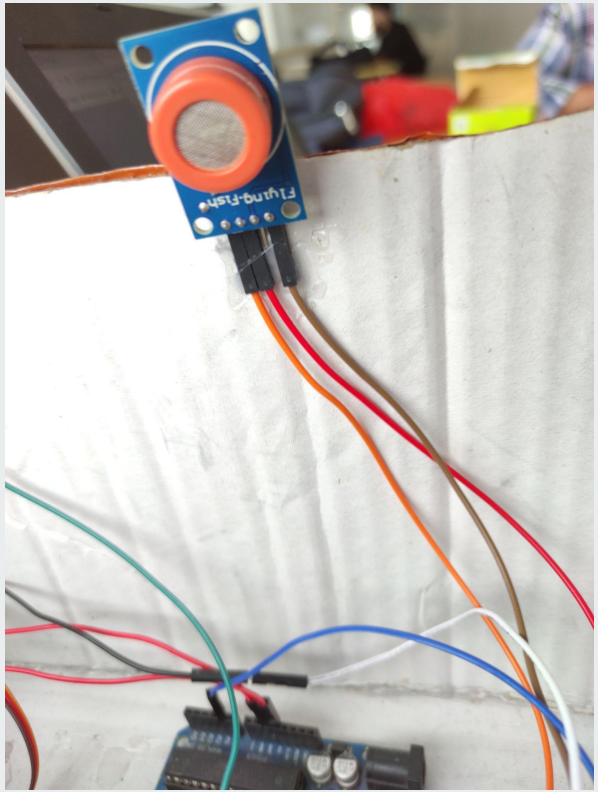
Should go to the outdoor as NodeMCU is not working at home or indoor.

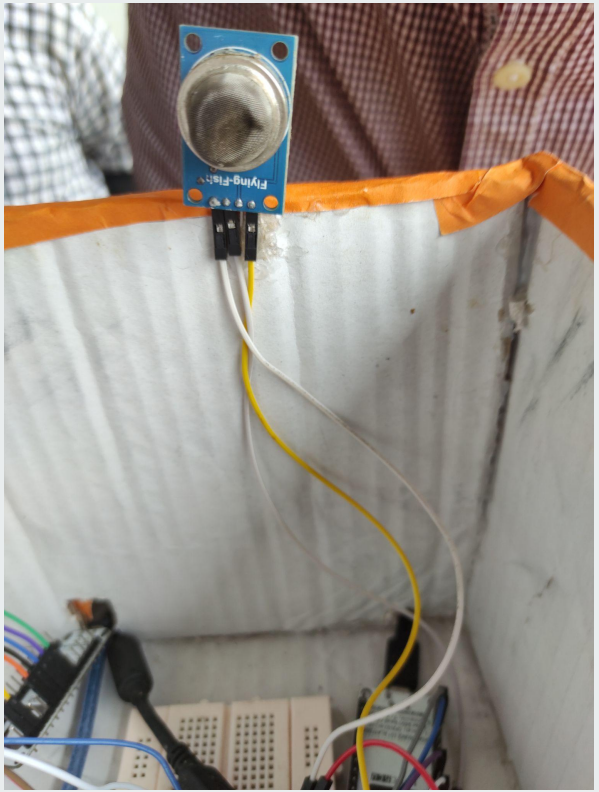


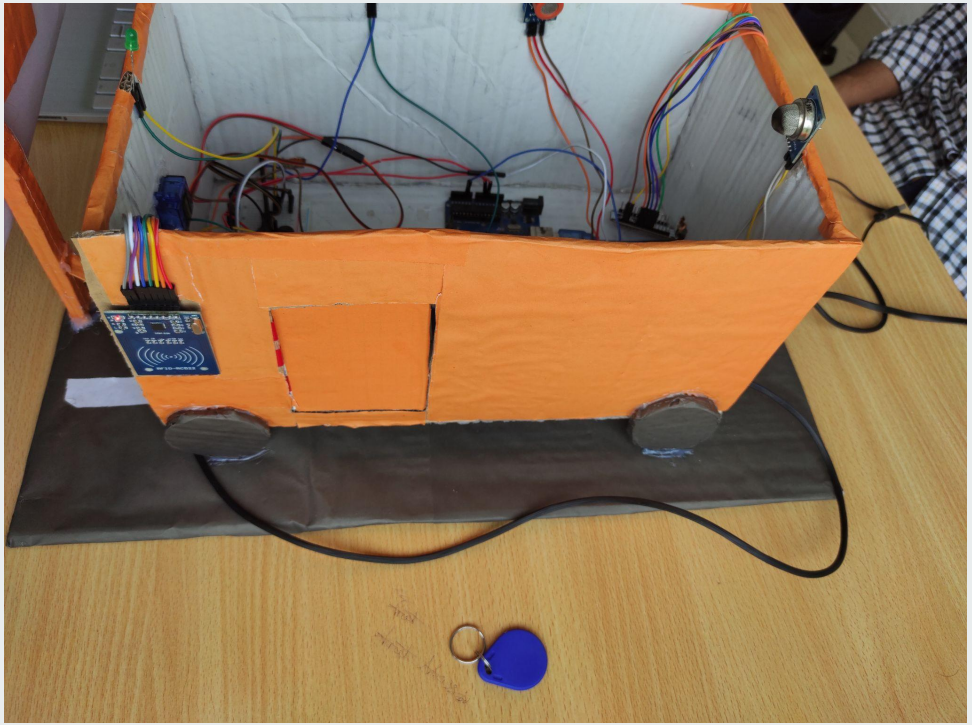
Project Show

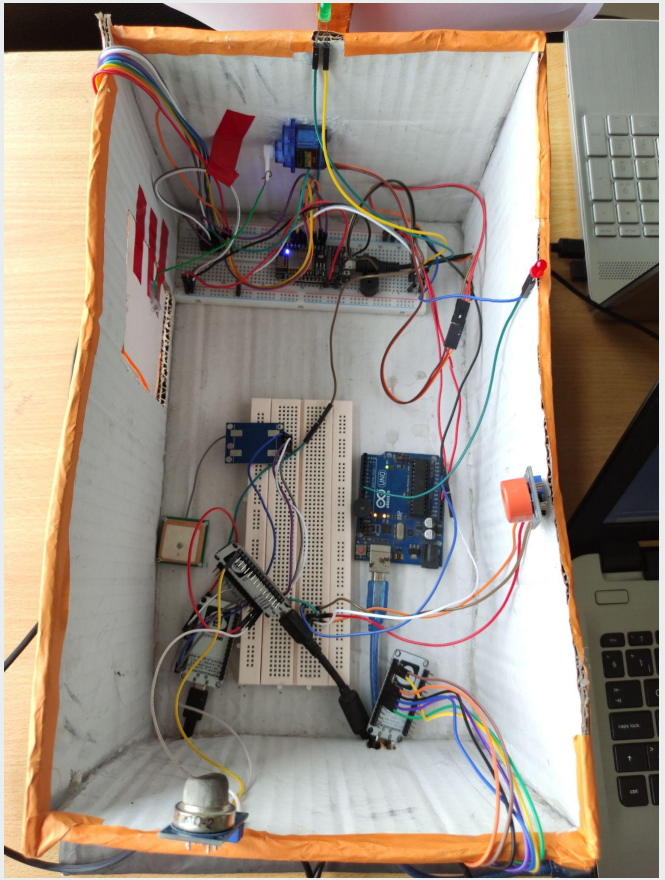





Flying-fish


Flying-fish





Result Analysis

1. The RFID-based registration system has significantly streamlined student entry processes. Data transmission to the server is efficient, ensuring accurate attendance records and minimizing entry delays.
2. During door opening, the web interface promptly displays real-time student information. This feature enhances transparency and accountability during boarding operations.
3. The seat booking mechanism provides an intuitive platform for students to visualize available seats and make reservations in real time. This feature optimizes seat allocation and enhances shuttle occupancy management.
4. Rapid responsiveness of the alcohol, smoke, and gas sensors is evident, promptly detecting hazardous conditions. Immediate alerts and safety measures are triggered, contributing to passenger safety and well-being.
5. The GPS module reliably tracks the shuttle's live location, empowering stakeholders with accurate real-time tracking for operational oversight and informed decision-making.

Conclusion

To sum it up, the Digital Shuttle System represents a big change in how students travel, bringing together things like RFID registration, showing updates in real-time, reserving seats, checking for safety, and finding the shuttle's location with GPS. Our work has already made things better by making processes smoother and sharing information more openly, and we see the potential for even more improvements, like predicting things ahead of time and connecting with the smart campus. This shows how student travel and safety can keep getting better over time.

Contributions

University ID	Full Name	Implementation
011201262	Azizul Islam Nayem	Alcohols Detection system, RFID 1st with nodemcu integration, Seat booking website. Extra:- Report(80%), Whole Slides. Project decoration(15%).
011201301	Md. Shakhan	RFID 1st and 2nd, nodemcu integration, motor, registration, Website integration 60% with Blynk use. Email sending alert. Extra: Report(20%), Video making, Project decoration(80%).
011191158	Md. Tahalil Azim	GPS System, Live location in Blynk. Website integration 20% Extra: Project decoration(5%).
011193058	A.Wahab	GPS System.Live location in Blynk. Website integration 20%
011183080	Md. Ajhar Uddin	Smoke and Gas Detection system show in Blynk with email concept.

Costs Estimation

Components	Costs
RFID with cards- 3	500/-
NodeMCU(ESP8266)- 4	1200/-
Servo Motor- 2	220/-
Blynk app	700/-
Breadboards- 2	220/-
Arduino UNO	600/-
Jumper Wires	200/-
Decoration Items	300/-
Travel Expenses	400/-

About 5000/-

THANK YOU