VIT®

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

School of Electronics Engineering (SENSE)

J COMPONENT – REPORT

COURSE CODE / TITLE	BECE204L – MICROPROCESSORS & MICROCONTROLLERS	
PROGRAM / YEAR/ SEM	B.Tech II Year/ FALL 2023-2024	
LAST DATE FOR REPORT SUBMISSION	23.11.2023, 3PM	
DATE OF SUBMISSION	23.11.2023	
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PROJECT TITLE	**Object Following Robot**	

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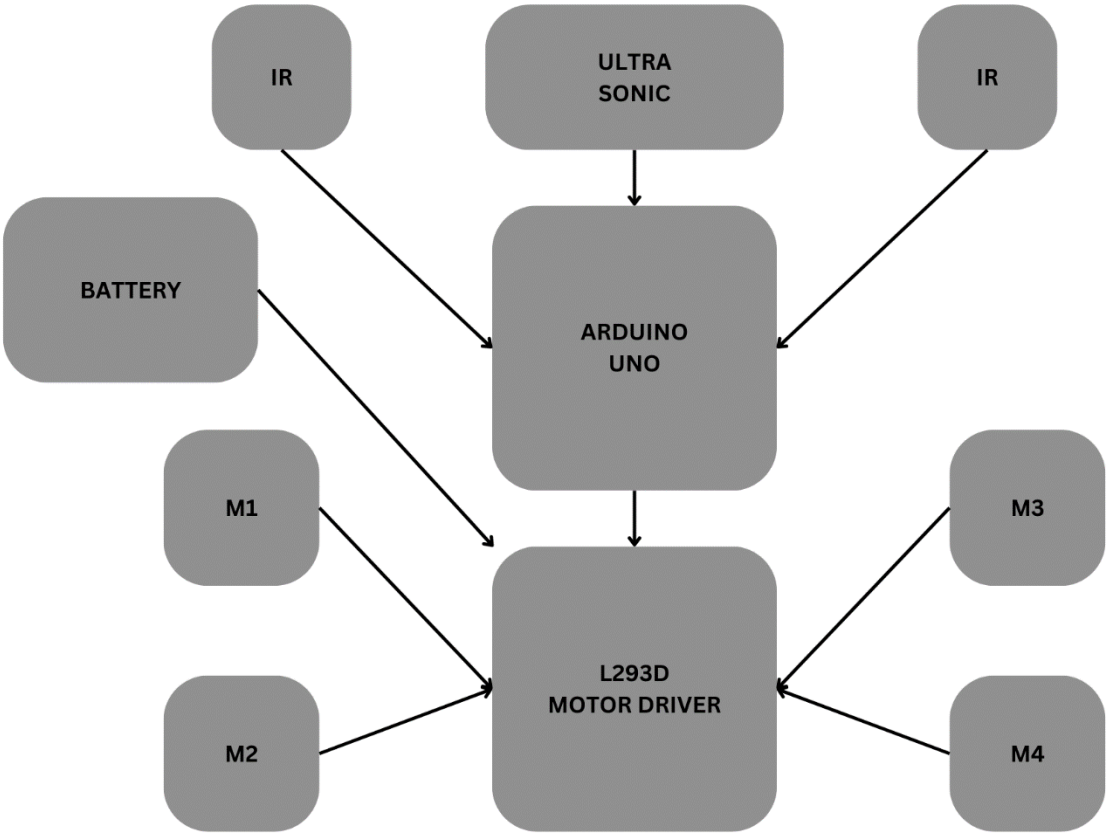
COURSE HANDLER'S SIGN			

OBJECTIVE:

The idea of the project is to build a bot that follows an object placed in front of it.

- If the object is too far the bot moves forward to follow it
- If the object is too close, the bot will move backward to keep it in the ideal range
- If the object is only detected by the left IR sensor, the bot will move left
- If the object is only detected by the right IR sensor, the bot will move right
- If the object is kept at ideal distance, the bot will be stationary

BLOCK DIAGRAM:



COMPONENTS/ SOFTWARE REQUIRED:

Components:

- 2 IR(Infrared) sensors
- 1 US (ultrasonic) sensor
- 1 Arduino UNO
- 1 Servo motor

- 4 DC motors
- 1 Motor driver – L293D
- 2 “18650” li-ion batteries

Software:

Arduino IDE- The Arduino IDE (Integrated Development Environment) is a software platform that is used for programming and developing applications for Arduino microcontroller boards

PROJECT DESCRIPTION:

The Object Following Robot showcases a fusion of hardware components and intelligent programming. It employs a diverse sensor setup, featuring an ultrasonic sensor and two IR sensors. These sensors act as its 'eyes,' enabling it to perceive its surroundings and make informed decisions. The ultrasonic sensor gauges distances, while the IR sensors detect obstacles in its path.

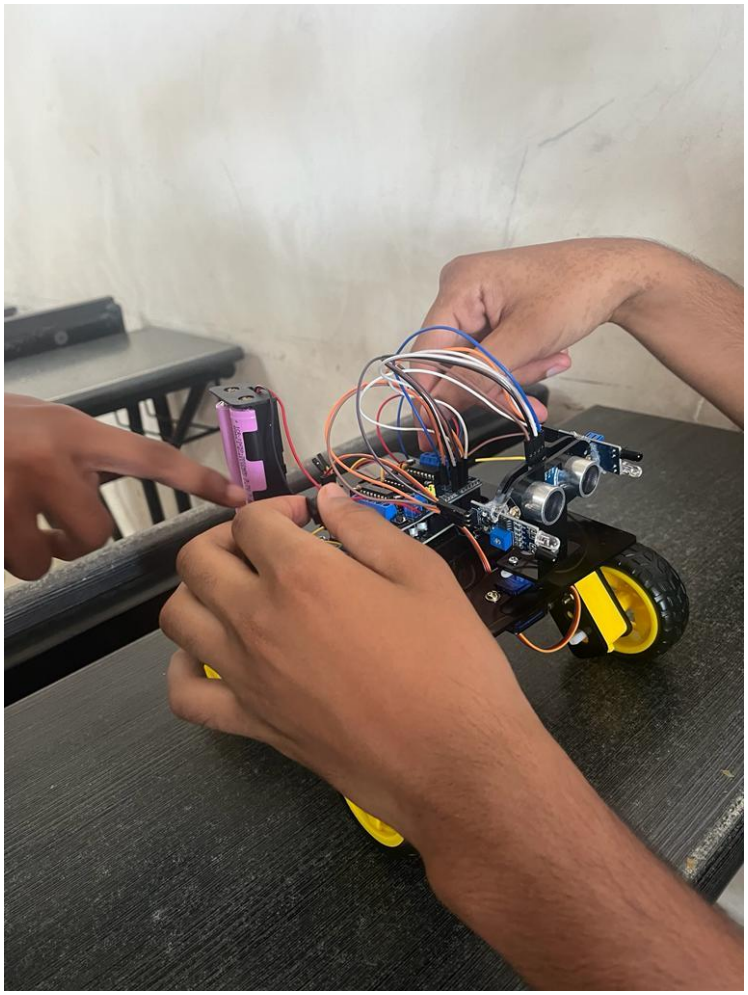
At its core, an Arduino Uno microprocessor functions as the brain of this technological marvel. It interprets the inputs from the sensors and processes them using coded algorithms. By leveraging this data, the robot determines how to navigate its environment efficiently.

This integration of sensors and microcontroller facilitates the robot's object-following capability. When it detects an object, the sensors provide crucial data about its location and distance. The microcontroller, powered by preprogrammed logic, then calculates the optimal route to keep the object within its pursuit.

CONCEPT LEARNED:

- Working of Arduino uno microcontroller
- Integration of sensors with motors
- Understanding of the AFmotor library in Arduino IDE

IMPLEMENTATION:



In the final stages of debugging

YouTube Video of execution: https://youtu.be/zOclfm0cbaE

CHALLENGES FACED:

- Insufficient power supply. So, we switched from using 2 AA batteries (1.5V each) to 2 "18650" li-ion batteries (3.7V each).
- Connectivity issues with the L293D motor driver. Hence, we had to change it to another L293D motor driver.

APPLICATIONS:

This "carrot on a stick" approach can be used in cars and robots to keep them following an object, and the object detecting can be used multiple applications like a camera tracking a fast-moving object, or a car following a specific lead car on the road. It can also be used in applications like ball-tracking in sports, and many more

CONCLUSION:

In summary, the object-following robot project has successfully combined computer vision, sensor technology, and precise control algorithms to create a robot capable of autonomously tracking and following designated objects. Despite challenges in optimizing algorithms and fine-tuning control parameters, the robot demonstrates agility and accuracy in dynamic environments.