HOOGHLY ENGINEERING & TECHNOLOGY COLLEGE

A Mini Project Report [EC 681]

OBSTACLE AVOIDING ROBOT WITHOUT ARDUINO

Presented by –

| Name	Roll No
☐ SK MOFIZ HOSSAIN	17632322011
☐ RIPA GHOSH	17632322012
☐ ABISEKH DEY	17632322013
☐ KALYANI BHANDARI	17632322014

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ABSTRACT

This project focuses on the design and implementation of an obstacle-avoiding robot without utilizing Arduino microcontrollers. The objective is to create a cost-effective and resource-efficient robotic system capable of navigating its environment autonomously. The project's findings contribute to the exploration of alternative hardware solutions for robotics enthusiasts and researchers seeking cost-effective and versatile designs.

CIRCUIT DIAGRAM
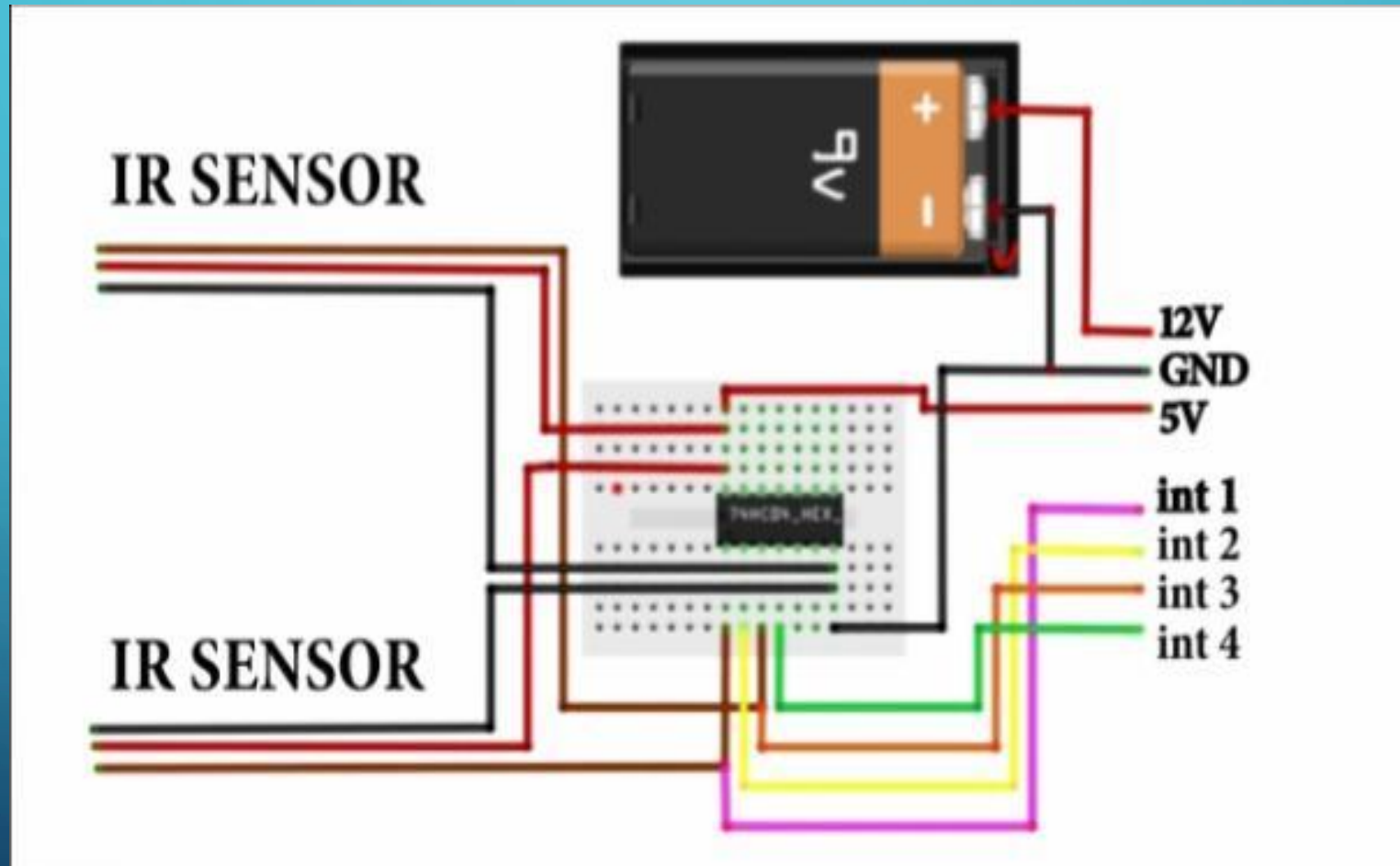
PROJECT MODEL
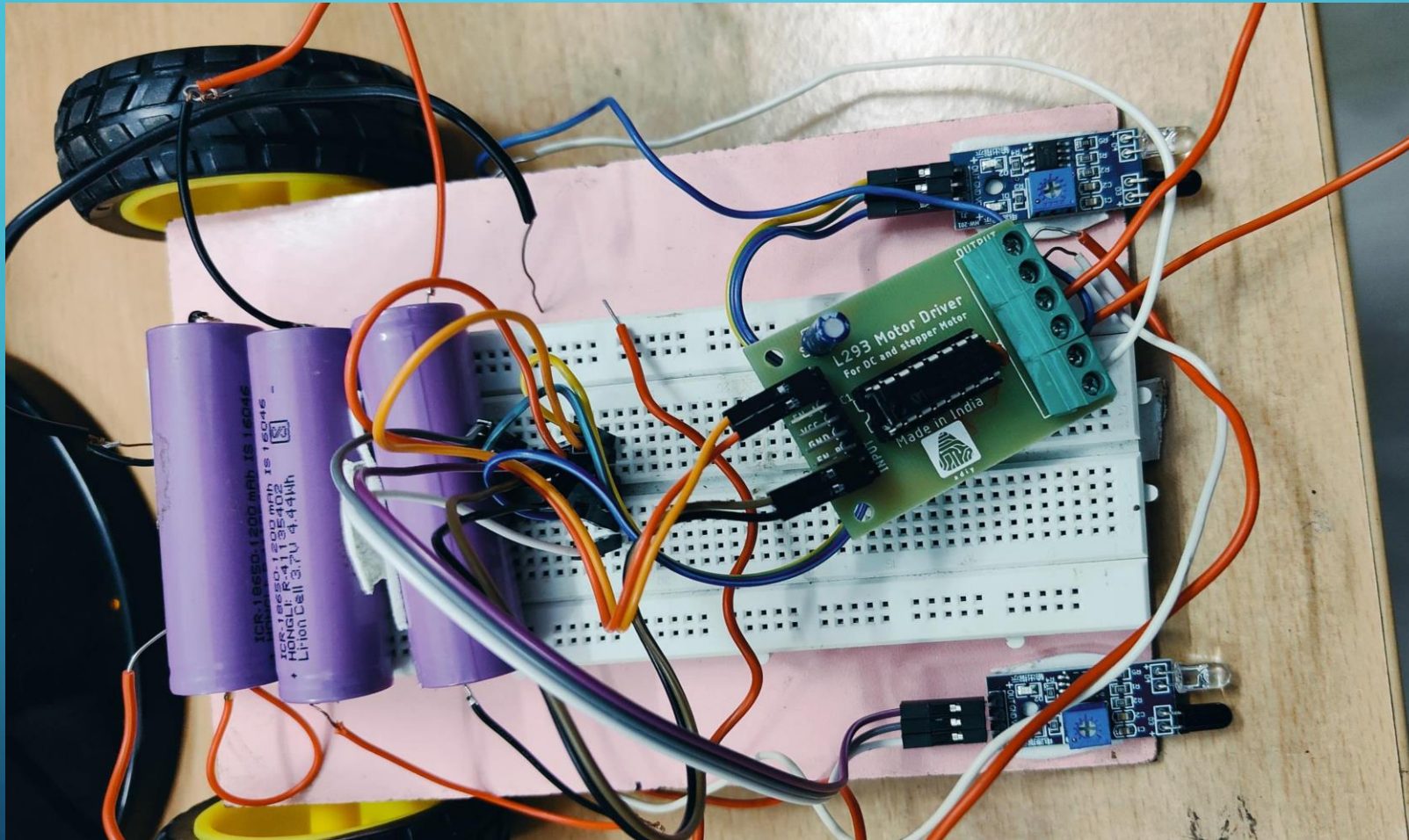
<u>INTRODUCTION</u>

This project aims to develop an obstacle-avoiding robot using a microcontroller-based system that does not depend on Arduino. Instead, we employ a more versatile Dual Motor IC (L293D) or a similar platform that provides enhanced computational capabilities and integration options. The primary objective is to design a robot that can efficiently detect and navigate around obstacles in real-time using a combination of ultrasonic sensors, infrared sensors.

COMPONENTS REQUIRED

1.L293D IC:

➢ The L293D is a popular quadruple high-current half-H driver IC used for driving inductive loads such as relays, solenoids, DC and stepping motors.
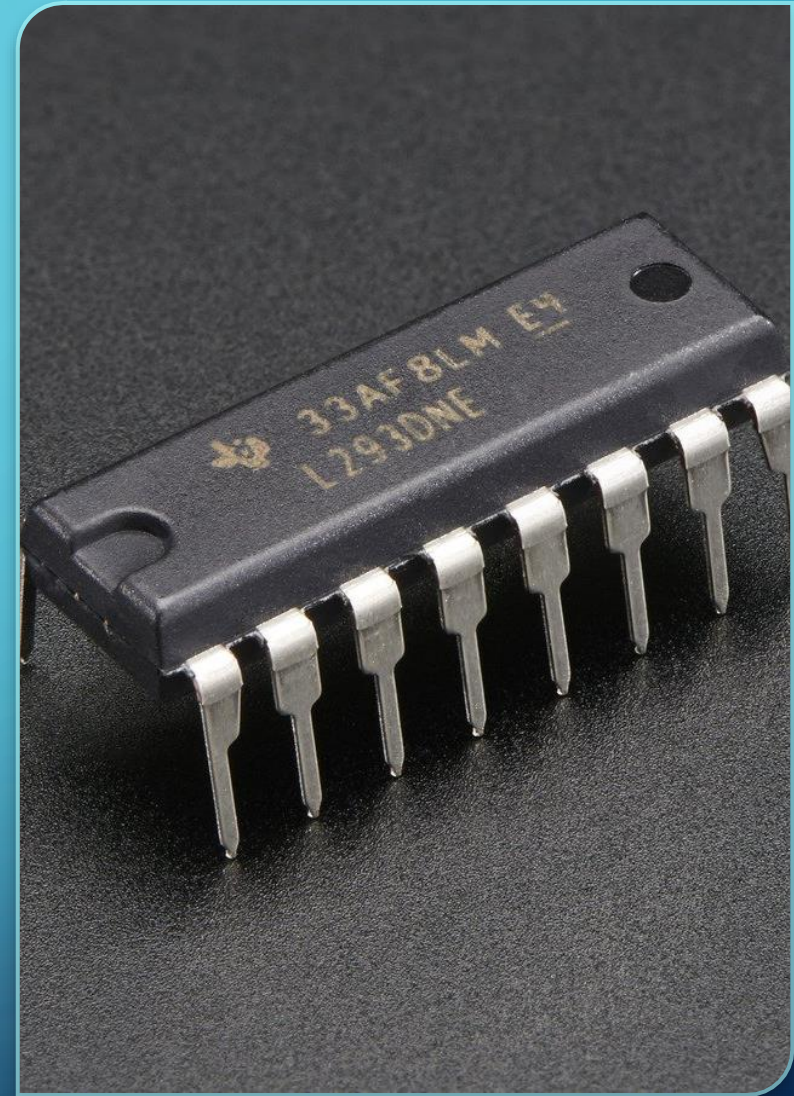
2.SINGLE STRAND WIRE:

➢ Often referred to as solid wire, consists of a single, solid piece of metal wire, typically copper or aluminium.

➢ This type of wire is commonly used in applications where rigidity and simplicity are desired.

➢ Solid wire has lower resistance and is ideal for use in fixed positions where the wire will not be subject to bending or movement.
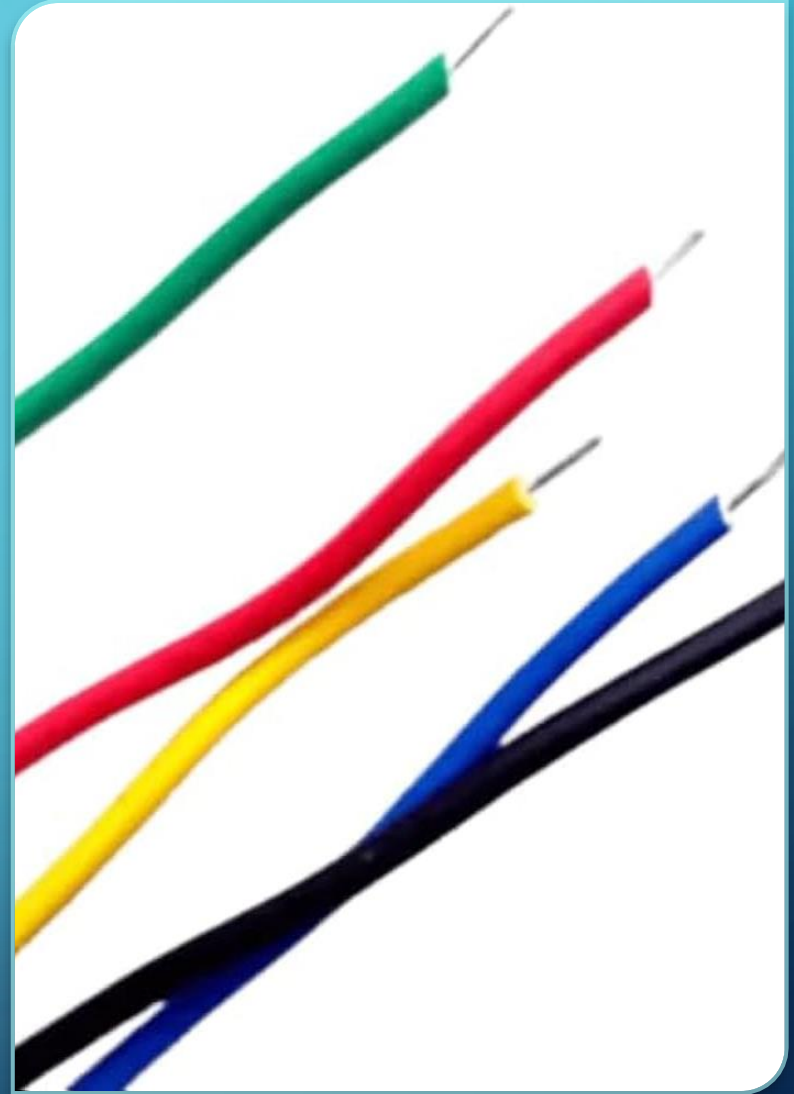
3. DC BO MOTOR (12V):

➢ A DC BO motor (Battery Operated motor) is a type of DC motor commonly used in optics and DIY electronics projects. These motors are known for their ease of use, low cost, and simple operation, making them ideal for hobbyists and educational purposes.

4.IC 7404:

➢ The IC 7404 is a Hex Inverter, part of the 7400 series of TTL (Transistor-Transistor Logic) integrated circuits.

➢ It contains six independent inverter gates, each of which performs a logical NOT operation.
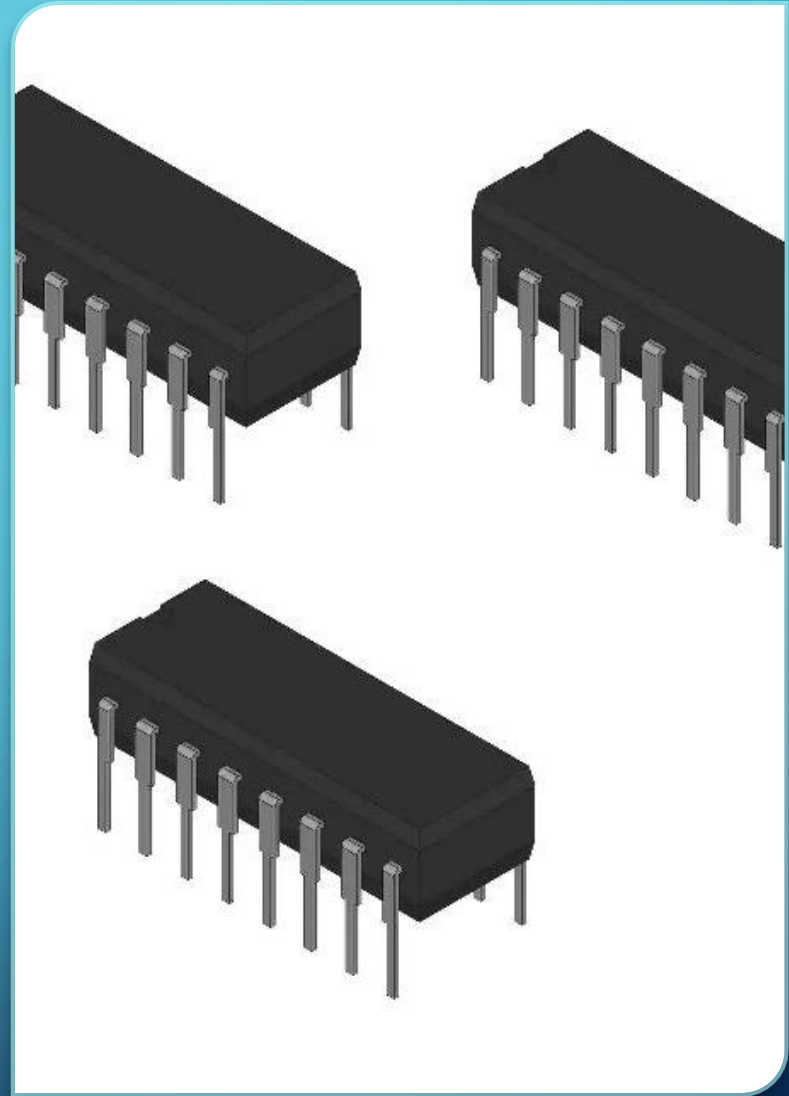
5.Breadboard:

➢ A breadboard is a reusable prototyping tool for electronics, featuring grid of interconnected holes for component insertion. It facilitates quick circuit assembly without soldering, ideal for experimenting and testing circuit designs. Breadboards have terminal strips for power and ground connections, bus strips for common connections, and rows of interconnected holes for component placement. Jumper wires are used to create electrical connections between components and terminals.
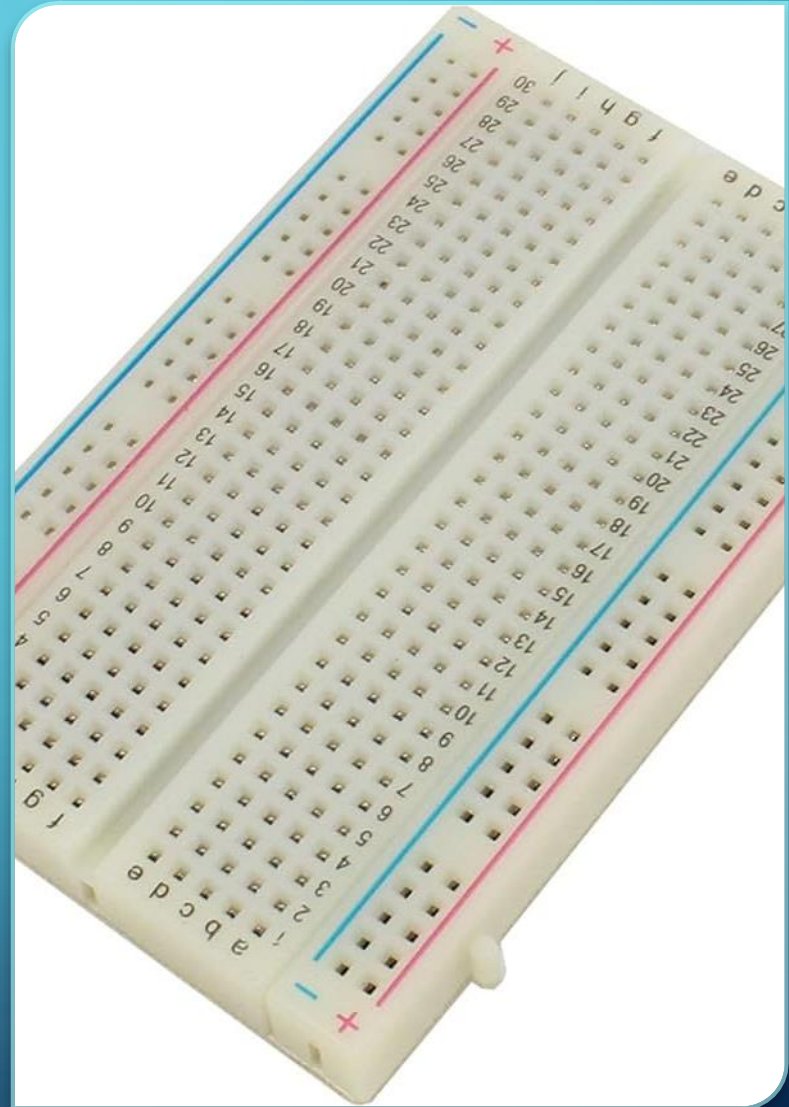
6.IR SENSOR:

➤ An IR (Infrared) sensor is an electronic device that emits and/or detects infrared radiation to sense certain aspects of its surroundings.

➤ IR sensors are commonly used in various applications such as object detection, proximity sensing, and remote controls.
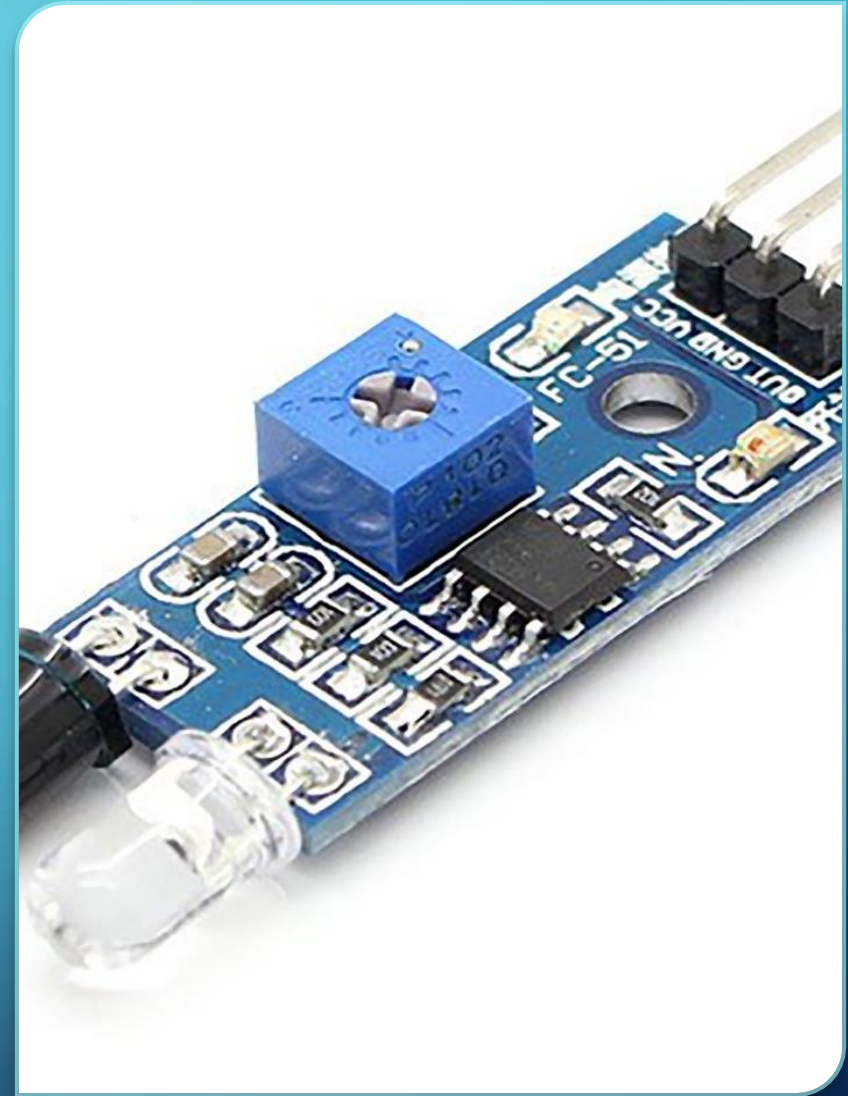
7.WHEELS:

➢ A wheel is a rotating component (typically circular in shape) that is intended to turn on an axle bearing.

➢ The wheel is one of the key components of the wheel and axle which is one of the six simple machines.

➢ Wheels, in conjunction with axles, allow heavy objects to be moved easily facilitating movement or transportation while supporting a load, or performing labour in machines.

❑ WORKING PRINCIPLE:

The IR proximity sensor detects obstacles. When an obstacle is detected, it sends a signal to the NOT gate. The NOT gate inverts the signal, which indicates the absence of obstacles. This inverted signal is then fed into the L293D, which controls the direction of the motors. When there's no obstacle, the motors will move forward. If an obstacle is detected, the NOT gate's output will change, causing the L293D to reverse the motors.
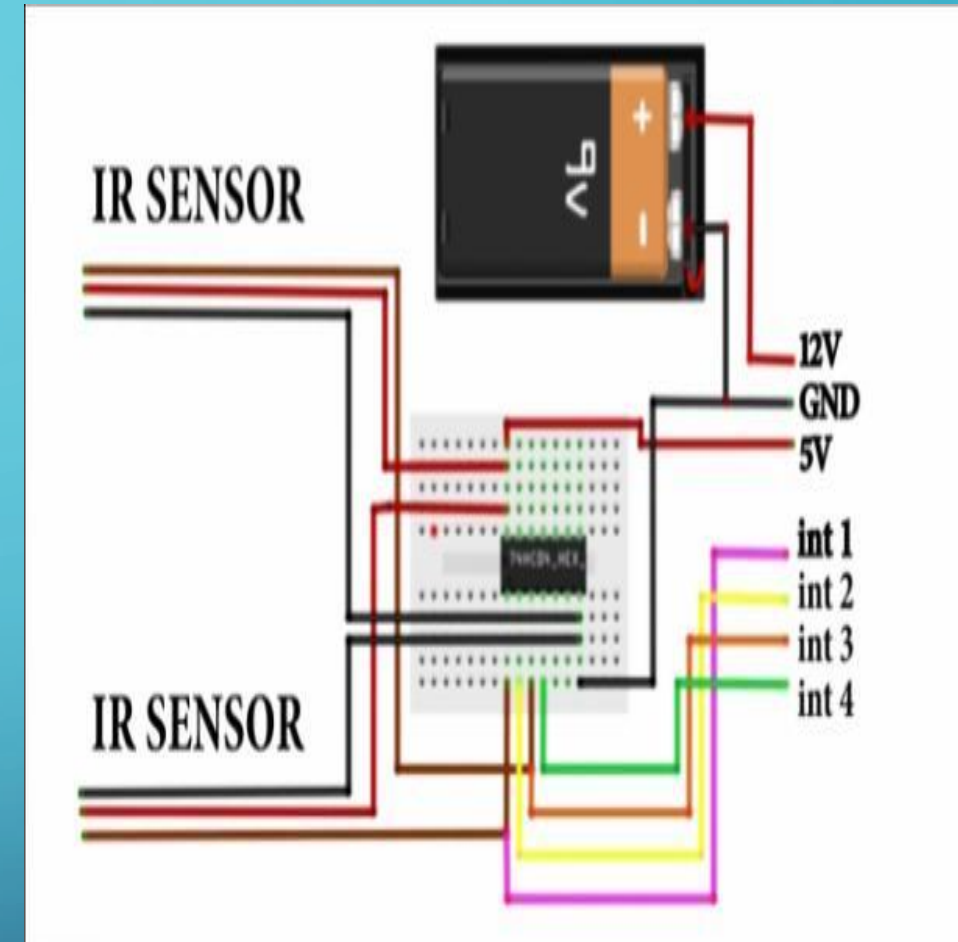
FUTURE SCOPE

- 1. Industrial Vehicles,

- 2. Home Assistance,

- 3. Healthcare,

- 4. Autonomous Vehicles,

- 5. Search and Rescue Operations,

- 6. Military Applications.

CONCLUSION

Creating an obstacle-avoiding robot without Arduino, using an L293D motor driver, NOT gate, and IR proximity sensor, offers an intriguing challenge with rewarding outcomes. This design relies on basic electronic components and logic circuits to achieve autonomous navigation, showcasing the fusion of simplicity and effectiveness in robotics. The L293D motor driver serves as the bridge between the microcontroller and the motors, enabling precise control over the robot's movements.

REFERENCES

WEBSITE-

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2.https://www.eevblog.com/forum/projects/obstacle-avoiding-car-without-using-arduino/

BOOKS-

1.Circuit Theory and Analysis's by Abhijit Chakrabarti

2.Practical Electronics for Inventors by Paul Scherz and Simon Monk

THANK YOU