Smart snack vending machine

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Introduction

This project presents a smart vending machine system designed using embedded technology. It uses an IR sensor to detect coin insertion, a 7-segment display to show balance, and buttons for item selection. Dispensing is controlled by a motor, and item retrieval is confirmed using an ultrasonic sensor. A temperature sensor continuously monitors the environment and controls a fan as needed. The system provides user feedback through buzzers and operates in a fully automated loop, demonstrating efficient and reliable vending logic.
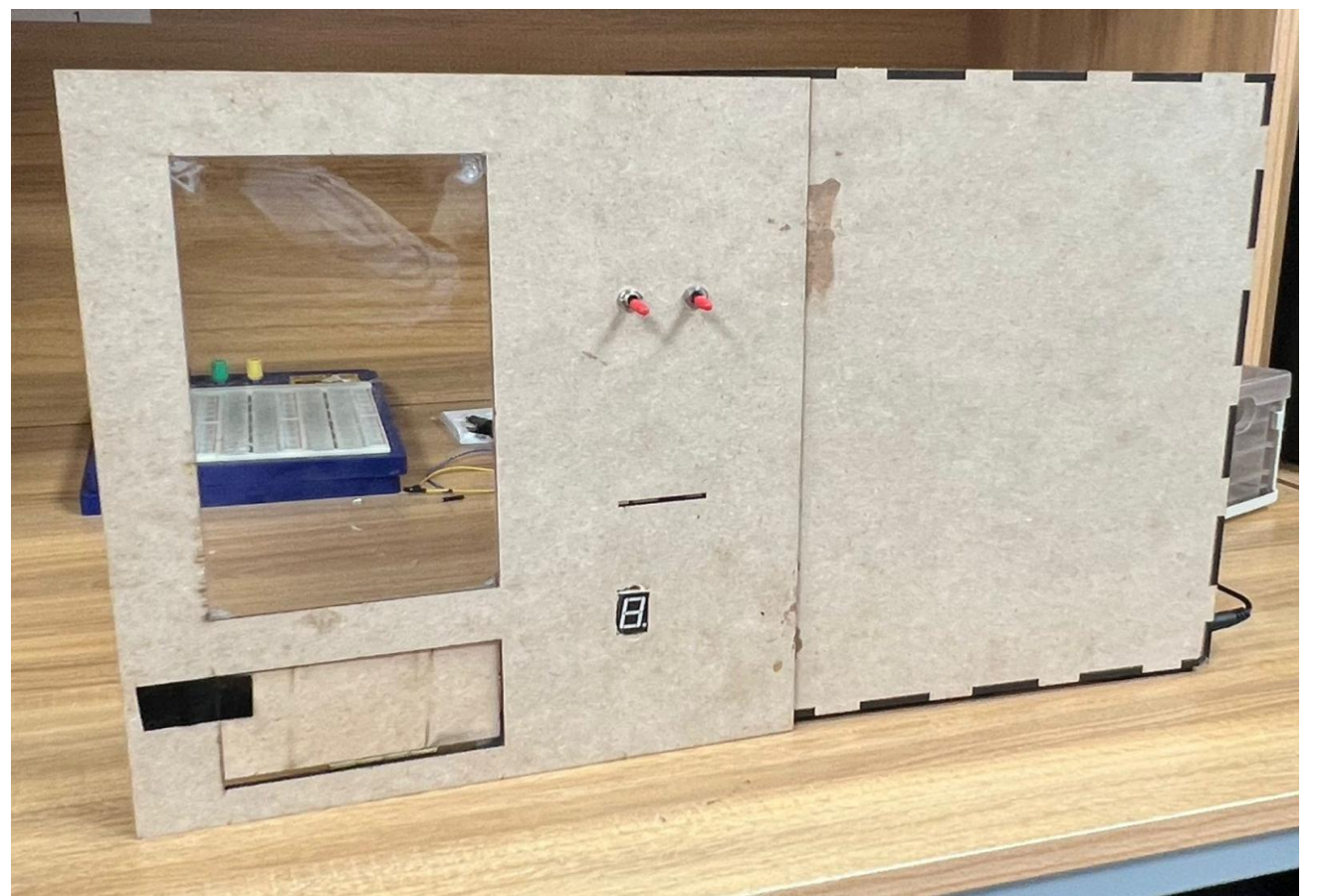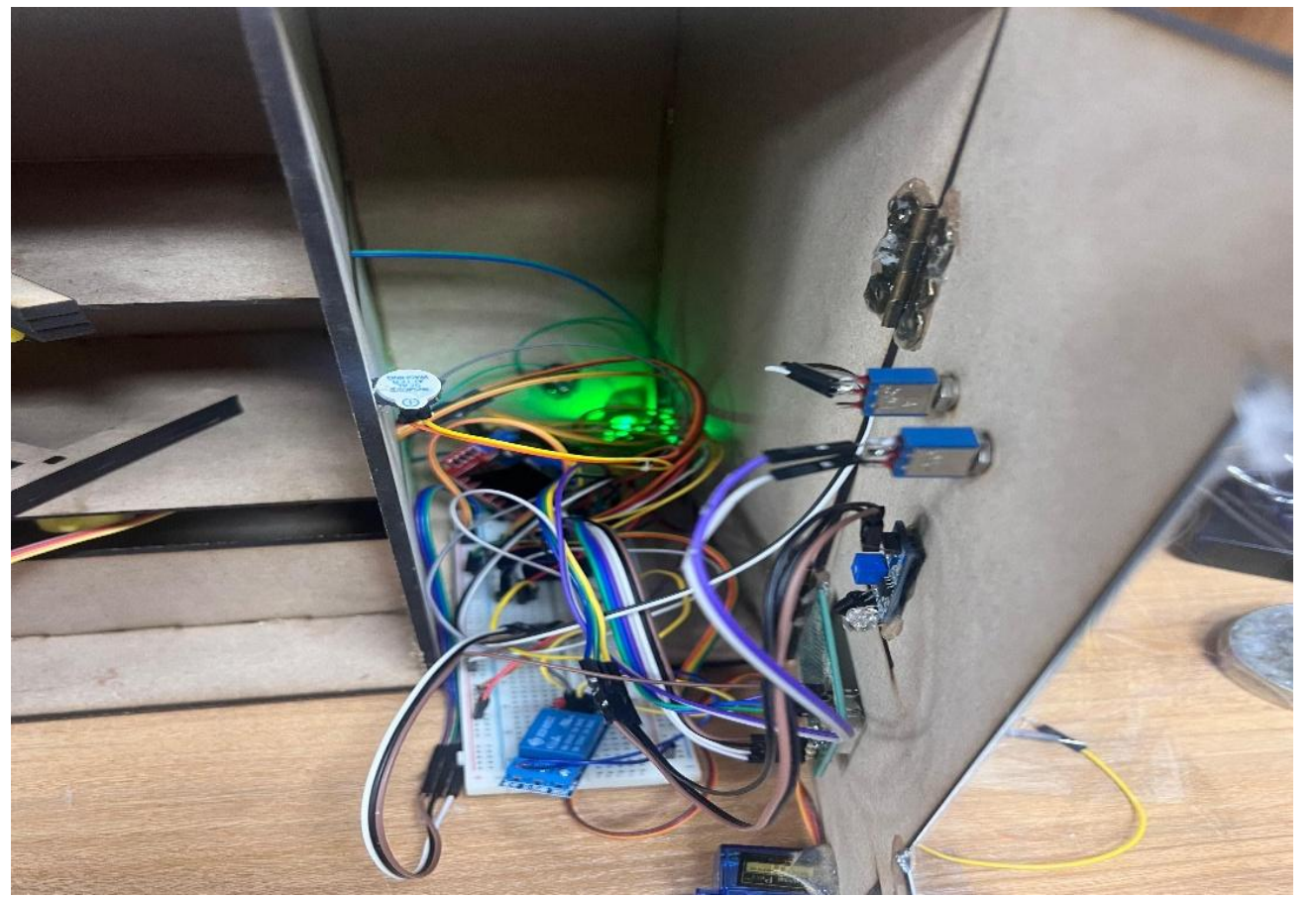
Design

The vending machine uses a PIC16F877A microcontroller to manage coin input via an IR sensor, snack selection through buttons, and dispensing with motors. An ultrasonic sensor confirms retrieval, and a temperature sensor controls a fan for cooling.
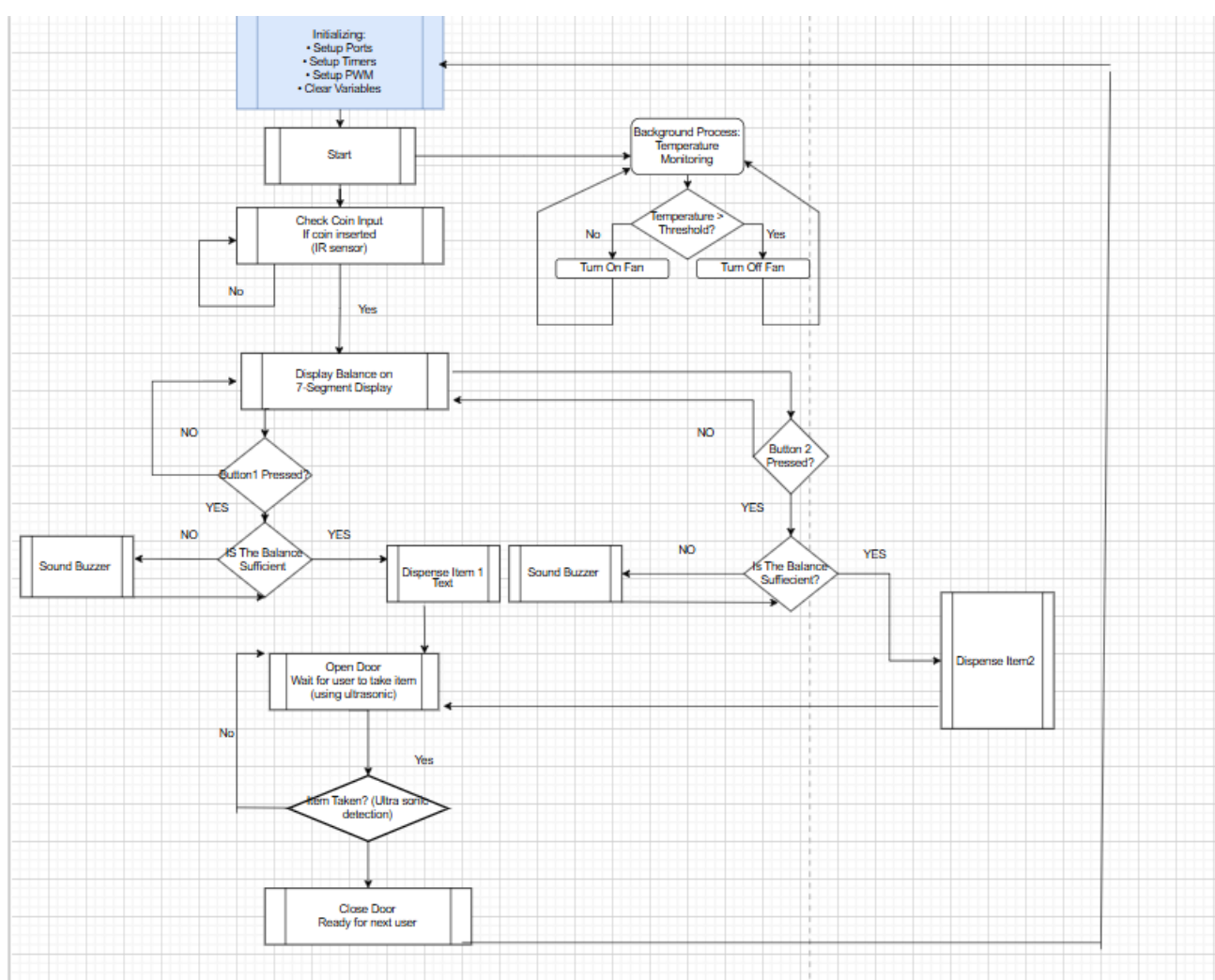
Results

The smart vending machine prototype functioned as intended during testing. The IR sensor detected coin input, balance was displayed, and item selection triggered accurate motor-controlled dispensing. The ultrasonic sensor confirmed item retrieval, and the servo motor managed door operation accordingly. The temperature sensor reliably activated the fan when needed, maintaining optimal internal conditions.

Overall, the system performed smoothly, confirming the success of the embedded design.

Conclusion

The smart vending machine successfully demonstrates how embedded systems can automate snack dispensing in a user-friendly and efficient manner. By integrating IR and ultrasonic sensors, motor control, and environmental monitoring, the system ensures accurate operation, reliable item delivery, and responsive performance. This project highlights the potential of embedded technology to improve convenience and functionality in everyday applications.