Mini Robot Rover poster

David Asare, Darrel Asare, Deepak Singh and Collaborator: Samuel Martey

Department of Applied Tech, Humber College North Campus

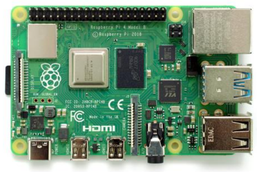
INTRODUCTION

Our project is called the Mini Robot Rover, where we will use a Mobile Application to control an RC car.

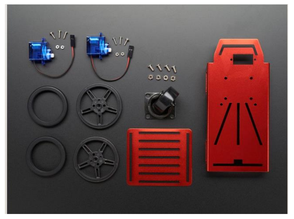
We created this project using the Raspberry Pi 4, Speed Sensor, Distance Sensor, Motors and Motor Driver Chip.

We also Created a Custom PCB Board where we can make all of our connections to our sensors.

RASPBERRY PI 4



The RPI4 is like the engine of the Mini Robot Rover, and powers up the car along with the PCB board.



Car parts we used to build the Mini Robot Rover.

AIM

Purchases

Mini Robot Rover Chassis Kit - 2WD with DC Motors ($24.95).

Raspberry Pi 4 Computer Model B 4GB v1.2 ($89).

HC-SR04 Ultrasonic Distance Sensor Pack ($11.99).

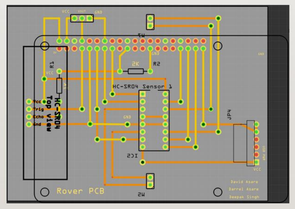
HC-89 Photoelectric IR Beam Speed Sensor ($20).

USB Portable Charger Power Bank ($16.99).

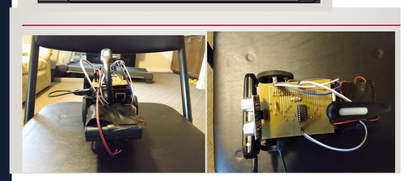
METHOD

This is the PCB design we made using the Fritzing software. Its connected with all the sensors which are the Speed Sensor, Distance Sensor, and the L293d Motor Driver Chip.

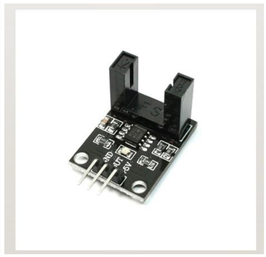
PCB DESIGN



This is the PCB design using the fritzing app.

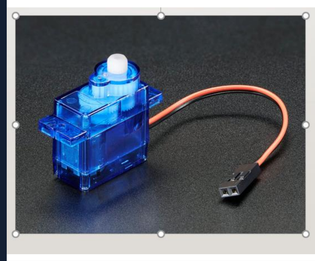


This is our printed PCB board attached to the control car.



This Speed Sensor is used to measure the rotation speed of the motor spinning the wheel. When it measures the rpm, it is displayed on the Mobile Application.

Distance Sensor is used to measure the distance of objects in centimeters. It can detect objects from 200cm away.



Motors used to spin the wheels of the Mini Robot Rover. Can be powered up with 4 to 6 volts.

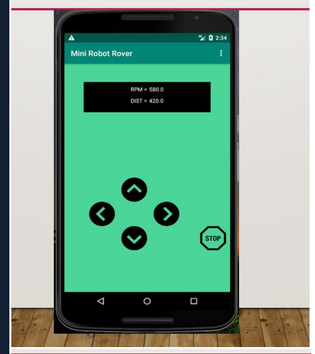
RESULTS

The results display the distance and the RPM at the top of the phone screen.

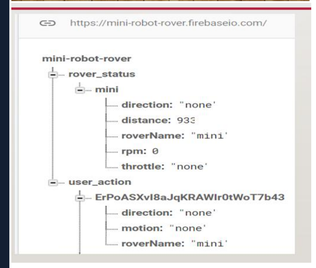
Mobile App to control the movement of the RC car. The screenshots bellow also display how the firebase reacts to the control buttons being pushed.

We were able to connect the Raspberry Pi to the power bank, giving it power to physically control the car from the phone using Pyrebase and Firebase.

MOBILE APPLICATION



A screen shot of our mobile app.



This is the Firebase Database connection to the Mobile Application where it shows the user action for the buttons we click on the app

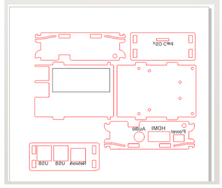
POWER BANK

USB Power Bank used to power up the RPI4, so the car has power to move. It can optionally be used to give power to the Motor Driver chip.

PRINTING

We used the Corel Draw app to design this enclosure. The enclosure was printed by using the laser cut machine in the prototype room, cutting from an Acrylic board.

ENCLOSURE



Enclosure case is made with the right dimensions to cover the Raspberry Pi and the PCB Board.

CONCLUSIONS

This project is to simulate our modern technology vehicles we have today. Vehicles now have sensors that can signal the car to stop moving, when it has reached a certain distance getting to close to an object. The Mini Robot Rover will be similar to what the modern technology implements.

ACKNOWLEDGEMENTS

We thank our collaborator Samuel Martey Jr. who is currently Principle Engineer at the Point Click for giving us feedback on the project.

Special thanks to Austin Tian who was our professor in the previous semester, and to Kristian Medri who was our teacher this semester. We also thank the Humber North prototype lab for giving us access to the materials.