ABSTRACT

This project aims to design and implement a Smart Barrier Gate system equipped with a QR Code scanning mechanism for visitor access control. The system operates the gate automatically by verifying the authenticity of the QR Code data provided to each visitor. Once a valid QR Code is scanned, the microcontroller on the Smart Barrier Gate module processes the data and triggers the gate to open, making the entry process safer and more efficient.

In its design, the system is developed using EasyEDA and the Raspberry Pi Pico YD-RP2040 microcontroller as the central data processing unit, which receives input from the QR Code scanner for verification. Upon successful verification, a signal is sent through a relay to activate the actuator that automatically lifts the barrier arm of the Smart Barrier Gate.

Testing results show that the system can process and verify QR Codes with an average response time of 0.35 seconds per transaction, achieving a reading success rate of 97% from 500 trials based on the hardware dataset, while maintaining stable communication during operation. The system fully utilizes the internet network provided by Dusun Bambu, meaning PT. Adhivasindo is not involved in network provisioning. This implementation results in an automated Smart Barrier Gate capable of fast, accurate, and reliable access verification under various operational conditions.

Keywords: *Smart Barrier Gate, QR Code, Raspberry Pi Pico, Automated Access Control, Visitor Data Validation, Queue Management System*