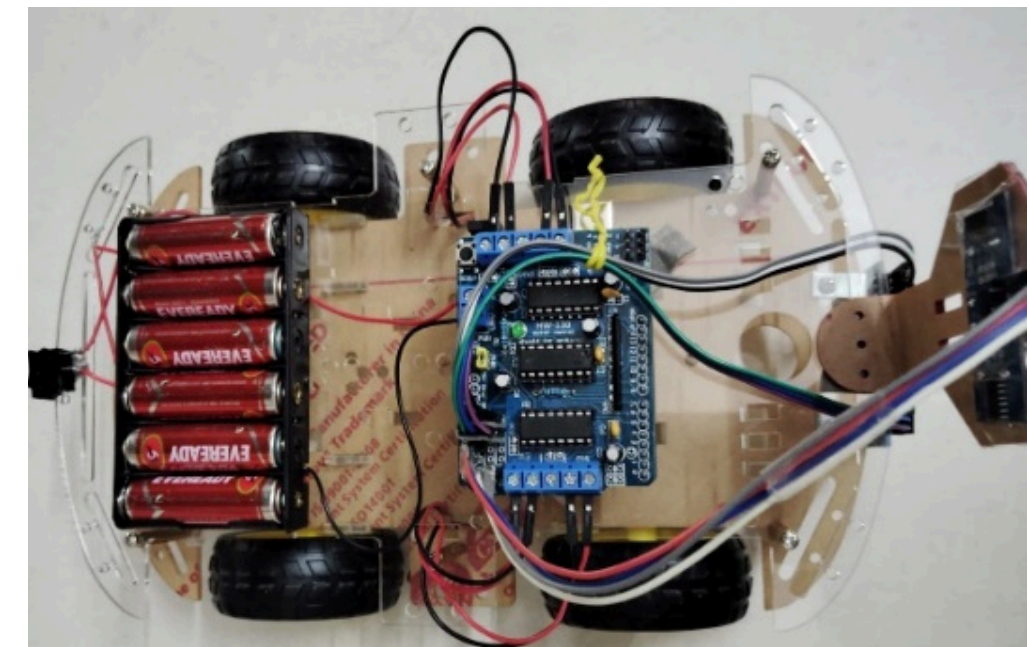
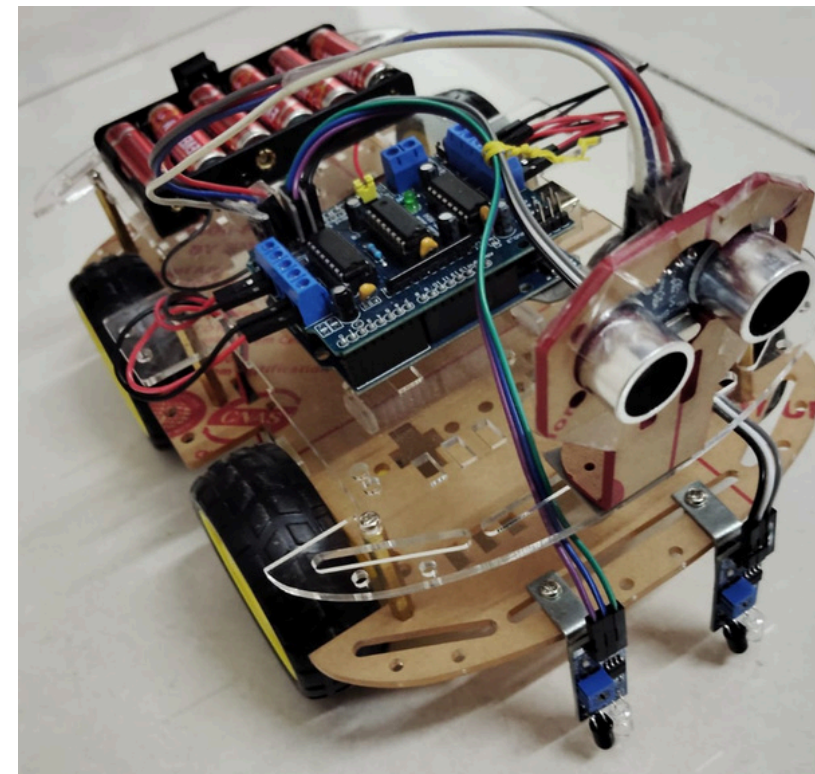
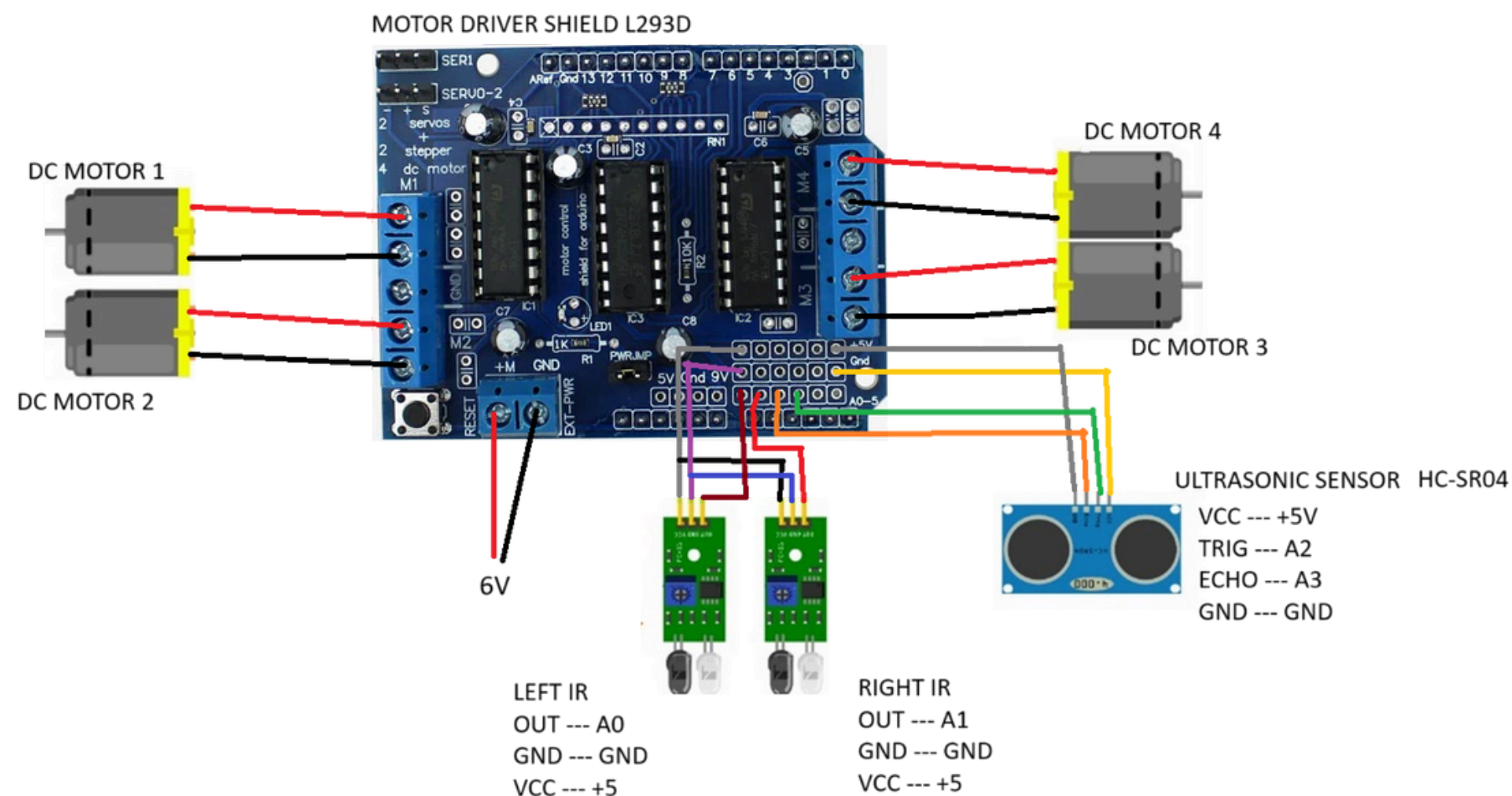


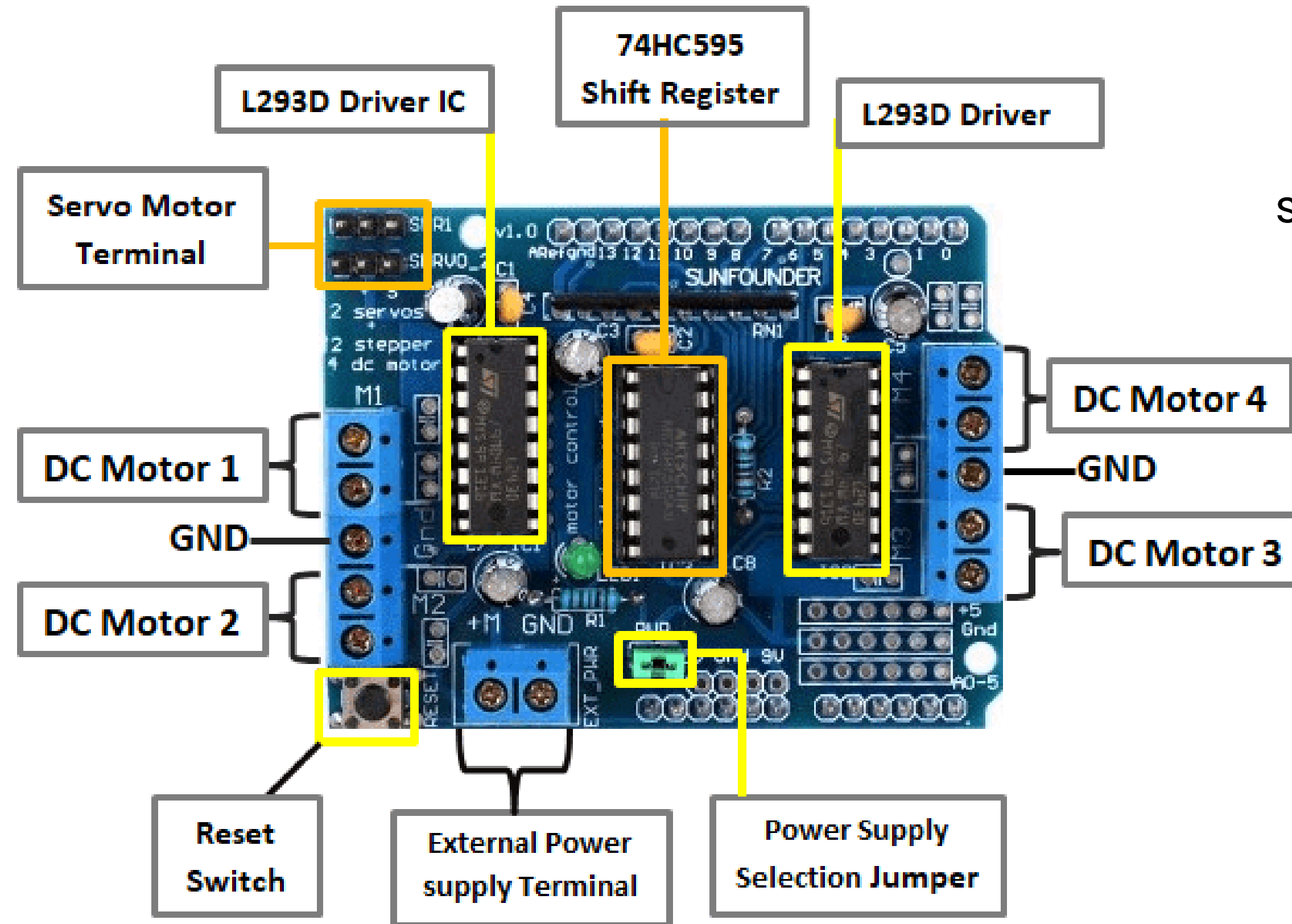
UE22CS251B: MPCA

Line Following Obstacle Avoiding Robot

This project presents an Arduino-based robot designed for line following and obstacle avoidance. The robot uses infrared sensors to follow a marked path and ultrasonic sensors to detect and respond to obstacles in real time. The integration of these functionalities enables accurate navigation, collision prevention and safe movement across varying environments. The robot illustrates how embedded systems and sensor integration can be applied to real-world industrial and service robotics applications.



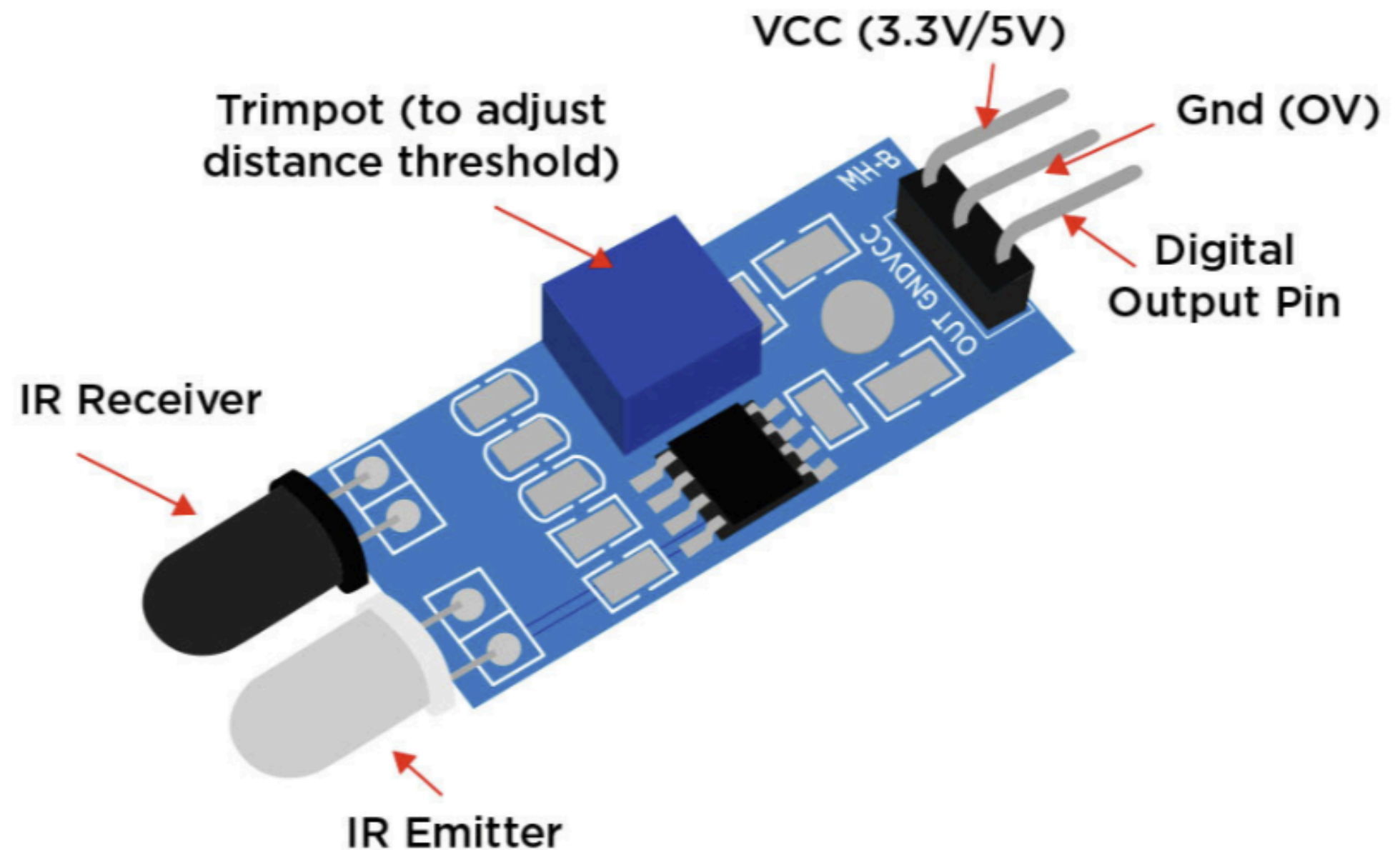
MOTOR DRIVER SHIELD L293D



L293D shield is a driver board based on L293 IC, which can drive 4 DC motors and 2 stepper or Servo motors at the same time. It is mainly compatible with the Arduino UNO and MEGA boards.

IR SENSOR

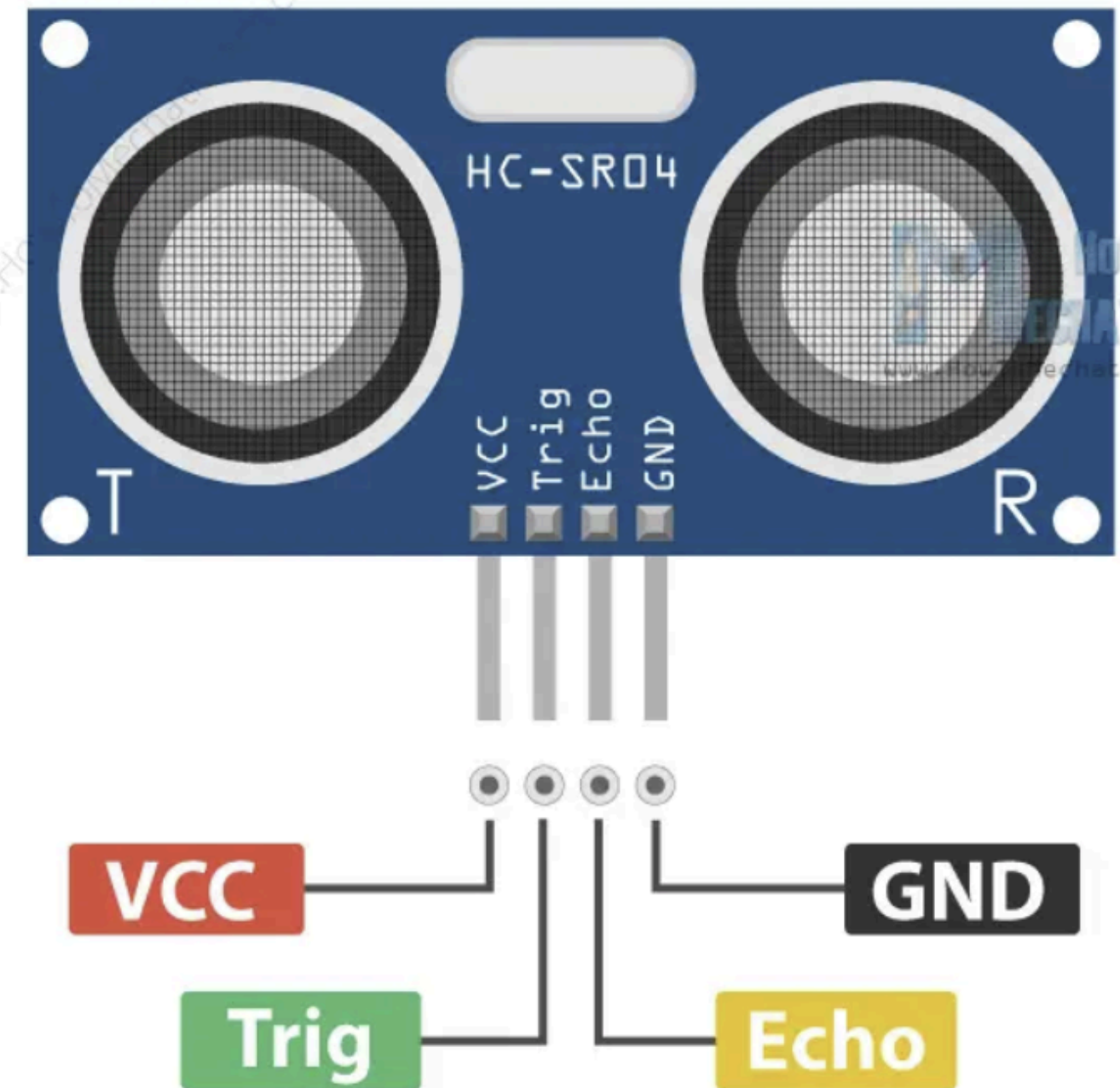
1. The distinction between the black and white tracks was based on reflection infrared sensors, these sensors consist of an infrared emitting LED that acts as an emitter and an infrared sensitive phototransistor that acts as a receiver, and these two components are placed side by side in a holder.
2. When the sensor is over a white surface, the infrared beam reflects strongly, causing the phototransistor to saturate.
3. When this sensor is in front of a black track, the infrared beam is practically not reflected and the phototransistor is then blocked



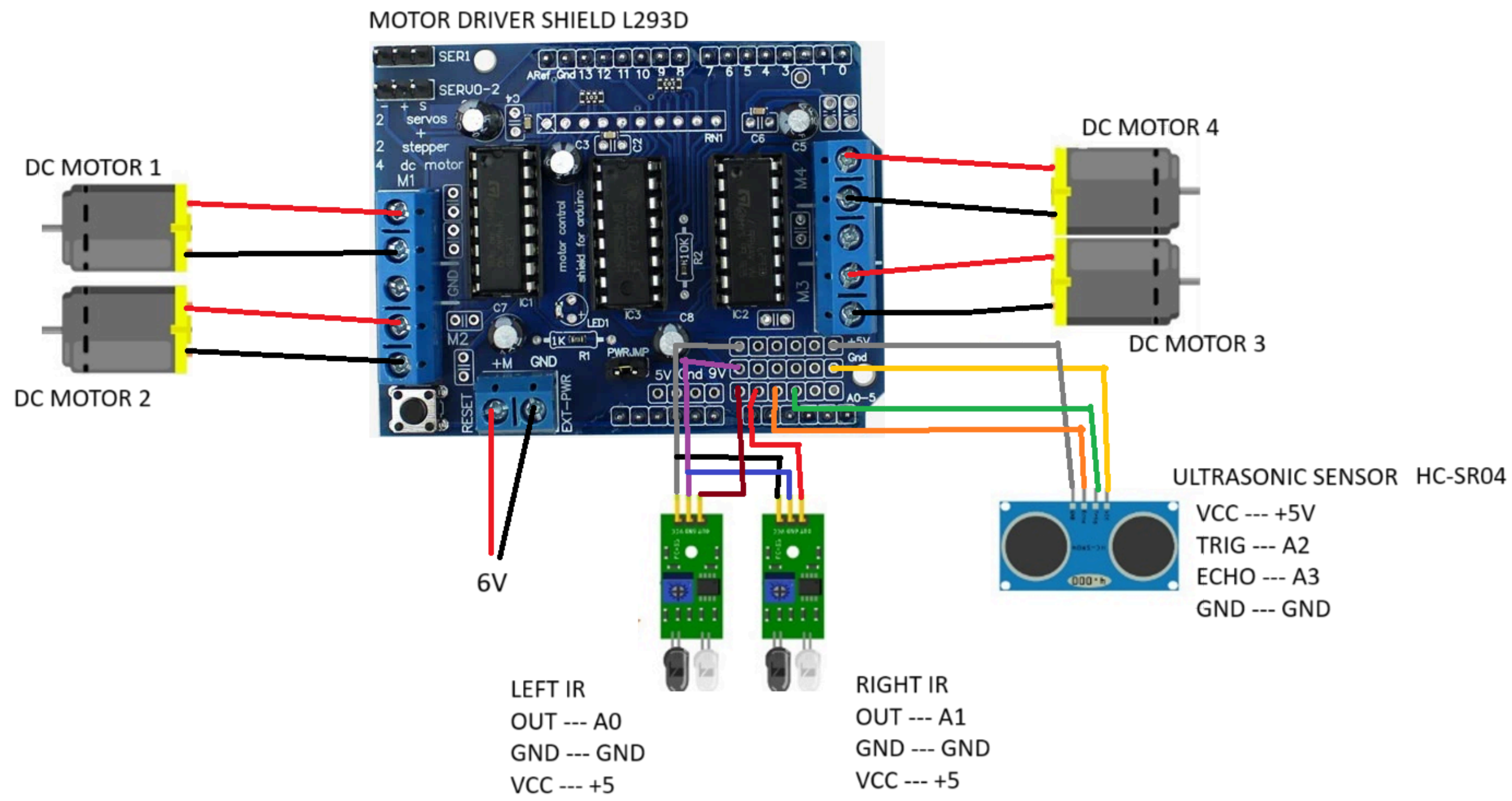
ULTRASONIC SENSOR

- 1.This type of sensor is based on the use of ultrasound to measure the distance to an obstacle without contact with the latter.
- 2.In an ultrasonic sensor, the transmitter and the receiver are located in the same housing. The transmitter sends a train of waves that will reflect on the object to be detected and then return to the source.
- 3.The time taken to go back and forth makes it possible to determine the distance of the object from the source.
- 4.The ultrasound sensor we chose is the HC-SR04 ,which has the advantage of being simple to use and to have an excellent non-contact detection range (from 2 cm to 4m), with high measurements precision and stable.
- 5.Its operation is not influenced by the light or the color of the obstacles to be detected.

HC-SR04 Pinout



CIRCUIT CONNECTIONS



Key Lessons learnt from our Arduino Project:

1. Precise calibration of IR sensors is crucial, especially considering environmental changes in lighting.
2. Maintaining constant battery voltage is essential due to Arduino's rapid power consumption.
3. Soldering DC motors aids in smoother maneuvering. Wheel friction issues sometimes may require manual intervention.
4. Trial and error in code adjustment for delay and speed optimization is necessary for optimal performance.