LINE FOLLOWING ROBOT

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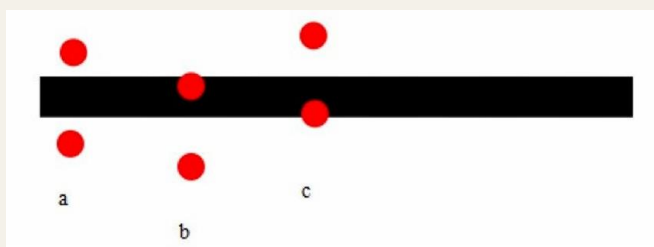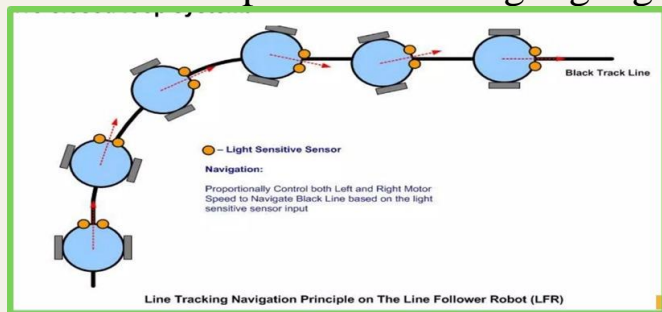19ECE384-OPENLAB

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PROBLEM STATEMENT

A line-following robot is designed to navigate a predefined path using IR sensors for path detection, without the use of a microcontroller. However, it faces significant challenges when trying to navigate complex shapes, such as a star pattern. The main difficulty arises at intersection points, where the robot needs to choose the correct direction. Standard line-following robots, relying solely on analog circuits and IR sensors, struggle to make the right decisions at these intersections, often leading to incorrect turns or stopping. The robot lacks the ability to identify intersection points and properly adjust its movement to successfully complete complex patterns like a star.
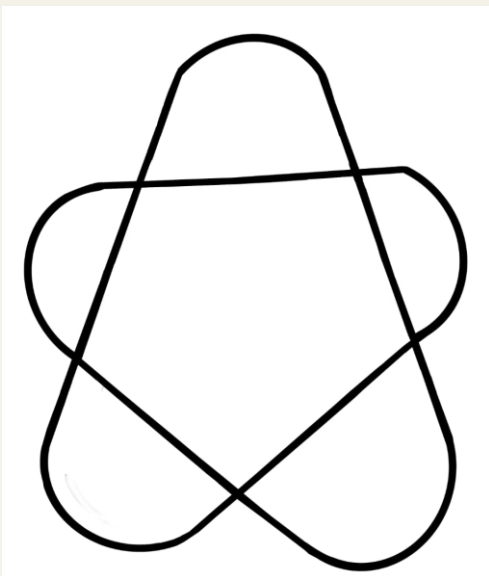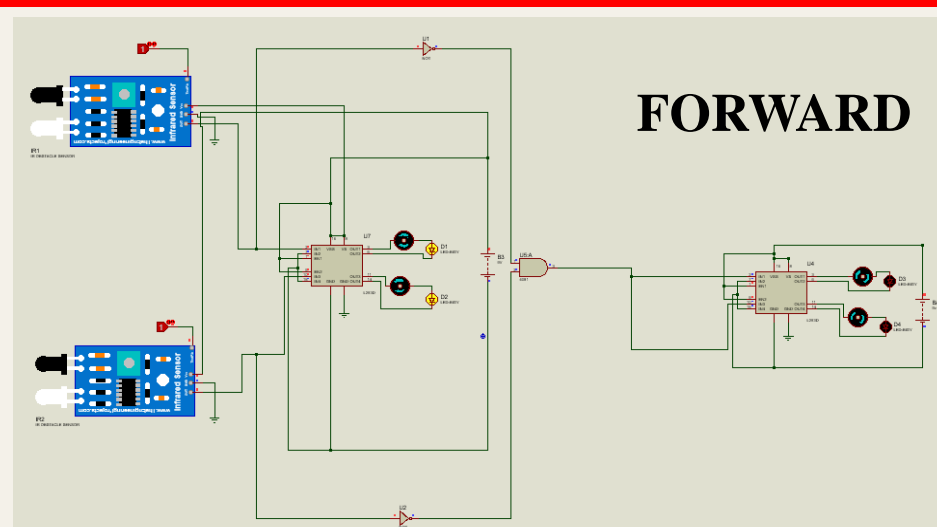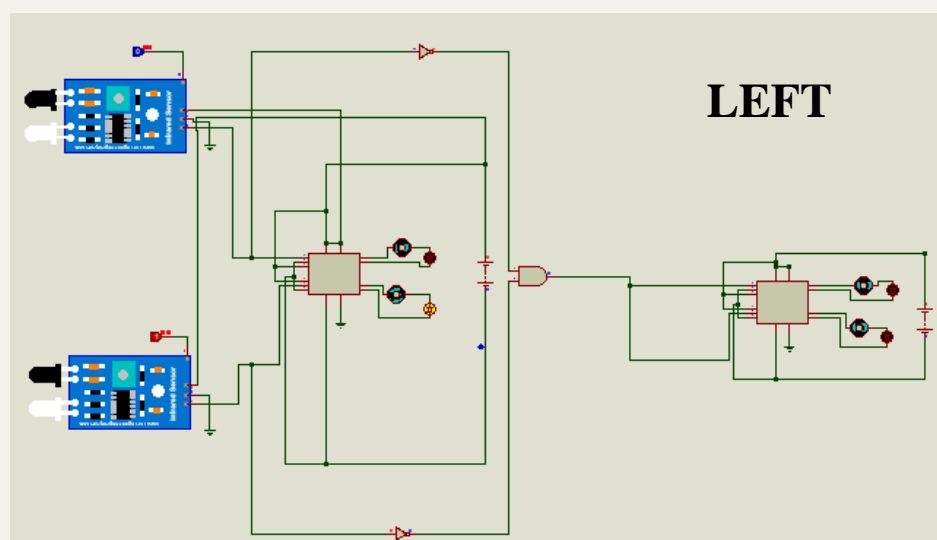

APPROACH / DESIGN/ METHODOLOGY

A line-following robot that follows a black line on a white surface without using a microcontroller. To follow complex shapes like a star, a simplified solution is implemented using logic gate
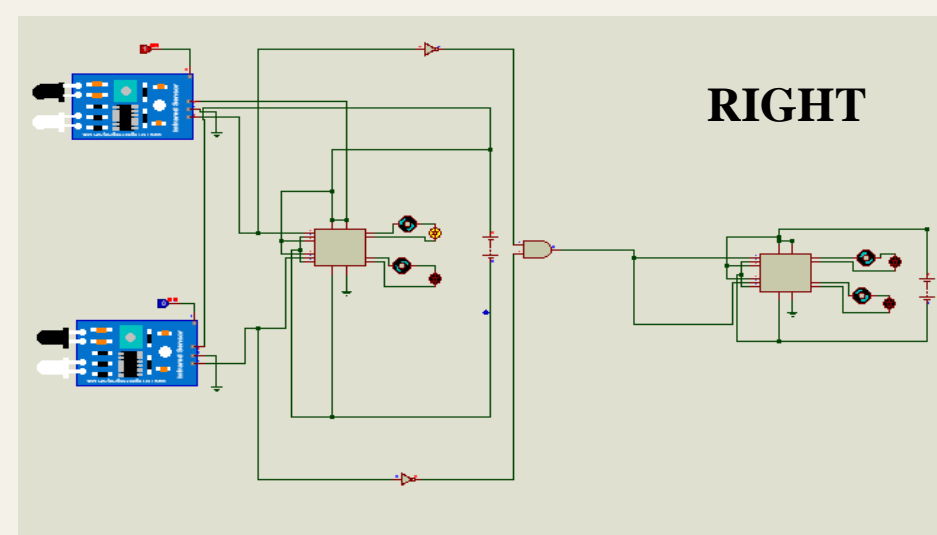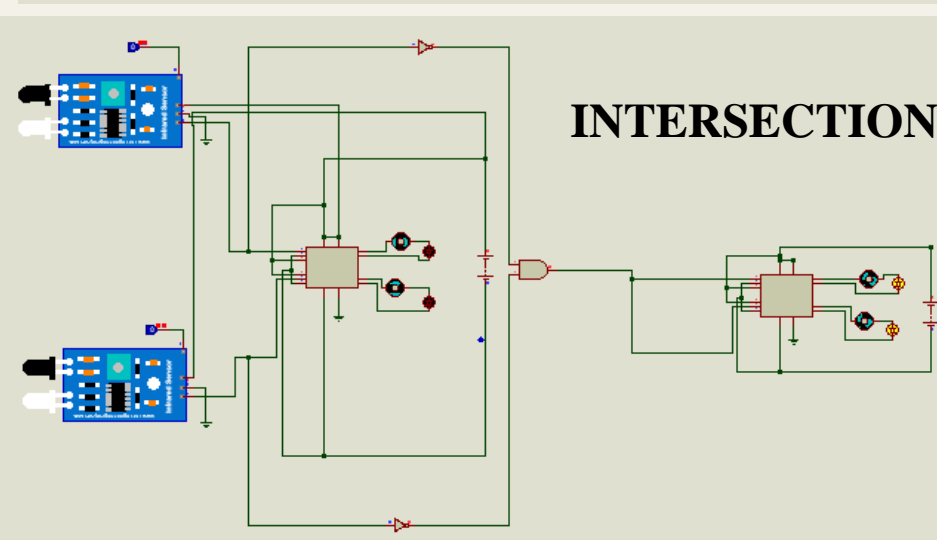

CIRCUIT DIAGRAM /ALGORITHM

CIRCUIT DIAGRAM::

ALGORITHM:

1.Path Detection Using IR Sensors-IR sensors detect the black line on a white surface.

2.Line Following Using Two Wheels-The robot moves forward along the path using two primary wheels controlled by a motor driver.

3.Intersection Point Detection Using Logic Gates-Logic gates identifies intersection points by detecting both IR sensor signals output.

4.Stopping at Intersection-The primary wheels stop at intersections. This ensures the robot pauses before making a turn, avoiding incorrect movements.

5.Switching Wheel Control for Complex Patterns-After stopping, secondary perpendicular wheels are activated to follow the star pattern.

6.Completion of the Star Path-The robot continuously detects intersections and makes logic-based decisions to complete the pattern without a microcontroller.

SIMULATION RESULTS
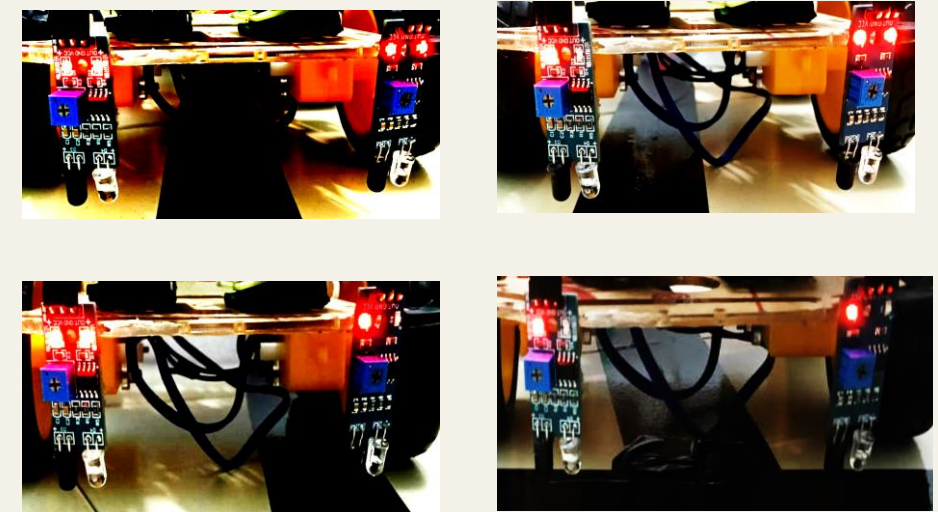
FORWARD
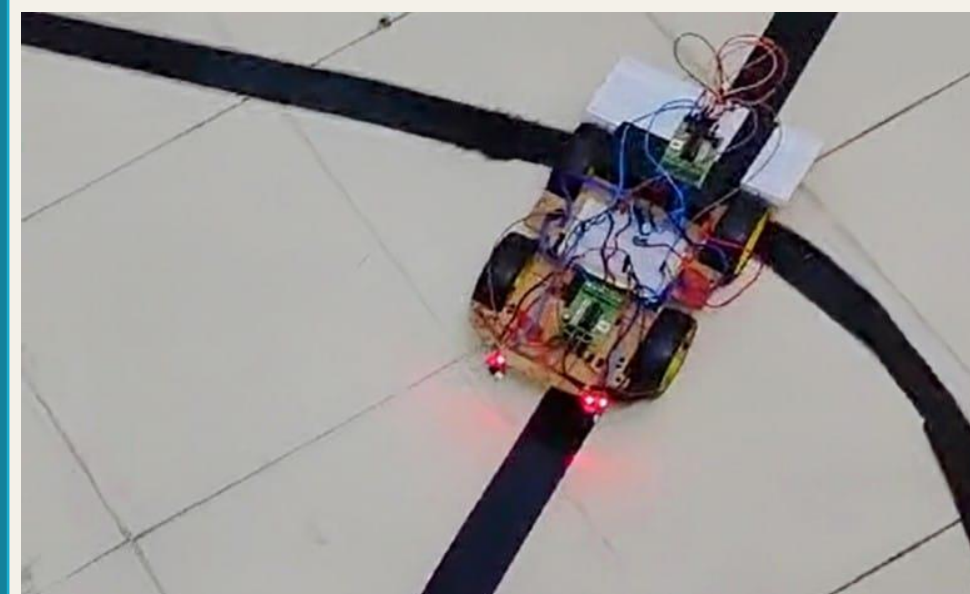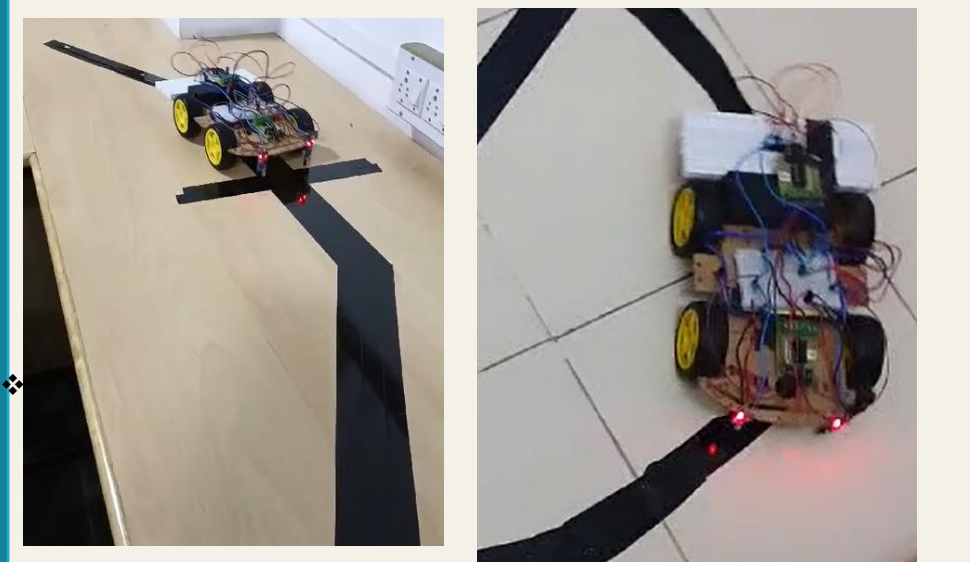

LEFT

RIGHT

INTERSECTION

RESULTS/ CALIBRATION/ ERROR GRAPH
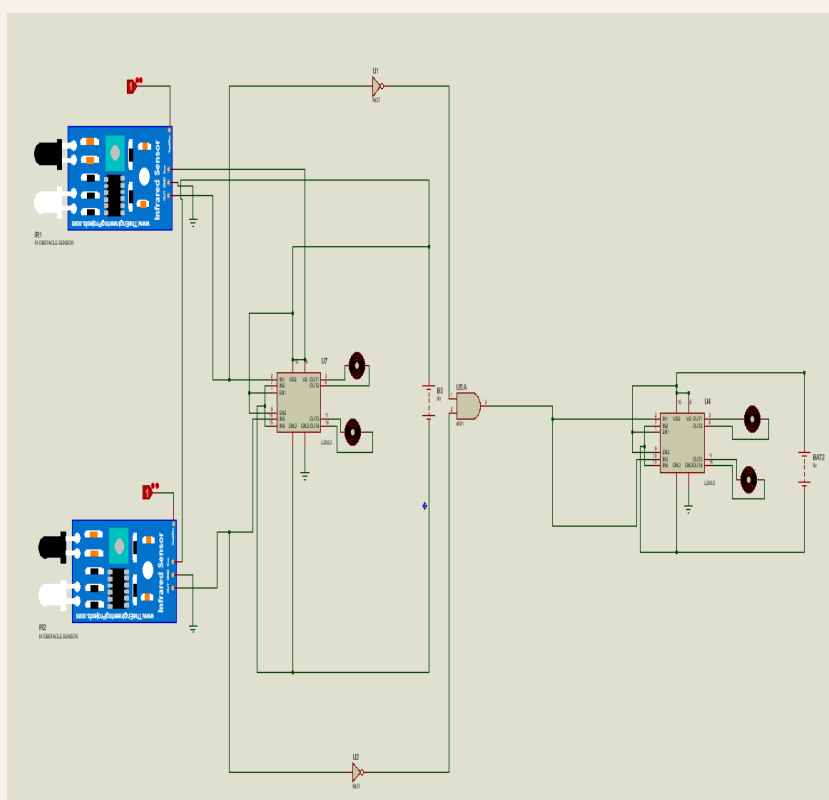
CALIBRATION OF IR SENSOR:

WORKING MODEL PICTURES

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