JAIN DEEMED-TO-BE UNIVERSITY | FACULTY OF ENGINEERING AND TECHNOLOGY

CSE - Internet of Things

HUMAN FOLLOWING ROBOCAR

Presented by:

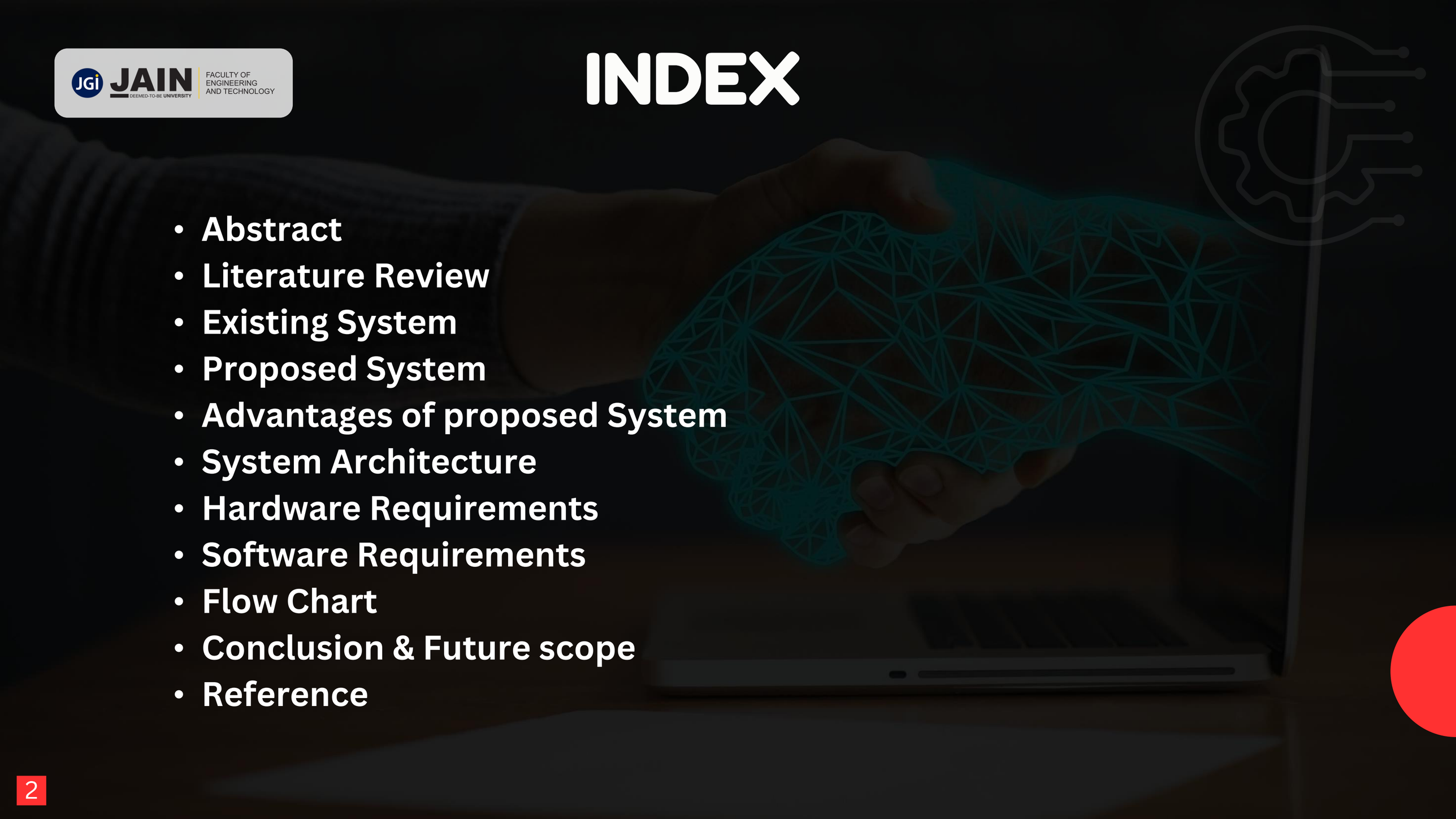
NAYAN ACHARYA (20BTRCO054)

UNDER THE GUIDANCE OF

Prof. Gaurav Londhe

JAIN DEEMED-TO-BE UNIVERSITY | FACULTY OF ENGINEERING AND TECHNOLOGY

INDEX



- Abstract
- Literature Review
- Existing System
- Proposed System
- Advantages of proposed System
- System Architecture
- Hardware Requirements
- Software Requirements
- Flow Chart
- Conclusion & Future scope
- Reference

JAIN DEEMED-TO-BE UNIVERSITY | FACULTY OF ENGINEERING AND TECHNOLOGY

ABSTRACT

A robot is a machine that can perform tasks autonomously or with supervision. This presentation describes the creation of an autonomous robot car capable of following a human and detecting and avoiding obstacles in its path. The robot car will be built with an Arduino uno, an ultrasonic sensor, an infrared sensor, and other necessary components such as a motor driver, a servo, DC motors, and batteries as a power source. The system is designed to detect and track the presence of an individual based on their movements. Furthermore, the ultrasonic sensor is used to detect and avoid collisions with obstacles in the path of the robot car. The system's effectiveness will be assessed through experiments in various environments and scenarios, demonstrating its ability to track, follow individuals in crowd & avoid obstacles. Overall, this project demonstrates the potential of combining simple and inexpensive technologies to create an intelligent robot car capable of performing complex tasks.

Keywords—robot, ultrasonic, infrared, Arduino uno, human following, car, motor.

JAIN DEEMED-TO-BE UNIVERSITY | FACULTY OF ENGINEERING AND TECHNOLOGY

LITERATURE REVIEW

Title of Project & Year	Description	Drawback
Remote and Autonomous Controlled Robotic Car based on Arduino with Real Time Obstacle Detection and Avoidance (2018)	This project employs infrared sensors and an Arduino to control a robotic automobile that senses its surroundings in real time and avoids obstacles.	The amount of time required to deal with obstacles is excessive.
Line Following Autonomous Office Assistant Robot with PID Algorithm (2018)	In this project, the PID algorithm is used to guide the robotic car along a course or line, and ultrasonic sensors are used to detect impediments.	If the line markers are too faint or unreadable, the robot car does not appear to stop or move.

JAIN DEEMED-TO-BE UNIVERSITY | FACULTY OF ENGINEERING AND TECHNOLOGY

LITERATURE REVIEW

Title of Project & Year	Description	Drawback
Line Follower Robots Controlling, Working Principle and Applications (2017)	This project discusses and explains the concept of a robotic car that follows a route or line.	Only the operation and the principle are described. The project is not completed.

JAIN DEEMED-TO-BE UNIVERSITY | FACULTY OF ENGINEERING AND TECHNOLOGY

EXISTING SYSTEM

- **Vision-based methods:** These methods rely on cameras or depth sensors to perceive the environment and track human motion. They use computer vision algorithms to detect and track human features, such as the body, face, or color-based markers. Techniques like optical flow, background subtraction, and object detection are commonly employed.

- **Probabilistic approaches**: Bayesian filtering techniques, such as Kalman filters or particle filters, are used to estimate the position and motion of humans. These methods incorporate probabilistic models to predict human movements and update the robot's belief about the human's location over time.

JGI JAIN DEEMED-TO-BE UNIVERSITY | FACULTY OF ENGINEERING AND TECHNOLOGY

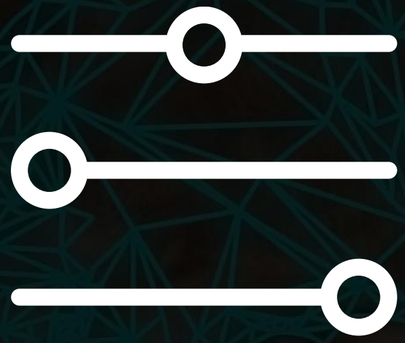
PROPOSED SYSTEM

- The proposed method involves creating a human-following robot using Arduino, an ultrasonic sensor, and an IR sensor array.
- The ultrasonic sensor is used to detect the presence of a human within a certain range, while the IR sensor array helps determine the human's position relative to the robot.
- Based on this information, the robot adjusts its movement using a motor driver module to follow the human.
- The Arduino board processes the sensor data and controls the motors accordingly.
- By maintaining a desired following distance, the robot tracks the human's movement.
- The method involves connecting and configuring the sensors, writing Arduino code for sensor data processing and motor control, assembling the robot, and testing its functionalit

JAIN DEEMED-TO-BE UNIVERSITY | FACULTY OF ENGINEERING AND TECHNOLOGY

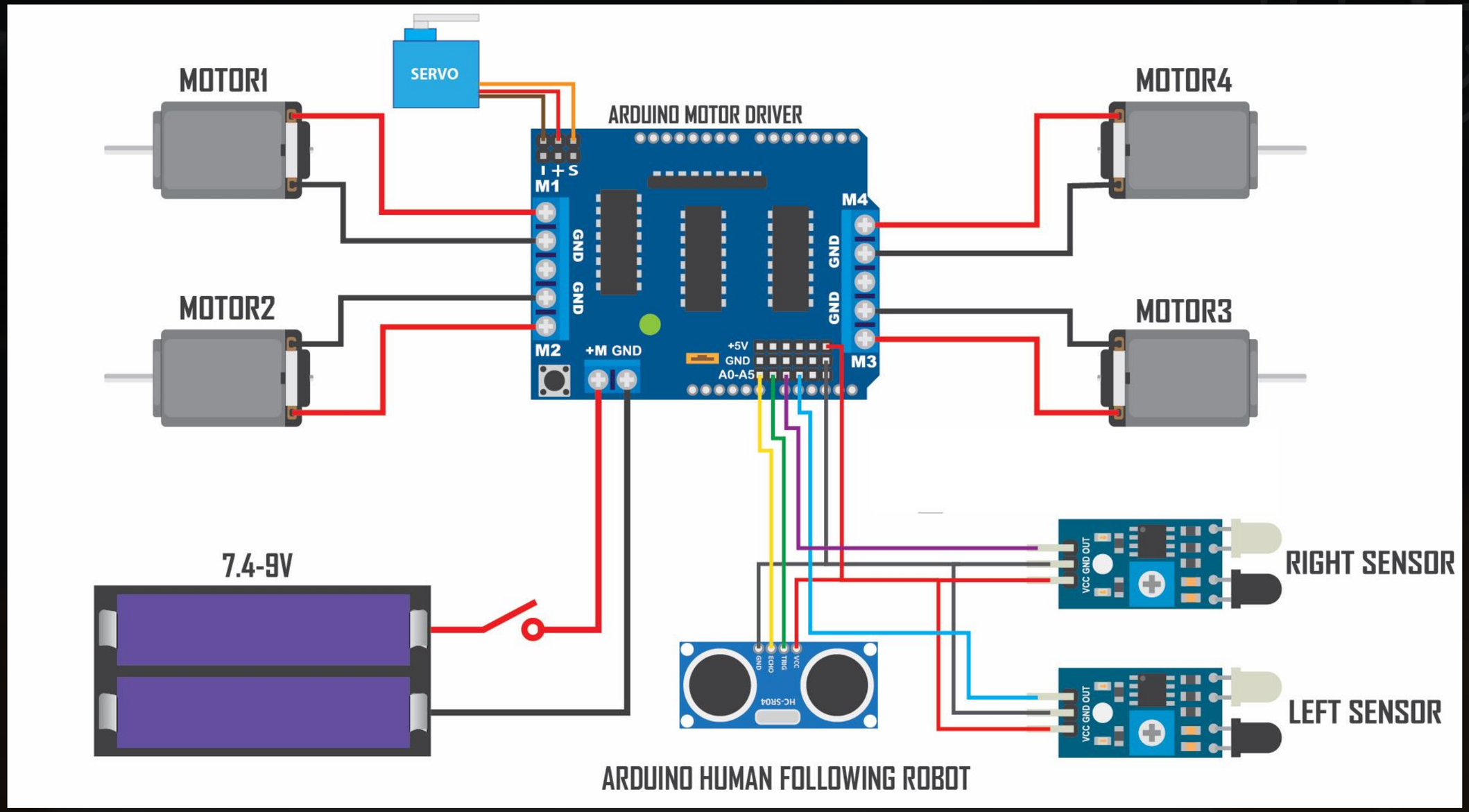
ADVANTAGES OF PROPOSED SYSTEM

- Individual Tracking
- Easy implementation
- Accurate human detection
- Relative positioning
- Customizability
- Potential for expansion



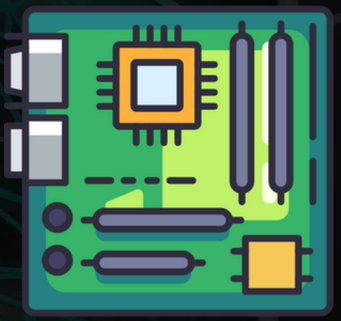
JAIN DEEMED-TO-BE UNIVERSITY | FACULTY OF ENGINEERING AND TECHNOLOGY

SYSTEM ARCHITECTURE



HARDWARE REQUIREMENTS

- Arduino board (e.g., Arduino Uno)
- Ultrasonic sensor (e.g., HC-SR04)
- IR sensor array (e.g., TCRT5000)
- Motor driver module (e.g., L293D)
- DC motors and wheels for robot movement
- Power supply (3.7V 3000mAh Li-io Battery)
- Jumper wires
- Servo Motor



JAIN DEEMED-TO-BE UNIVERSITY | FACULTY OF ENGINEERING AND TECHNOLOGY

SOFTWARE REQUIREMENTS

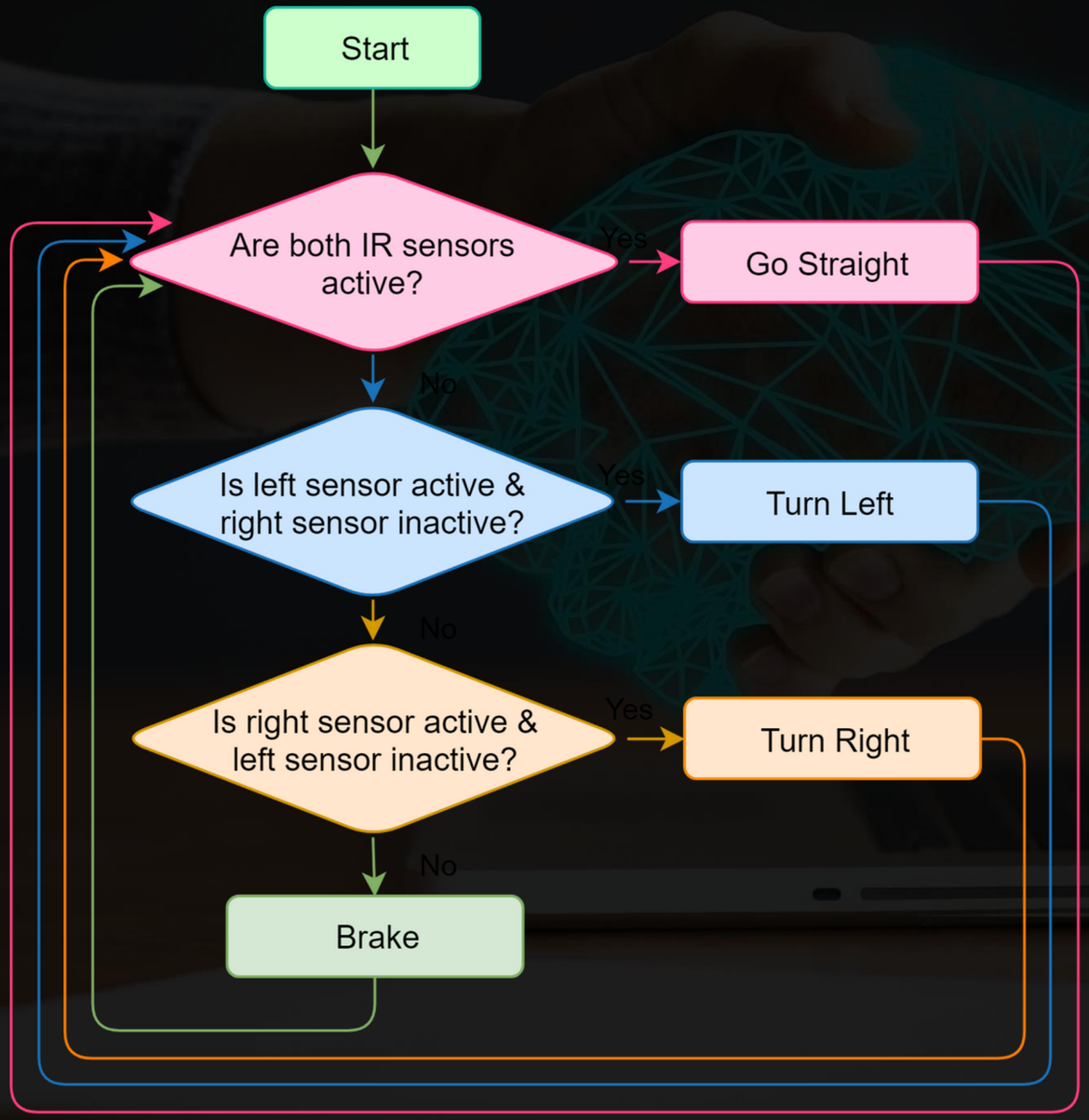
AUTODESK® TINKERCAD®

- Arduino IDE
- Tinker cad

ARDUINO™

JAIN DEEMED-TO-BE UNIVERSITY | FACULTY OF ENGINEERING AND TECHNOLOGY

FLOW CHART



JAIN DEEMED-TO-BE UNIVERSITY | FACULTY OF ENGINEERING AND TECHNOLOGY

CONCLUSION & FUTURE SCOPE

This demonstrates a successful implementation of a prototype of the robot's obstacle avoidance as well as human following capabilities. While developing the prototype, it was important to keep in mind that the robot's functions should be as efficient as possible. The human-following robot is a vehicle system that can detect obstacles, move, and adjust its position in relation to the subject in order to stay on course. This project makes use of an Arduino, motors, and a variety of sensors to achieve its goal. This project allowed the team to collaborate, communicate effectively, and gain a better understanding of how mechanical systems, electronics, and programming are all linked.

REFERENCE

[1] Sharma, S., & Sinha, A. (2020). Human Following Car with Obstacle Detection and Avoidance System using Arduino. International Journal of Engineering Research and Technology, 13(8), 372-375.

[2] Kaur, H., & Kaur, M. (2018). Design and Implementation of Human-Following Robot using Arduino. International Journal of Innovative Technology and Exploring Engineering, 8(10), 2002-2006.

[3] Kavya, K. M., & Prakash, K. L. (2019). Design and Development of Human Following Robot using Arduino and Ultrasonic Sensor. International Journal of Innovative Technology and Exploring Engineering, 8(11), 1279-1283.

[4] Jadhav, S., & Kumavat, P. (2019). Human Following Car Using Ultrasonic Sensor. In Proceedings of 2019 5th International Conference on Computing, Communication and Security (pp. 74-78). IEEE.

[5] Khan, S. A., Kumar, P., & Banerjee, S. (2019). A Low-Cost Human Following Robot with Obstacle Avoidance Capability. In Proceedings of 2019 International Conference on Smart Electronics and Communication (pp. 105-110). IEEE.

[6] https://chat.openai.com/

JAIN DEEMED-TO-BE UNIVERSITY | FACULTY OF ENGINEERING AND TECHNOLOGY

ANY QUESTION ??