



Trash Picking Robot

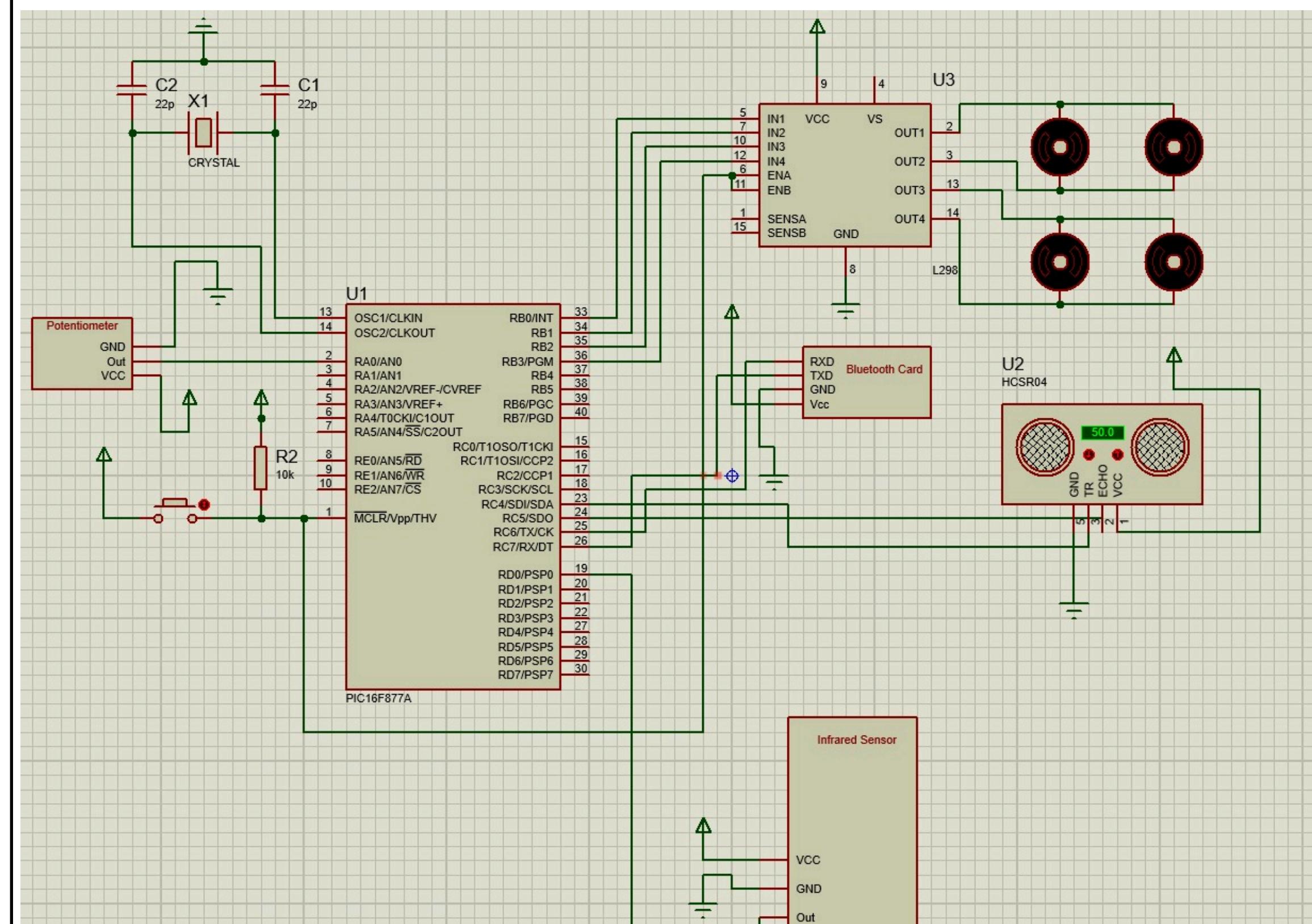
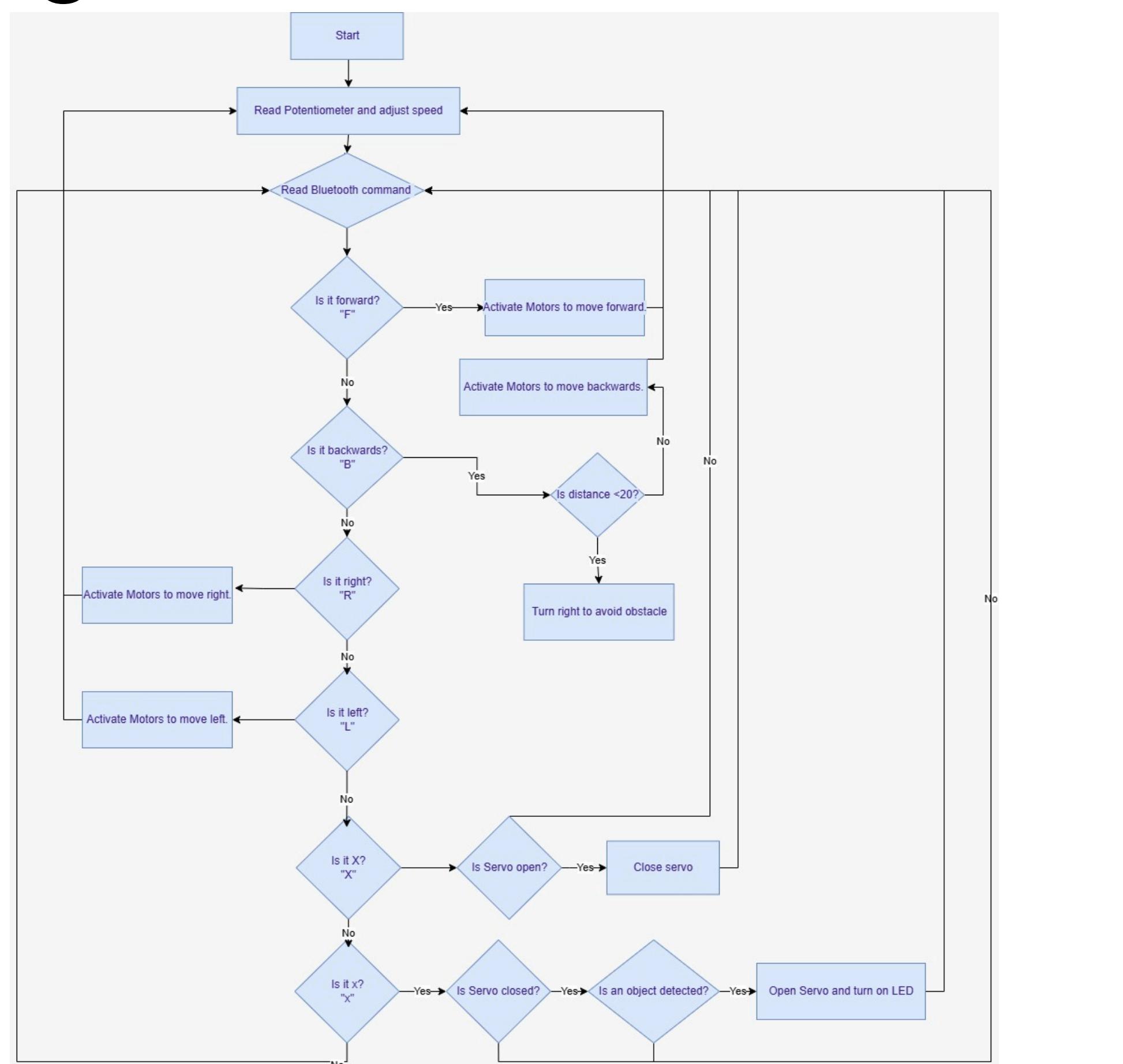
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Introduction

Waste management is an important issue that affects our daily lives, especially in crowded urban areas. This project focuses on building a trash-picking robot that can help address this problem by automating the process of detecting, collecting, and moving waste. The robot uses sensors like an IR sensor to detect objects and an ultrasonic sensor to avoid obstacles. It also includes a servo motor to pick up and release objects, while Bluetooth communication allows it to be controlled remotely.

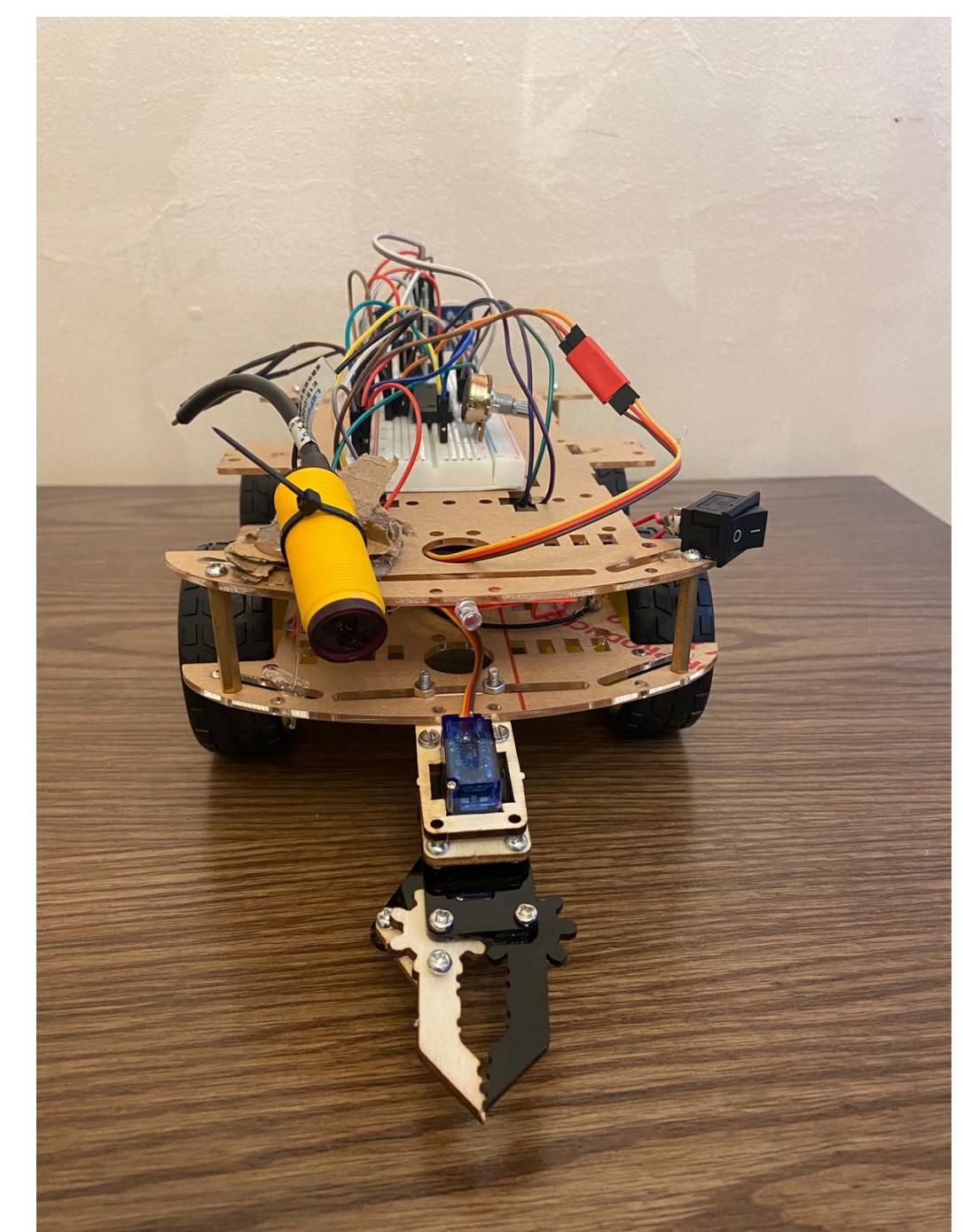
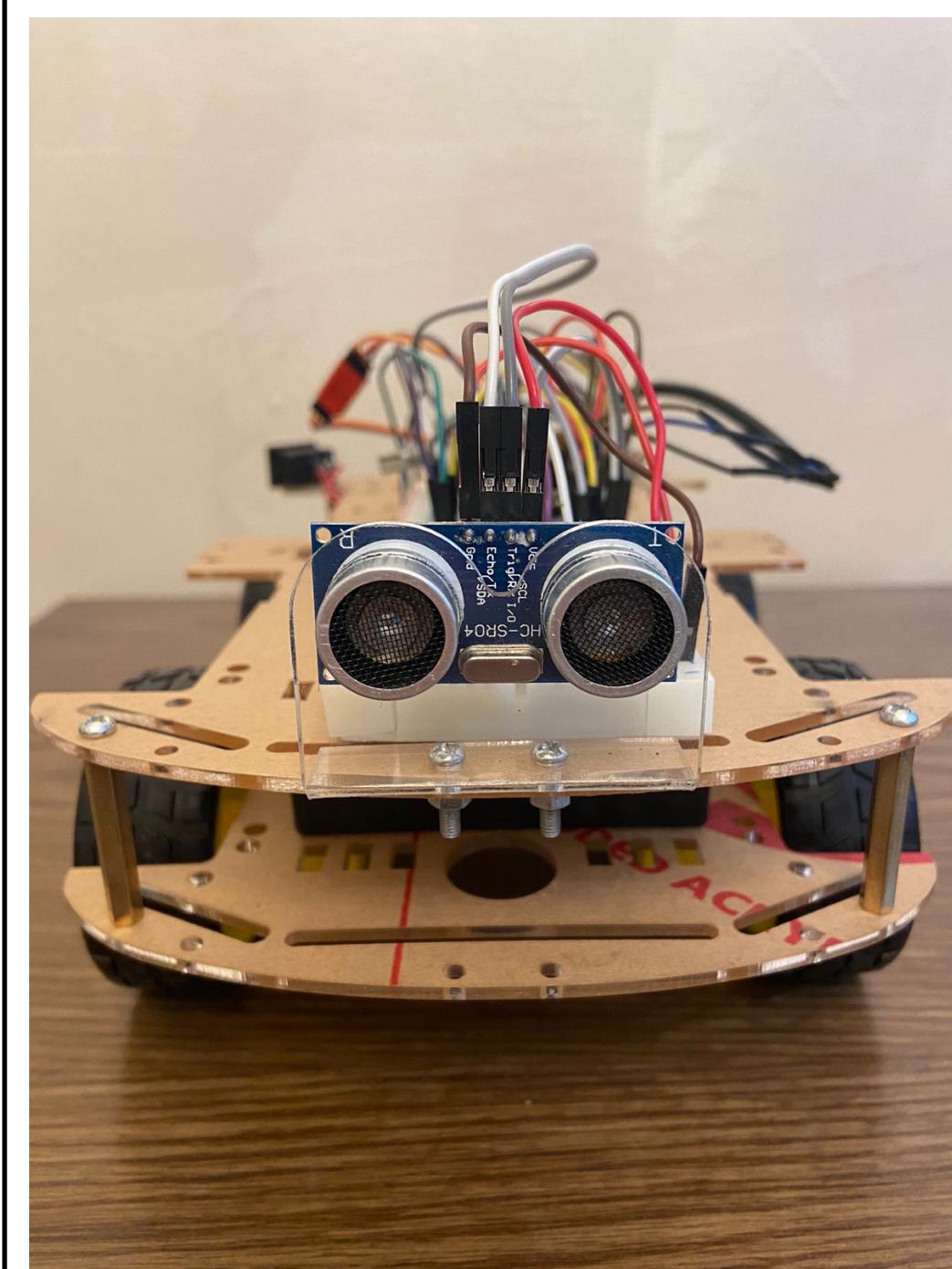
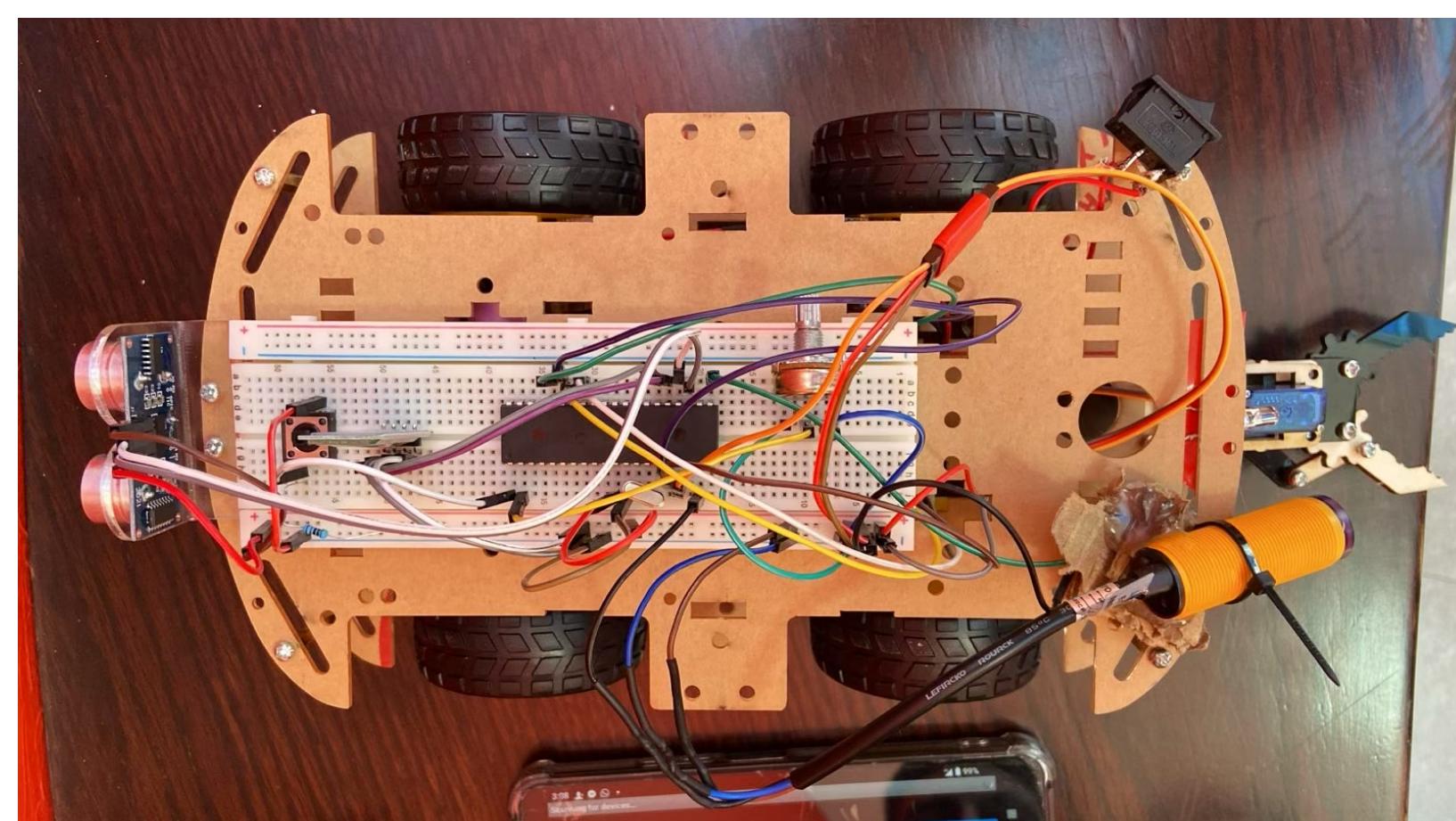
The robot is designed to operate efficiently, with features like motor speed adjustment through a potentiometer and interrupt-based tasks for precise control. The goal of this project is to create a working prototype that demonstrates how simple embedded systems can be used to tackle practical problems like waste collection. This robot not only fulfills the requirements for an embedded systems project but also shows how technology can contribute to keeping our environment cleaner.

Design



Results

In this project, we designed this robot that meets all of the requirements using three sensors, the potentiometer, the ultrasonic sensor and the IR sensor. We also used a clip that picks up the trash that is connected to a servo motor, an H bridge for the wheels, the 16F877A microcontroller and a push button. All of the components that were used are shown in the 3 pictures below. We designed this robot in a way that it can be easy to fix if something was damaged.



Conclusion

This project which is controlled by PIC16F877A microcontroller is going to produce a trash picking robot that is controlled manually by bluetooth that the user controls. This project achieves key objectives successfully such as not only does it meet all requirements and budget constraints, it also successfully leverages embedded systems to address waste management challenges efficiently. The robot is capable of detecting objects using an IR sensor, measuring distances with an ultrasonic sensor, and adjusting motor speed via a potentiometer. It can pick up and release objects with a servo motor controlled by Bluetooth commands and navigate its environment while avoiding obstacles. By integrating interrupt-based tasks and PWM control, the project achieves precise timing and efficient operation. The implementation meets the key design expectations and provides a practical application in waste management. This robot has the potential to be further developed into an autonomous system with advanced features for real-world scenarios, making it a step toward automated solutions for cleaner and more sustainable environments.