

Basic Electronics Lab Project 2021

Project Report

Wirelessly controlled car using ultrasonic sensors and Bluetooth modules

Team Members:

- IMT2020523 Kedar Deshpande
- IMT2020512 Aakash Khot
- IMT2020534 B. Sathiya Naraayanan
- IMT2020544 Pranav Vajreshwari
- IMT2020533 Dheeraj Sairam
- IMT2020524 Anant Pandey

As proposed in the project proposal, our car has all the functions of speed variation, left turn, right turn, and object avoidance. This car is controlled wirelessly by object/hand detection using ultrasonic sensors. The distance of the object/hand will determine the behaviour of the car. We have used HC05 Bluetooth modules for wireless communication between the control side and the car.

- **Speed Variation:**

As we go closer to the central ultrasonic sensor the speed of the car increases and as we go far, it decreases. If we go very far from the sensor(>20cm), the car stops.

- **Left turn:**

If we keep our hand/object near to the left sensor($\leq 3\text{cm}$), the car will imitate a left turn by switching off the left motors (and keeping right side on).

- **Right turn:**

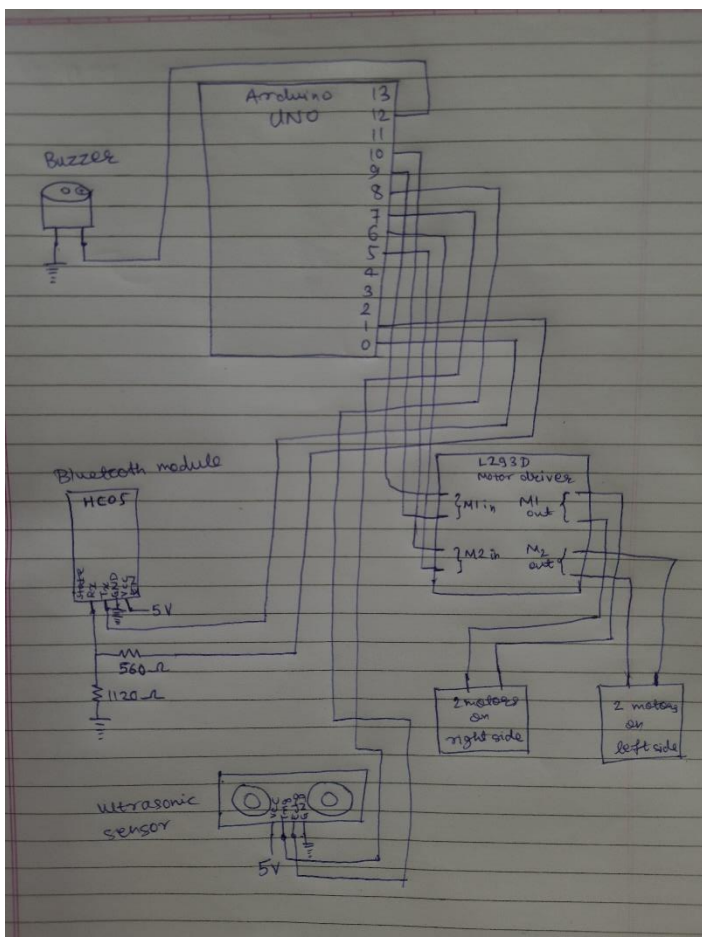
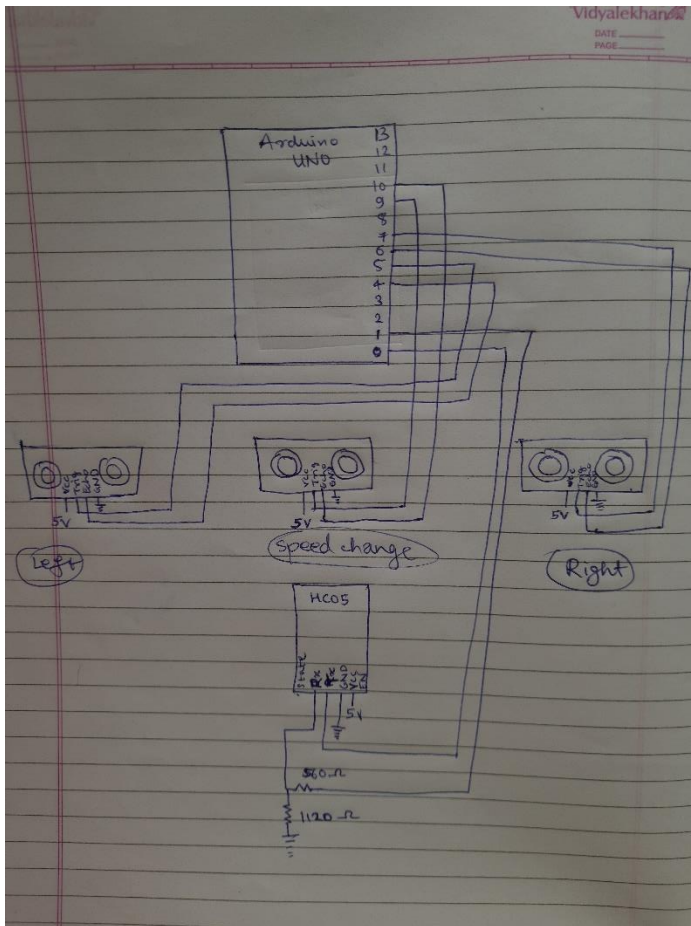
If we keep our hand/object near to the right sensor($\leq 3\text{cm}$), the car will imitate a right turn by switching off the right motors (and keeping left side on).

- **Object Avoidance:**

If the sensor on the car detects any object in front of it($< 10\text{cm}$) then the car stops. It won't turn on even if it is signalled from the control side.

Link to the demo video on YouTube: <https://www.youtube.com/watch?v=uMkLorhJaoc>

Circuit Diagrams:



What is not working?

The car shows all of the above-mentioned functions when it takes power from laptop and is hold in air. The reason it does not work on ground is due to friction and less power transmitted to motors. The reason why the car does not work properly when powered by an external battery is the high-power usage of both Arduino uno and HC05 Bluetooth module.

As we have to hold the car for the demo, we cannot demonstrate both running and object avoidance at the same time. Because when we hold the car, the ultrasonic sensor detects obstacle and does not let the car run.

So, to demonstrate both of these functions separately we are using two different codes (one with object avoidance part commented out).

What did we learn?

- How L293D motor driver works.
- Working of Ultrasonic sensors
- How to pair two HC05 Bluetooth modules as master and slave and transmit data.
- We also learnt that our project could have been better with use of more powerful motors and different power sources (of appropriate voltage) for different components like Bluetooth and Arduino.