ABSTRACT

This project details the development and implementation of the SmartTrack Attendance system, an RFID-based solution designed to automate attendance management in educational settings. The system operates using a 13.56 MHz RFID frequency, leveraging an ESP8266 microcontroller and an NXP MFRC522 RFID reader module for efficient tag detection and data processing. A unique aspect of the design includes the use of soldered jumper wires on a breadboard prototype, housed in a compact enclosure, to achieve a polished and portable final product suitable for classroom deployment.

The system integrates real-time data transmission to a Firebase Realtime Database and Google Sheets for logging, with a Next.js frontend interface providing user-friendly session management and attendance visualization. Design optimization was performed through simulations in Proteus and Tinkercad, focusing on parameters such as detection accuracy and latency. The prototype achieved a 98% tag detection success rate and 97.5% attendance accuracy over 10-minute sessions, with minor deviations addressed through debugging efforts targeting Wi-Fi and code upload issues.

Testing was conducted on the breadboard setup under various conditions, confirming reliable performance with a latency of less than 1.5 seconds. The results validate the system's effectiveness, offering a cost-efficient alternative to manual attendance methods. This project presents a practical, scalable solution for educational institutions, with potential applications in workplaces and event management, enhancing administrative efficiency and accuracy in attendance tracking.

Saurav Kumar

Nikhil Mahamuni

Vedant Narawadkar

List of figures:

List of tables:

Contents