REPORT

IC 152 : MAKERSPACE LINE FOLLOWER REPORT

BATCH B2

GROUP F

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ABOUT LINE FOLLOWER

A line follower robot is an automated robot that follows a predetermined path or track, typically marked with a contrasting color, using sensors to detect the line and make necessary adjustments to stay on course

Some important components

- *Microcontroller*
- *Sensors*
- *Motor Driver*
- *Motor and Wheels*
- *Power Supply*
- *Chassis*

WHY LINE FOLLOWER ROBOT ?

- *It is an Automatic Movement Robot and can easily work on rechargeable Li-ion batteries.*
- *It's basic functions can be altered through amendments in just the Arduino code.*
- *It is a Simple and efficient Robo which can be also used for longer distances.*
- *The Net making cost of Robo is very feasible.*

BASIC WORKING PRINCIPLE:

In this line follower robot, we have used IR transmitters and receivers (also known as photodiodes). When IR light falls on a white surface, it gets reflected back towards the IR receiver, generating some voltage changes that are analyzed by the Arduino.

When IR light falls on a black surface, it gets absorbed by the black surface, and no rays are reflected back thus, the IR receiver doesn't receive any rays.

In this project, when the IR sensor senses a white surface, an Arduino gets HIGH as input, and when it senses a black line, an Arduino gets LOW as input. Based on these inputs, an Arduino Uno provides the proper output to control the line follower.

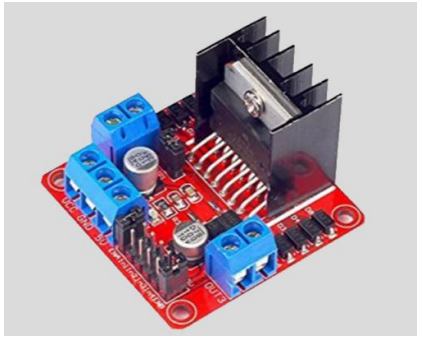
ABOUT OUR PROJECT

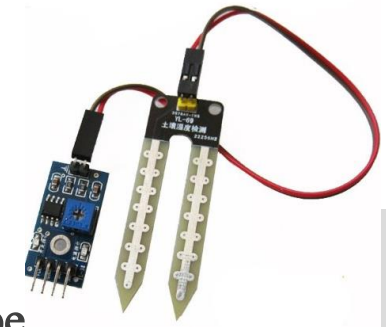
Our Project Comprise of 3 sub-projects:

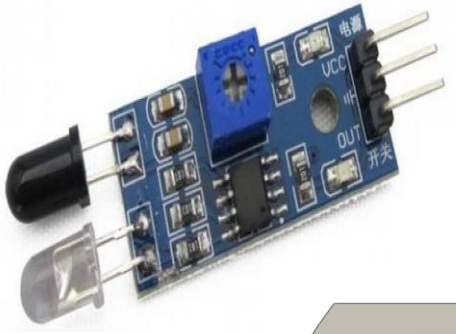
- LINE FOLLOWER
- SOIL MOISTURE SENSOR
- TEMPERATURE SENSOR

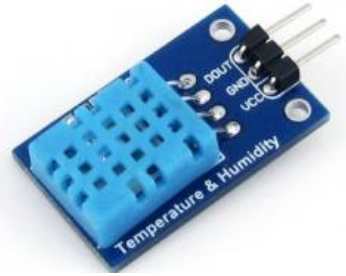
COMPONENTS USED :-

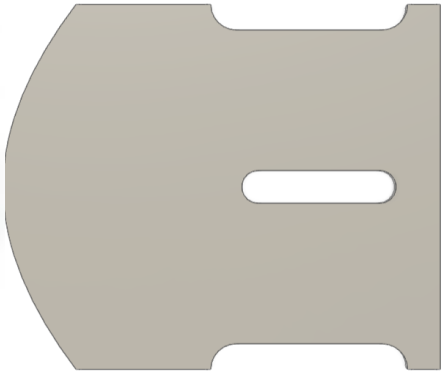
- Arduino Board(UNO)
- Jumper Wires
- Car Chassis
- L298 motor driver module
- IR sensor module
- Rechargeable Li-ion Battery
- 3-d Printed Wheels
- Motor
- Glue Gun and Double-sided tape
- Temperature and Humidity sensor
- Soil Moisture Sensor
- Bluetooth Module(Hc-05)







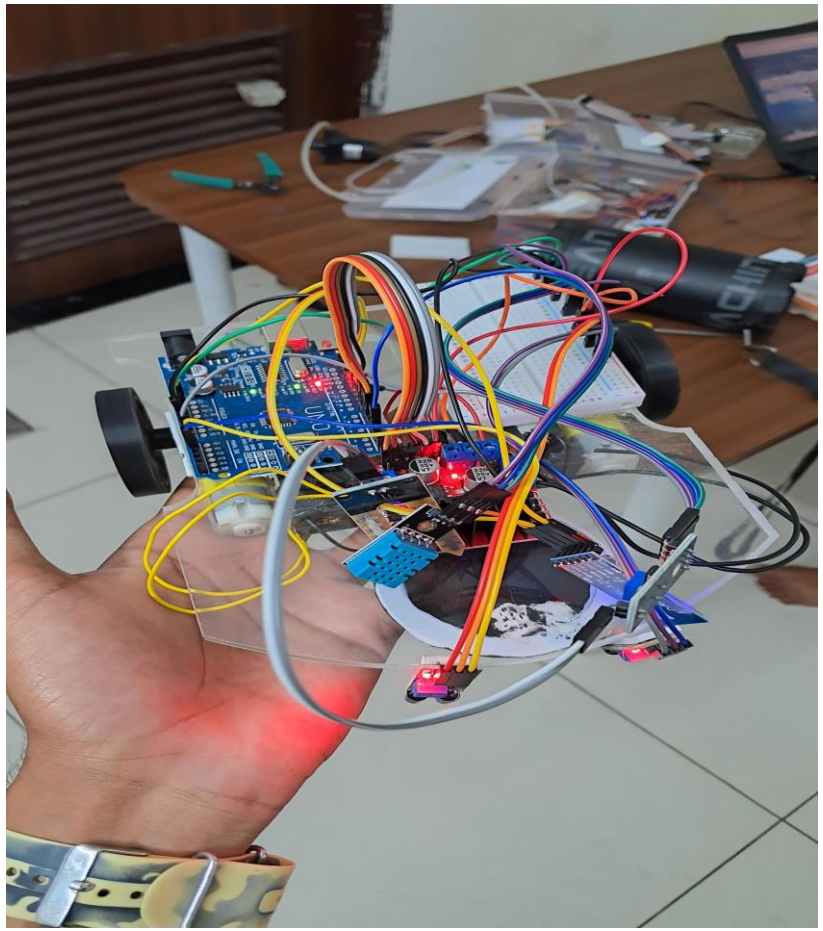


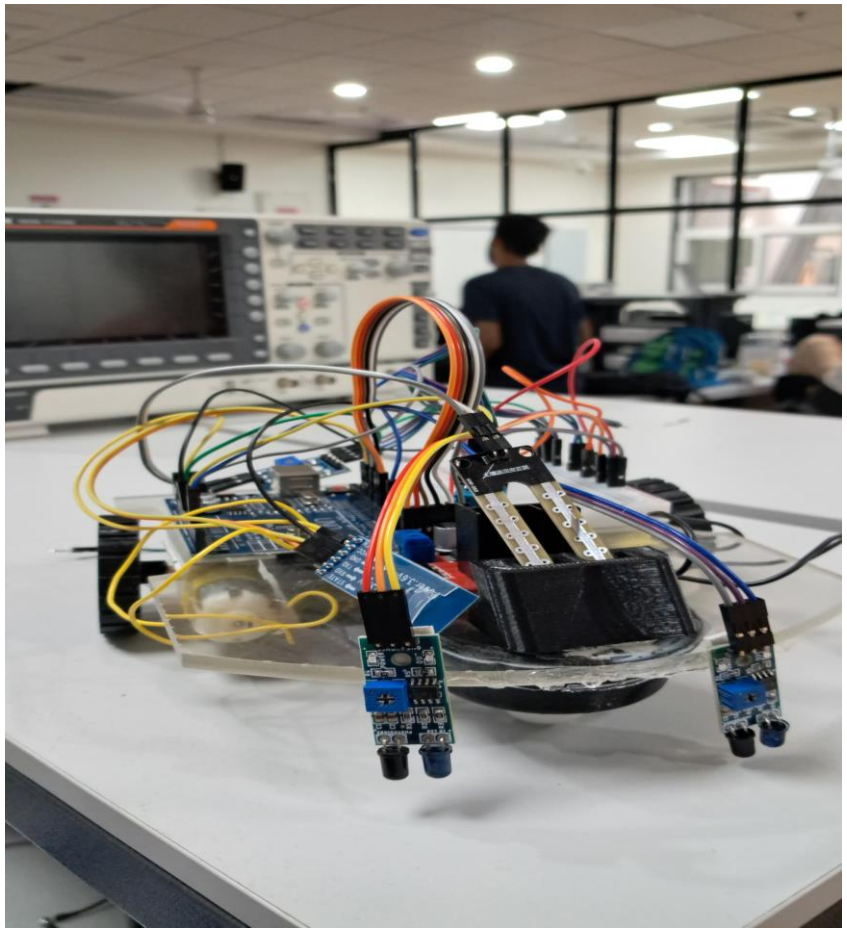


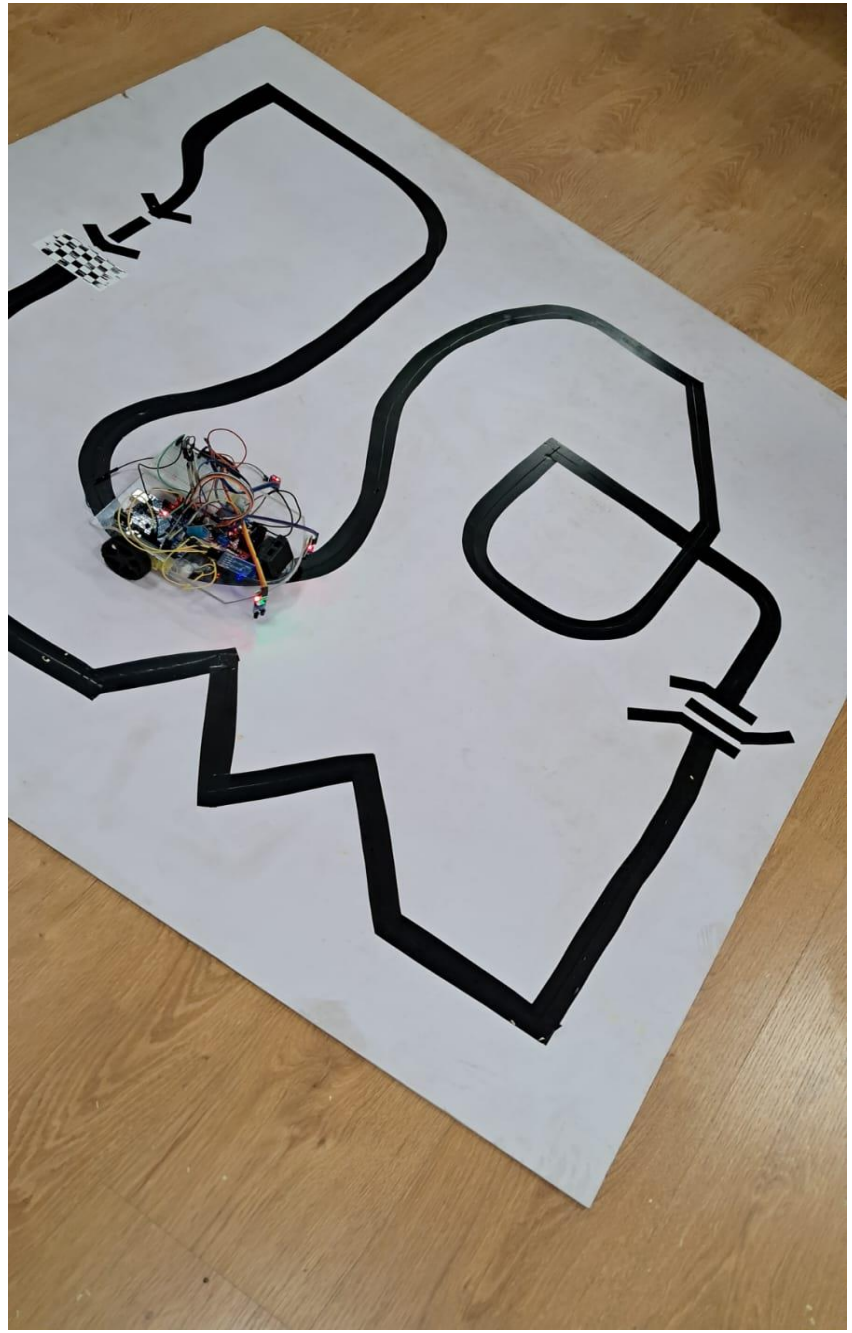
PROCEDURE

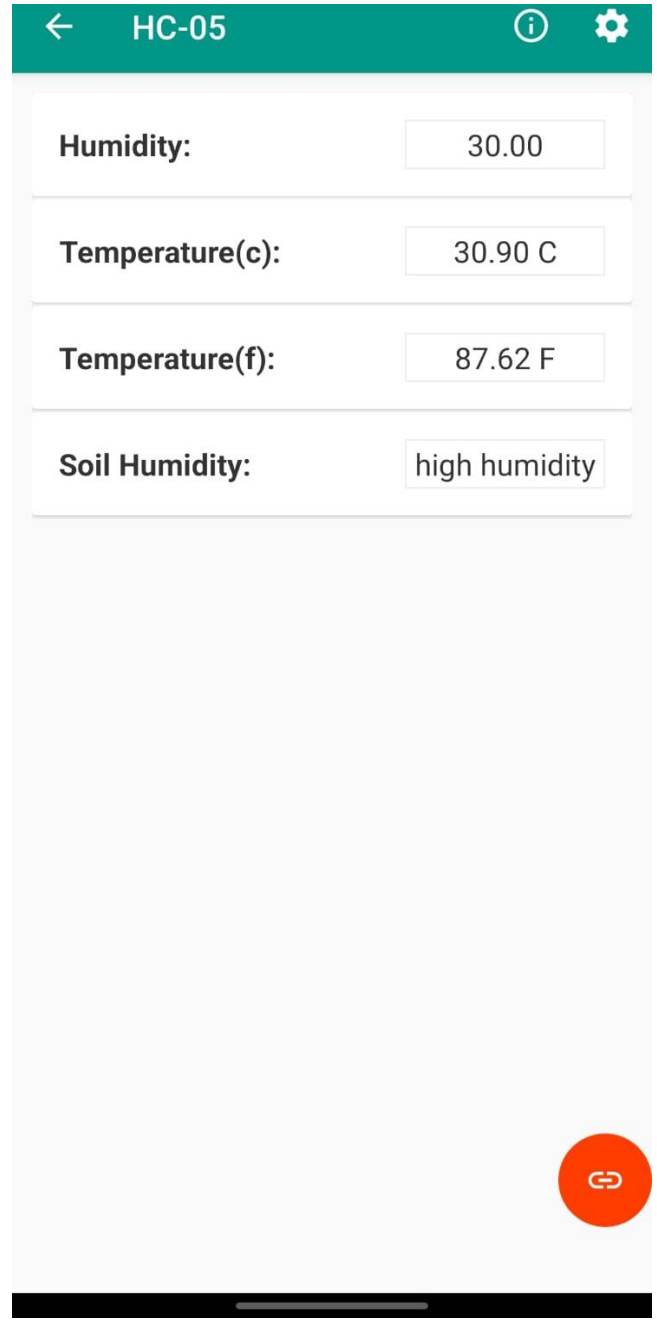
1. *3-D PRINTING THE WHEELS*
2. *LASER PRINTING THE CHESSIS BOARD*
3. *CONNECTIONS AND WIRING*
4. *CHANGING OF SPEED BY USING CASTOR WHEEL*
5. *PLACEMENT OF SENSORS*
6. *CALIBERATION AND TESTING*

PICS FROM THE PROJECTS

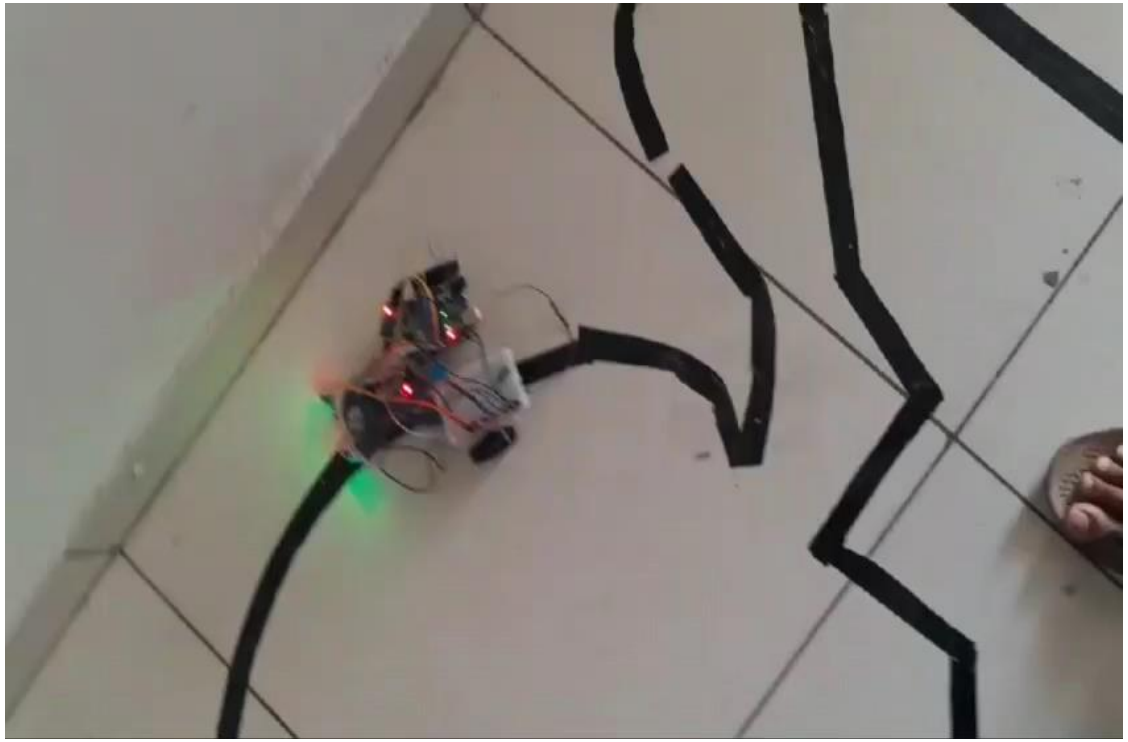


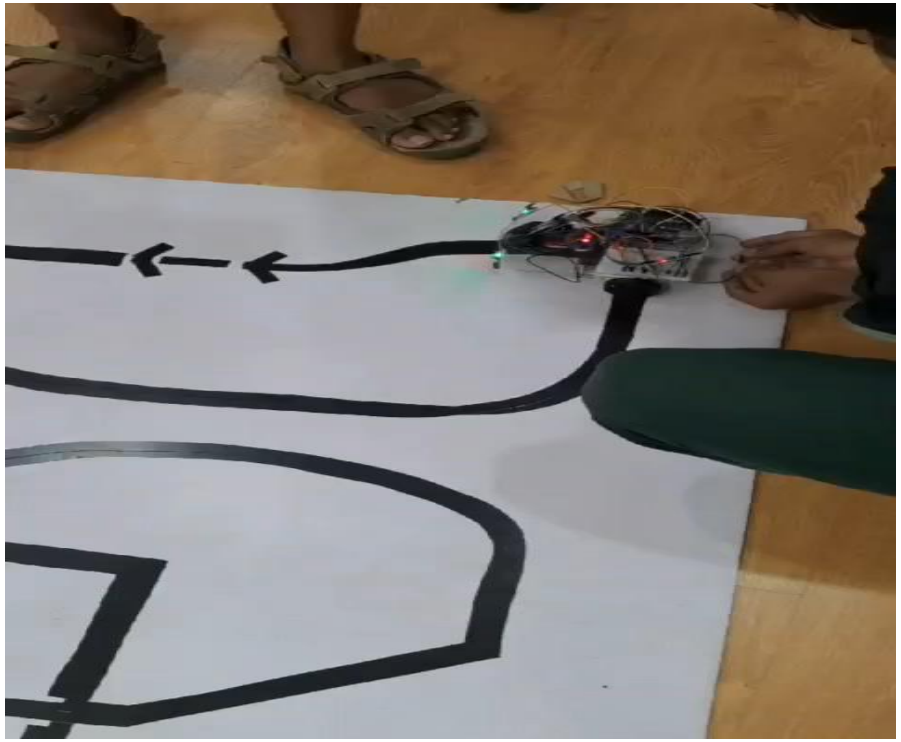





HC-05
Humidity:
30.00
Temperature(c):
30.90 C
Temperature(f):
87.62 F
Soil Humidity:
high humidity

SOME VIDEOS FROM THE PROJECT





KEY LEARNINGS:

- **Sensor Integration: Learnt to integrate and calibrate IR sensors.**
- **Algorithm Development:It provides hands-on experience in translating control theory into practical applications.**
- **Hardware Design:Designing the physical structure of the robot, including the chassis and motor configurations.**
- **Problem- Solving: Enhanced critical thinking.**
- **Programming Skills:Dealing with challenges such as sharp turns, intersections, and variations in line characteristics enhances problem-solving skills in robotics.**
- **Testing and Iteration : It involved patience and understanding for not repeating the same mistakes.**
- **Electronics and Wiring:Learning to connect and wire components such as motors, sensors, and microcontrollers provides practical experience in electronics and circuit design.**

CHALLENGES FACED IN LINE FOLLOWING:

Line following with robots can pose several challenges, and addressing these challenges is crucial for achieving reliable performance. Here are some common challenges faced in line following:

- *Ambient Light Variations*
- *Line Width and Colour*
- *Sharp Turns and Intersections*
- *Uneven Surfaces*
- *Sensor Interference*
- *Calibration Drift*

CONCLUSION:

In conclusion, the line follower robot represents a remarkable intersection of technology and practical applications. Its ability to autonomously navigate a predefined path using infrared sensors and sophisticated algorithms not only showcases the advancements in robotics but also opens doors to numerous real-world applications. From industrial automation to educational projects, the line follower robot serves as a versatile tool for enhancing efficiency and learning. As technology continues to evolve, we can anticipate further refinements in line follower robots, paving the way for increased precision, adaptability, and integration into various fields

THANK YOU

FROM
BATCH-B2
GROUP-F