TEAM44 EW1 Project Report

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1 Problem Statement

We were tasked with designing and building an Object-Following Rover—a robotic system capable of detecting and tracking an object in its vicinity using sensors, enabling it to autonomously follow the object.

2 Aim of the Project

To design and develop an autonomous robotic system capable of detecting and tracking a designated object using sensors and embedded systems. The rover should efficiently follow the object in real-time while navigating its environment, demonstrating applications in automation, surveillance, and personal assistance.

3 Components Used

- Arduino UNO
- L293D Motor Driver
- Servo motor
- Ultrasonic sensor
- IR sensors
- Jumper wires
- Motor and Wheels
- Chassis

4 Circuit Schematics and Process Diagrams

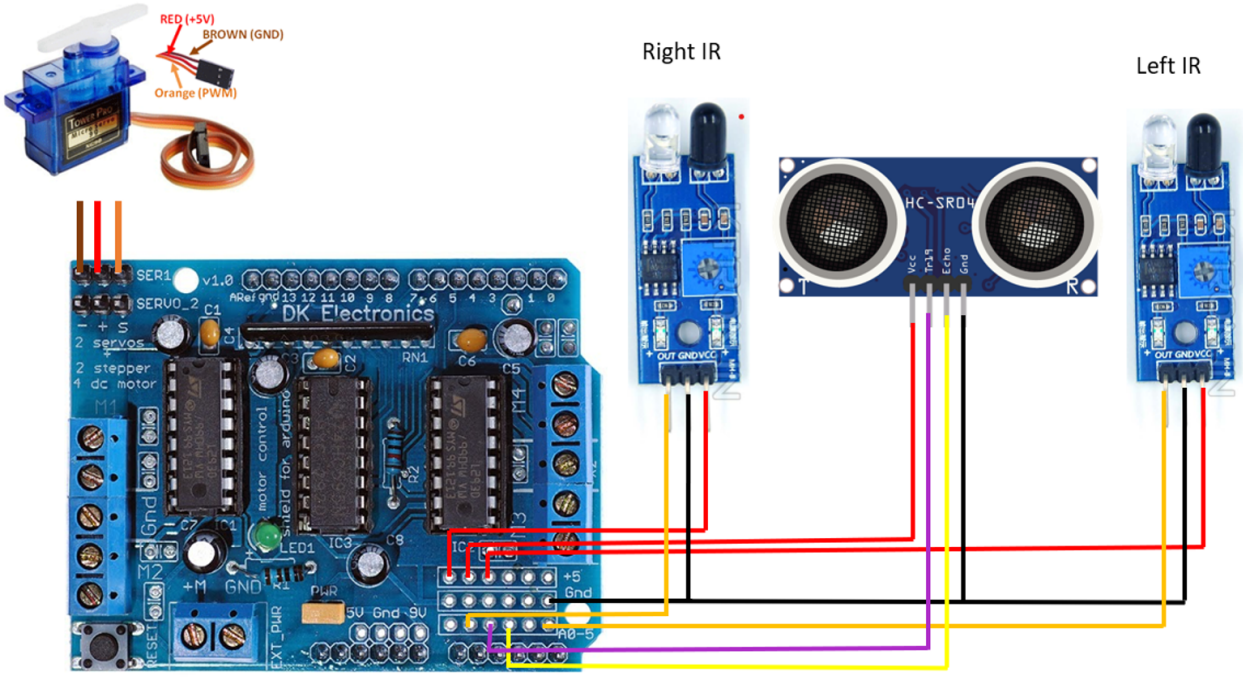

Figure 1: Circuit Schematic

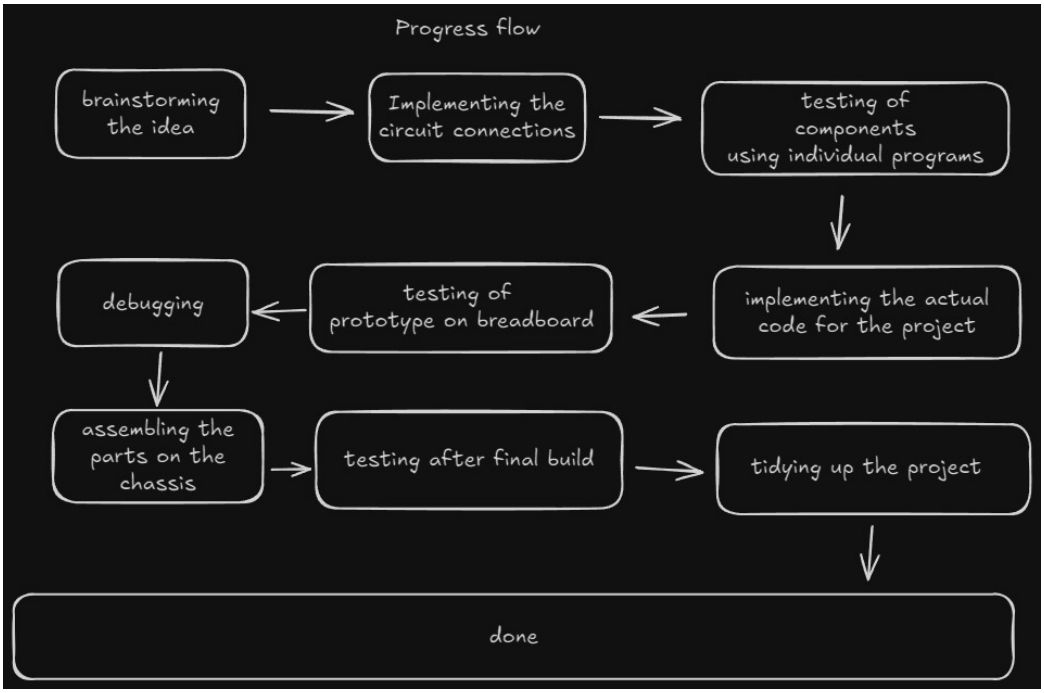

Figure 2: Process Diagram

5 Flowchart

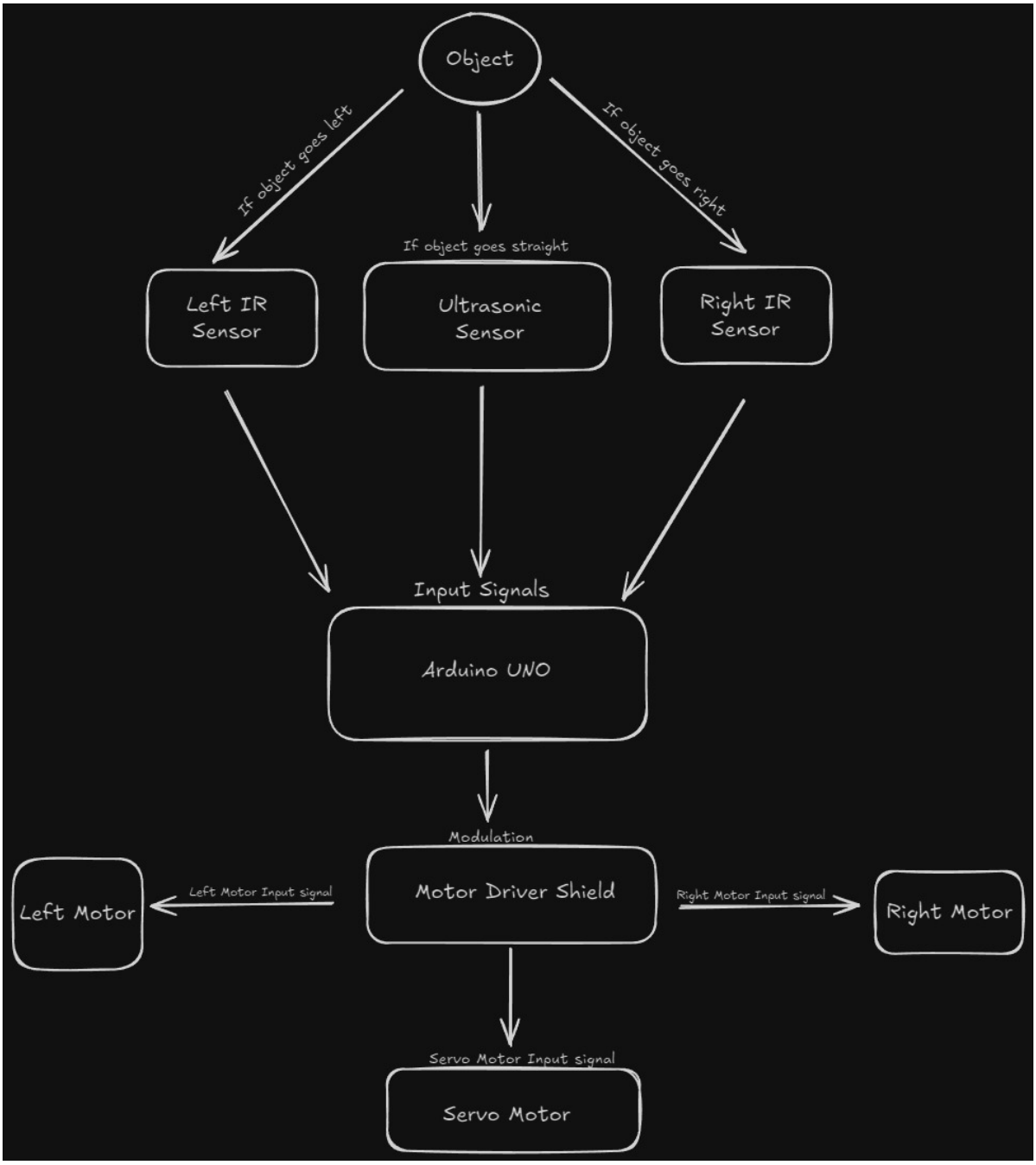

Figure 3: Flowchart

6 Description of the Project

Object-Following Rover Project Description

The Object-Following Rover is a robotic system designed to autonomously detect and follow a target object using sensors and motors controlled by an Arduino. Below are the key components:

1. Arduino UNO: Central controller processes sensor data and commands motors.
2. L293D Motor Driver: Controls motor speed and direction.
3. Servo Motor: Rotates all the sensors for object scanning.
4. Ultrasonic Sensor: Measures distance to the object for tracking.
5. IR Sensors: Helps with obstacle detection or line-following.
6. Motors and Wheels: Enable mobility by driving the chassis.
7. Chassis: Houses components and provides structural support.
8. Jumper Wires: Connect components for communication.

The rover uses sensor data to detect, track, and follow an object while navigating its environment autonomously.

7 Results

The sensors accurately detect objects and respond by following them in the correct direction.

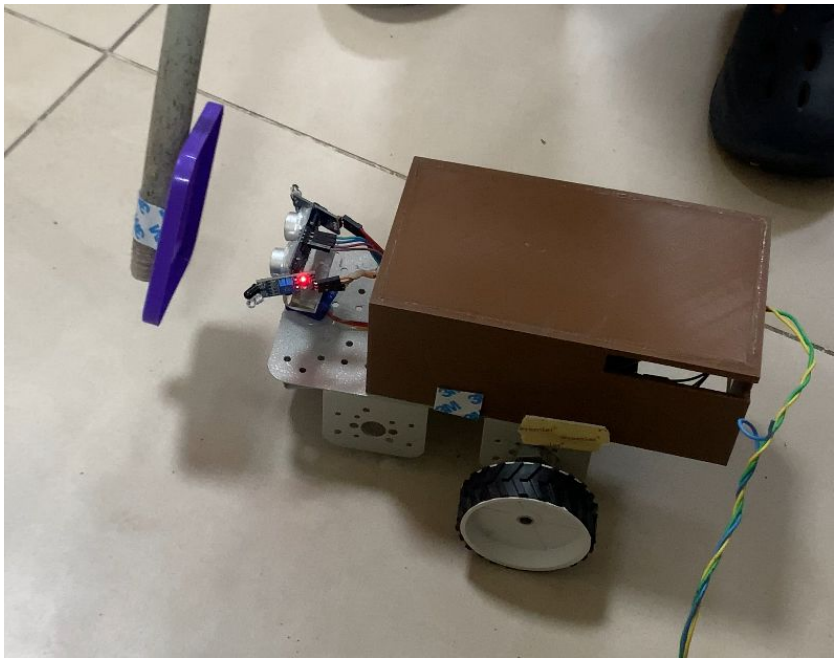

Figure 4: Results Visualization

8 Short Video Demonstration

- Demonstration Video: `https://vimeo.com/1035000705?share=copy#t=0`

9 Photos

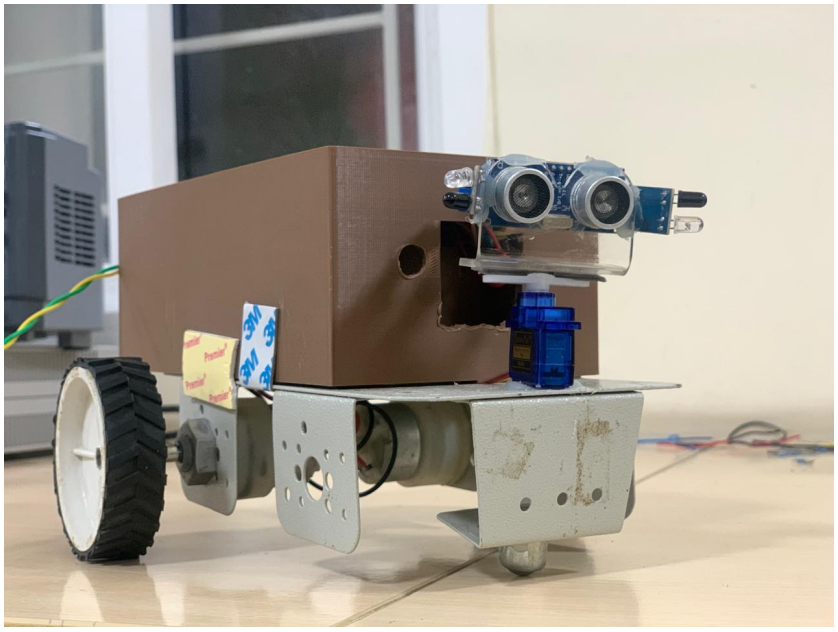

Figure 5: Project Photo

10 Bibliography

References

[1] AFMOTOR library
`https://github.com/adafruit/Adafruit-Motor-Shield-library`

[2] L293D Motor Driver Shield
`https://microcontrollerslab.com/arduino-l293d-motor-driver-shield-tutorial/`

[3] Servo Motor
`https://github.com/arduino-libraries/Servo`

[4] Newping library
`https://docs.arduino.cc/libraries/newping/`