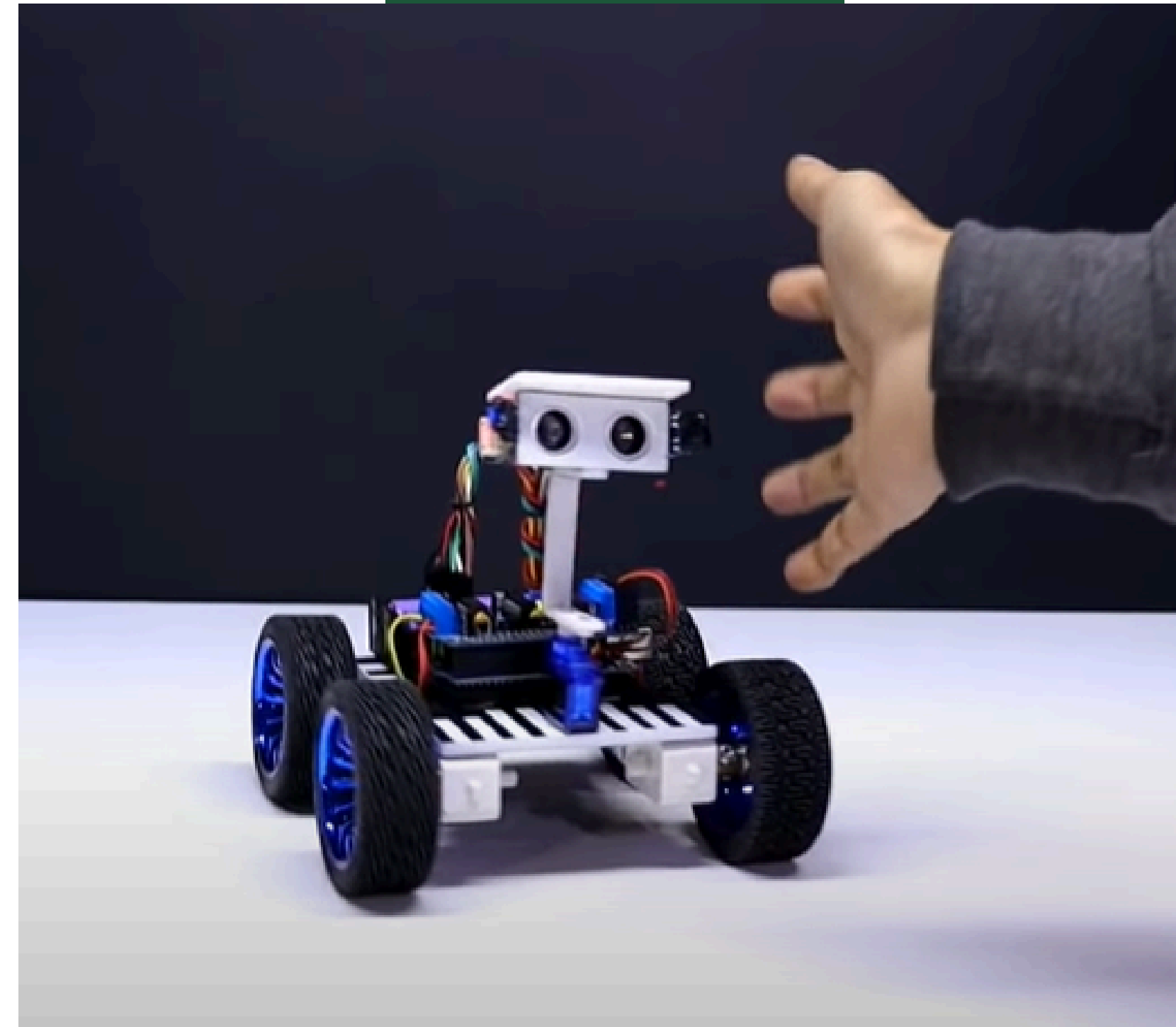


HUMAN FOLLOWING ROBOT

TEAM MEMBERS

- KHAN IMRAN
 - KHAN TALHA
 - JAFAR ANSARI
 - KHAN EJAJ



INTRODUCTION

- Human Following Robot: Advanced robotics enables robots to follow humans, enhancing interaction.
- Hazardous Environments: Robots mitigate risks and accomplish tasks beyond human capabilities in mining and war-zones.
- Surpassing Human Limitations: Robots excel in tasks where human limitations such as vision, speed, and consistency are challenging.
- Non-Technical Interaction: Developing robots capable of non-technical interaction with humans is crucial.
- Sector Benefits: Industries benefit greatly from robotic assistance, offering precision and adaptability.
- Safety Improvement: Deploying robots enhances safety in hazardous environments, reducing risks.
- Continuous Evolution: Robotic technology promises to revolutionize industries, boosting productivity, and safeguarding human lives.

LITERATURE REVIEW

Title: Design and Implementation of a Human Following Robot Using Arduino

Purpose: To develop a robot capable of autonomously following a human.

Year: 2021

Technique:

Utilization of Arduino microcontroller for control and sensor interfacing.

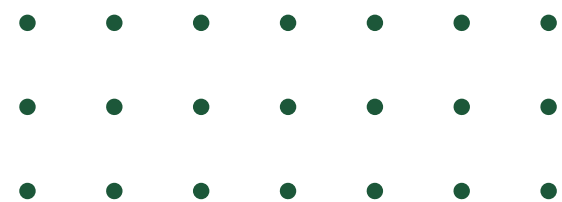
Integration of ultrasonic sensors for obstacle detection.

Implementation of infrared sensors for human detection and tracking.

PID control algorithm for smooth movement.

Drawbacks:

- Limited range of human detection and tracking.
- Vulnerability to environmental conditions (e.g., low lighting affecting sensor performance).
- Power consumption may limit operating time, especially in continuous use scenarios.



LITERATURE REVIEW

Title: Arduino Based Human Following Robot

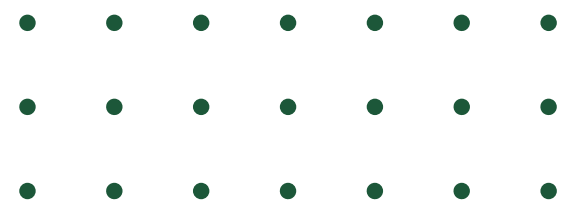
Year: June 2021

Purpose: To design and construct a cost-effective and reliable robot that autonomously follows humans and assists in various tasks.

Technique: Utilizes Arduino as the main functioning tool with ultrasonic sensors for object detection and motor drivers for controlling the wheels.

Drawbacks:

The robot's operation is limited to indoor environments with flat ground and walking speeds.



LITERATURE REVIEW

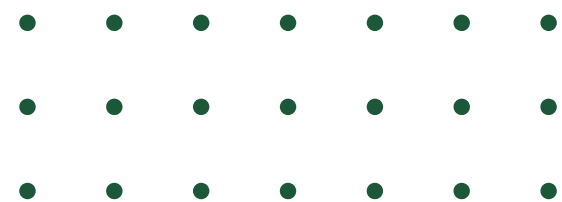
Title: Human Following Robot Using Arduino Uno

Purpose: The purpose of the paper is to design and implement a robot that can follow humans or obstacles using Infrared and Ultrasonic sensors. The robot is intended to assist in various tasks such as carrying items, aiding in hospitals, and potentially in defense sectors.

Year: The paper was published in Volume 03/Issue 07 in July 2021.

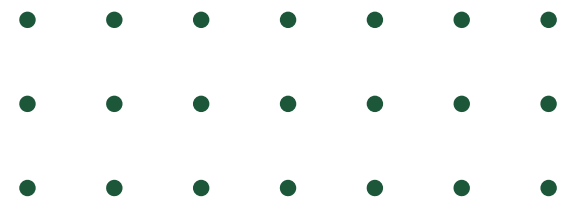
Technique: The robot is built using Arduino Uno as the microcontroller, Infrared sensors for directional movement, Ultrasonic sensor for forward and reverse movement, and a motor driver shield with ATmega L293d to control the four DC motors.

Drawbacks: The project faced challenges during the development phase, including errors in the program code and motor driver connections. These issues required troubleshooting and rectification before achieving the desired functionality.



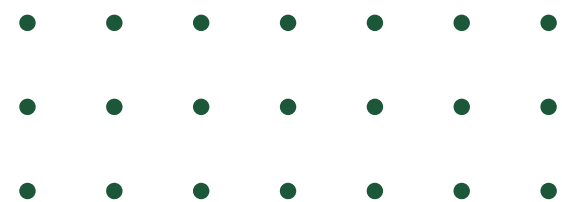
PROBLEM DEFINATION

- Continuous Design and implement a human-following robot system that autonomously tracks and follows a human target in various environments.
- The primary goal is to develop a reliable and efficient solution that enables the robot to navigate safely while maintaining a desired distance from the human target, overcoming obstacles, and adapting to changes in the environment



OBJECTIVES

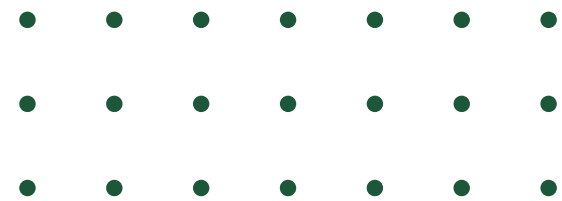
1. Develop algorithms for real-time detection and tracking of human targets across varied environments.
2. Ensure the robot offers safe and convenient assistance, especially in potentially risky environments.
3. Implement control algorithms for maintaining a consistent and adjustable distance between the robot and the human target
4. Define quantitative metrics to evaluate tracking accuracy, distance regulation, and response time.
5. Conduct thorough real-world testing to validate system effectiveness, reliability, and safety.



HARDWARE REQUIREMENTS

Hardware Requirements:

- 1.Arduino Uno
- 2.Motor Driver Shield
- 3.Wheels (4x)
- 4.TT Gear Motor (4x)
- 5.Servo Motor
- 6.Ultrasonic Sensor
- 7.Infrared Sensor (2x)
- 8.18650 Li-ion Battery (2x)
- 9.18650 Battery Holder.



SOFTWARE AND COST ESTIMATION

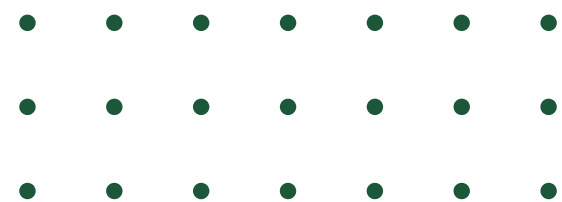
Software Requirements:

- Operating System
- Arduino IDE
- Navigation and Control
- User Interface

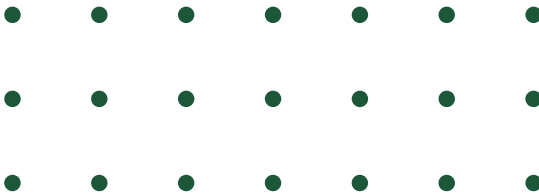
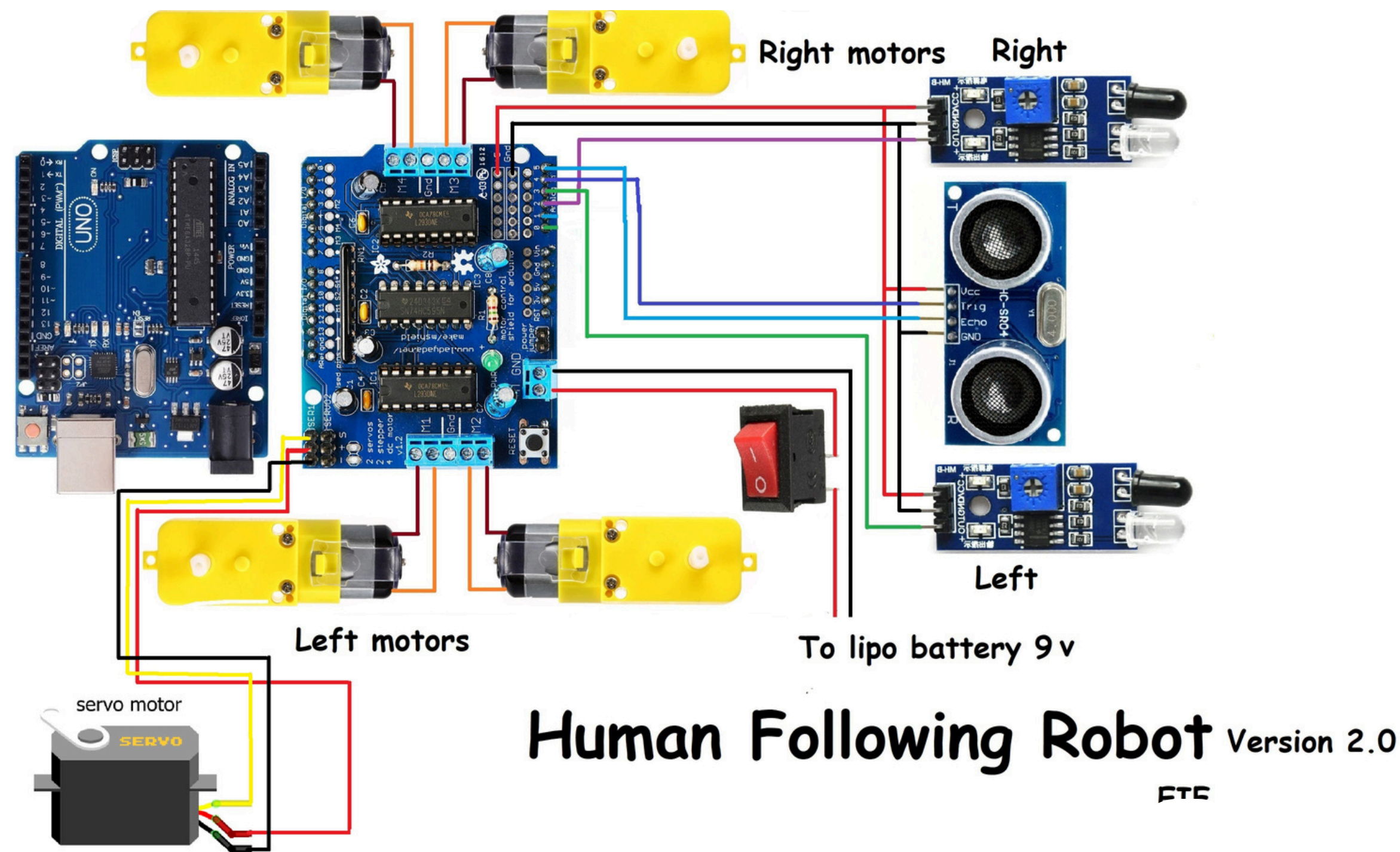
Estimated Cost:

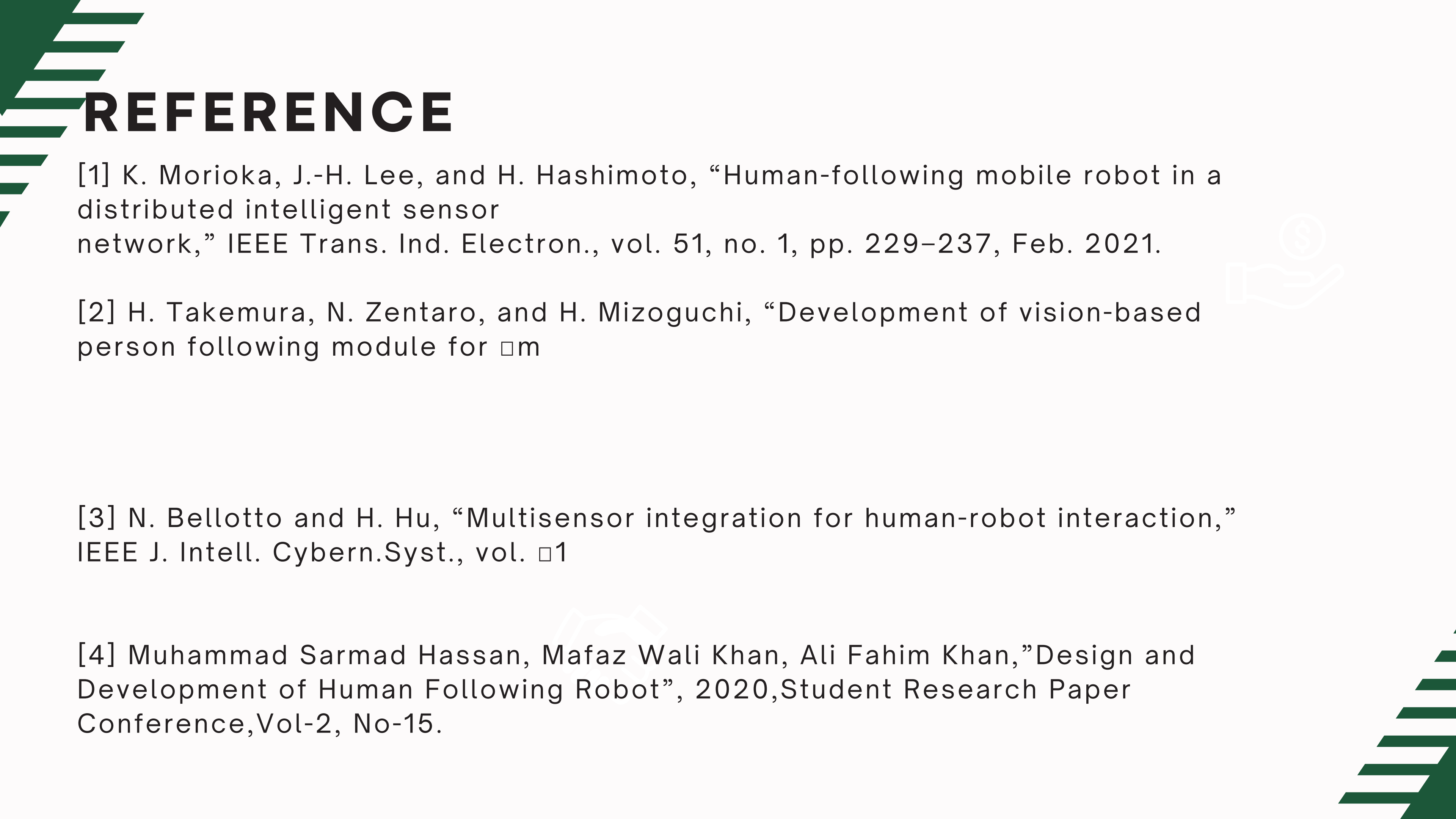
- 1.Arduino Uno: ₹237
- 2.Motor Driver Shield: ₹215
- 3.Wheels (4x): ₹237
- 4.TT Gear Motor (4x): ₹86
- 5.Servo Motor: ₹129
- 6.Ultrasonic Sensor: ₹65
- 7.Infrared Sensor (2x): ₹86
- 8.18650 Li-ion Battery (2x): ₹215
- 9.18650 Battery Holder: ₹43

Total estimated cost after adjustment: ₹1,713



CIRCUIT DIAGRAM





REFERENCE

- [1] K. Morioka, J.-H. Lee, and H. Hashimoto, “Human-following mobile robot in a distributed intelligent sensor network,” IEEE Trans. Ind. Electron., vol. 51, no. 1, pp. 229–237, Feb. 2021.
- [2] H. Takemura, N. Zentaro, and H. Mizoguchi, “Development of vision-based person following module for □m
- [3] N. Bellotto and H. Hu, “Multisensor integration for human-robot interaction,” IEEE J. Intell. Cybern.Syst., vol. □1
- [4] Muhammad Sarmad Hassan, Mafaz Wali Khan, Ali Fahim Khan,”Design and Development of Human Following Robot”, 2020,Student Research Paper Conference,Vol-2, No-15.



THANK YOU

