Ahsanullah University of Science & Technology

Department of Computer Science & Engineering

Object and Human Following Robot

Microcontroller Based System Design Lab

Submitted By:

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Project Objective: An object and human following robot can detect an object or human within a certain range .The robot will follow the object or human when the object or human is moving away from it. The robot will also go away from the object or human when the object or human is approaching the robot.

Required Equipment:

Hardware:

- ✓ Arduino Uno (1)
- ✓ Dc gear motor (4)
- ✓ Ultrasonic Sensor HC-SR04 (1)
- ✓ L293d motor driver (1)
- ✓ Servo Motor(1)
- ✓ Wheels (4)
- ✓ Chassis (1)
- ✓ 9v battery/Power bank (1)

Software:

- ✓ Arduino IDE

Features:

- ➢ Moving forward when distance will be between 20 – 40 cm
- ➢ Moving backward when distance will be between 10 – 20 cm
- ➢ No movement when distance will be less than 10 cm and greater than 40 cm
- ➢ A servo motor works in 180 degree angle to detect any object

Working Principle:

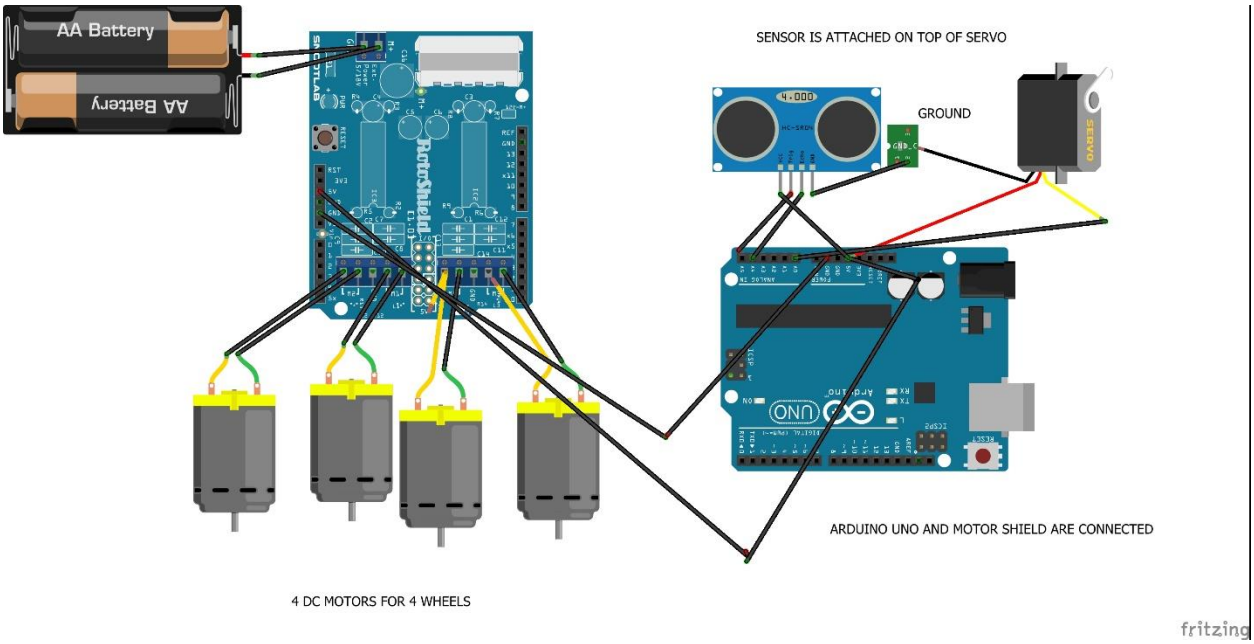
- This robot will work depend on ultrasonic sensor which will help to find any object or human in a specified range.

- Ultrasonic sensor works in 180 degree angle. If distance is more than 40cm and less than 10 cm then robot will be stopped.

- If distance of ultrasonic sensor is more than 20cm then the robot moves forward and if distance is less than 20cm then robot moves backward.

- A servo motor works in 180 degree angle to detect any object. If it finds any object within this 180 degree angle it will stop and start to follow the object.

Circuit Diagram:



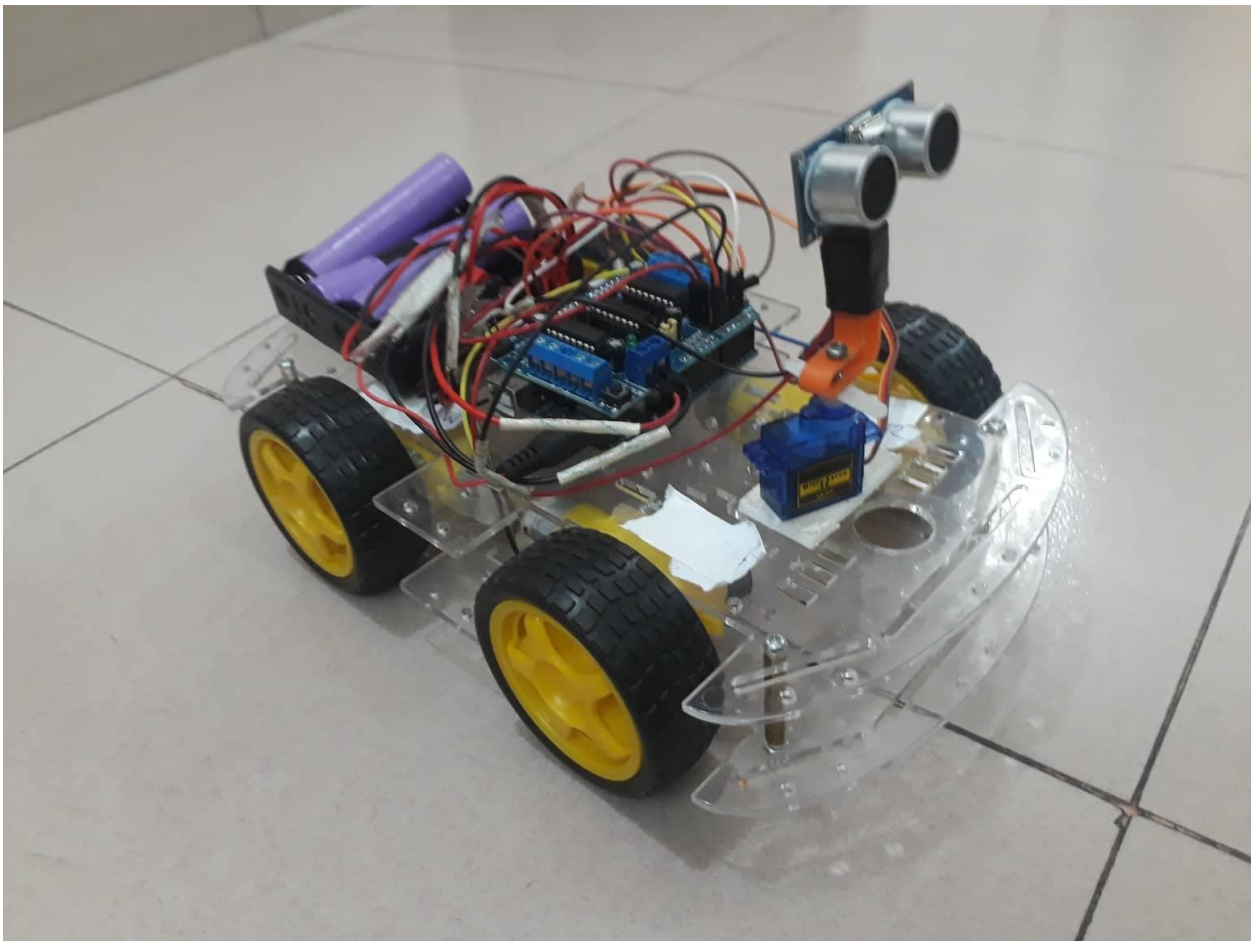
Notes:

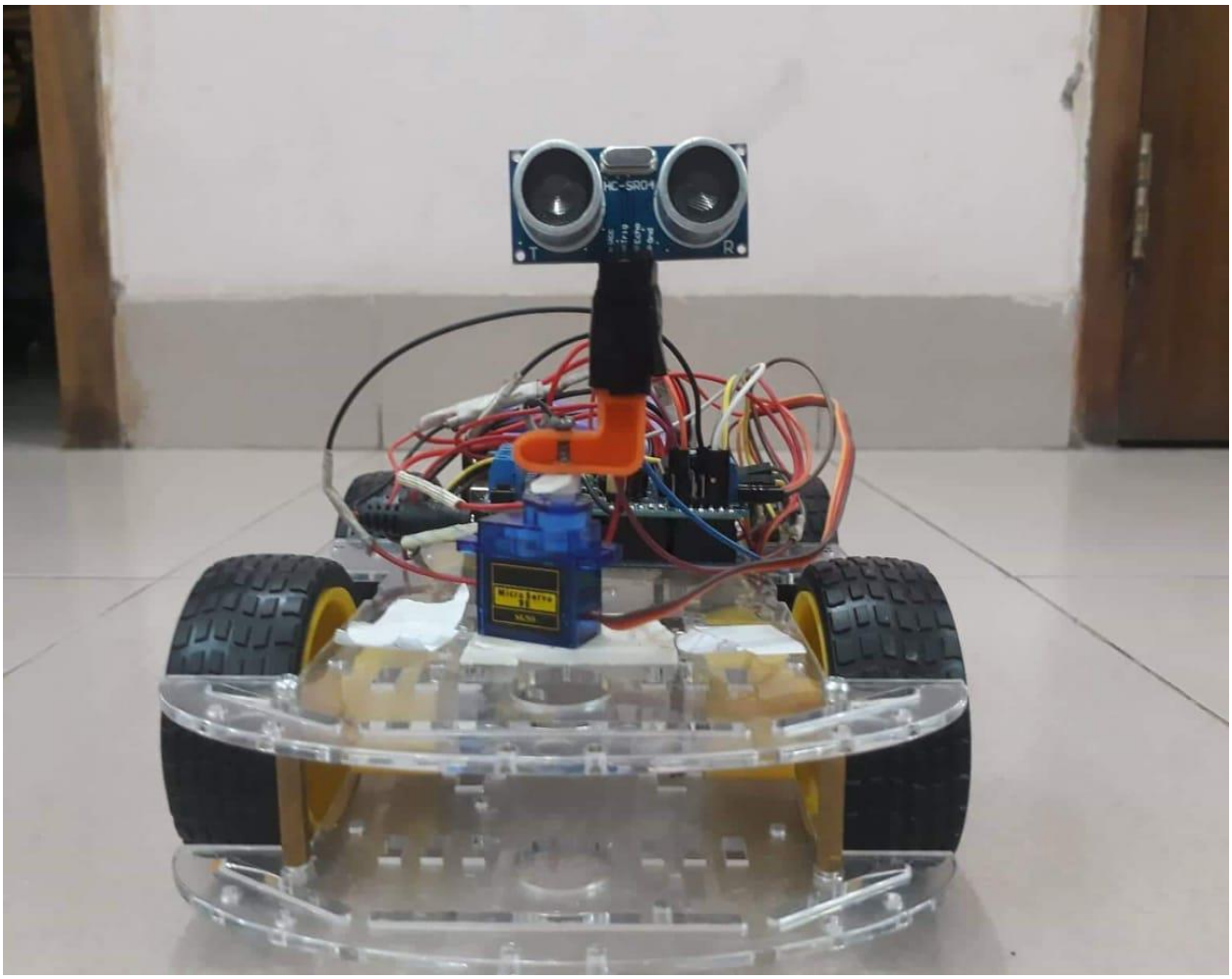
1.'Trig' pin of sensor is connected with A5 analog pin of Arduino Uno.

2.'Echo' pin of sensor is connected with A4 analog pin of Arduino Uno.

3. Yellow pin of servo motor is connected with A0 analog pin of Arduino uno.

Figures of the project:





Constrains:

The object must be in front of the sensor for about two seconds for the sensor to detect the object. After the object moves away from the sensor the sensor waits for a few seconds before it starts to rotate to detect the object.

Dos and Don’ts:

1. The object can be at a maximum distance of 40 cm away from the sensor to be detected.

2. The position of the servo motor is fixed and it should not be changed.

3. The ultrasonic sensor should be firmly attached with the servo motor using a sensor holder or any supporting medium.

4. The robot should be following one object at a time, multiple objects should not be placed in front of it.

Conclusion:

We hope this project will help us to understand more about how an Arduino project works.

Appendix:

At first the robot is stationary. The sensor remains stationary for a few seconds if it does not detect any object. After that the sensor starts rotating 180 degrees and if any object is detected then the motor turns right or turns left by a certain degree depending on the position of the object. At the same time the sensor also goes back to its initial position and then the robot starts following the object. If the object moves away from the robot now then again the sensor would remain stationary for a few seconds to detect it. When it detects it then again the mentioned events will occur. In this way the robot operates.