ABSTRACT

The advancement of robotics technology offers opportunities to improve service efficiency and quality, one of which is through food delivery robots equipped with automatic door capabilities. This system is designed to address issues of hygiene, efficiency, and accuracy in the food delivery process. This study aims to develop an automatic door control and monitoring system based on the Internet of Things (IoT) to improve the efficiency of automatic door operations.

This research focuses on designing and implementing an automatic door system using PID control with a rotary encoder as a position feedback sensor. A limit switch is used as an additional safety feature to ensure the door stops precisely at the end limit and prevents mechanical damage. Furthermore, the system is equipped with two-way communication between control modules and integrated with IoT technology, allowing the door status to be monitored and controlled remotely.

Test results show that the optimal combination of PID control parameters produces precise door movements. The system has also proven to be stable and responsive, thus supporting the food delivery process in a safe and efficient manner while maintaining the food's hygienic quality. With the integration of the automatic door and IoT, the food delivery robot becomes more innovative and provides additional convenience and comfort for users.

Keywords: IoT, PID control, automatic door, rotary encoder, food delivery robot.