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Human Following Robot

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ABSTRACT: The capability of a robot to track and follow a moving object can be used for several purposes.

1. Assistance : The robot can assist humans in various tasks.
2. Entertainment : The robot can be employed in amusement parks.
3. Accessibility : Human Following Robot can assist individuals.

I. INTRODUCTION

In this high technology, a robot must be able to detect and follow humans. A robot that can detect and follow human or obstacle within a specific range is called „Human Following Robot“. Robots are used to change people's lives and make people's life luxurious. A robot that can use in the hospital for bringing medicine with more accuracy and fast. The human following robot has many works like work as trolley, structure in hospital, and a small basket with a car and so on. Now in this changing world, people are started to lives with robotlike humans following robots for their luxurious life. The human following robot can use in the defence sector also to carry weapons for the soldiers. This type of robot can sense obstacles and humans automatically and it can use in the future in our cars. An human following robot can be modified in the future with more developed components and can make it more advance. This robot will be more trend in our future.

Robotic technology has increased appreciably in past couple of years. Such innovations were only a dream for some people a couple of years back. But in this rapid moving world, now there is a need of robot such as “A Human Following Robot” that can interact and co-exist with them. The development of robot technology had increased significantly due to industrial, medical and military applications. Tasks performed by humans have its own limitations in many ways. In order to perceive beyond the human limitation in vision, speed, consistency, flexibility, quality etc. we should make use of robots. A key requirement for these robots is the ability to detect humans and to interact with the min non-technical way. The main objective of this dissertation is to make a robot that can help humans with various tasks.. In this project, we present a prototype of a human following robot that uses Arduino Uno and different sensors for detection and following an object.

II. RELATED WORK

Chen, K. [1] has present a vision-based human-following robot system that utilizes a camera and image processing techniques to track and follow a human. The approach includes methods for detecting and tracking humans, as well as algorithms for controlling the robot's movement. focusing on real-time human detection, tracking, and robot control. The system offers potential applications in areas such as human-robot interaction, mobile

Shen.S. [2] has given some information about "Autonomous Human-Following Robot with a Particle Filter Based on the Learned Motion Model" This paper presents a humanfollowing robot that uses a particle filter algorithm with a learned motion model to estimate the human's position and track it in real time. The system incorporates depth information from a depth camera to improve tracking accuracy.

Chen, S. [3] has introduced about "A Human-Following Robot with Behavior Learning and Adaptive Control" The authors propose a human-following robot that incorporates behavior learning and adaptive control techniques. The system learns human motion patterns and adapts its control strategy accordingly to follow the human in a natural and intuitive manner. Human-following robots with behavior learning and adaptive control aim to create robots that can autonomously track and follow humans while exhibiting adaptive and intelligent behavior. The

integration of behavior learning and adaptive control allows the robot to learn from its interactions with the environment and adapt its behavior accordingly. Wang,

Y. et al. [4] has introduced "A Human-Following Mobile Robot using Visual Servoing and Path Planning" by The authors propose a human-following mobile robot that combines visual servoing and path planning techniques. The system uses a camera to detect and track a human target, and a path planner to generate a collision-free trajectory for the robot to follow. A human-following mobile robot aims to autonomously track

III. METHODOLOGY

BACKGROUNDS & CHALLENGES

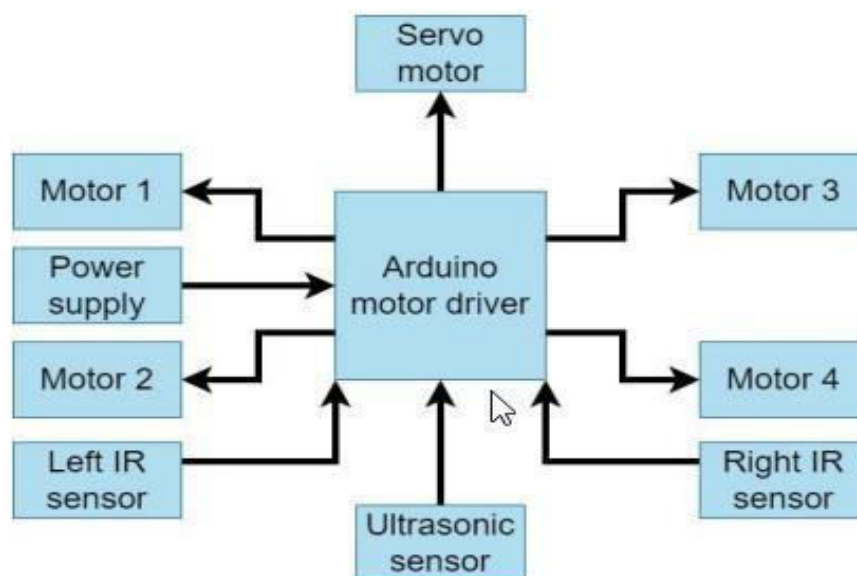
A human following robot has two building stages: hardware and software. **Hardware**

Our system is made up of a four-wheel robotic vehicle with its own microprocessor and control unit, as well as various sensors and modules, such as ultrasonic sensors and infrared sensors, which help them to follow people and objects in their surroundings. The aforementioned sensors work in coordination with each other to help the robot operate and navigate its path by avoiding obstacles and maintaining a specific distance from objects. Ultrasonic sensors were used to avoid obstacles and keep objects at a specific distance. Two infrared sensors on both sides are used to detect orientation.

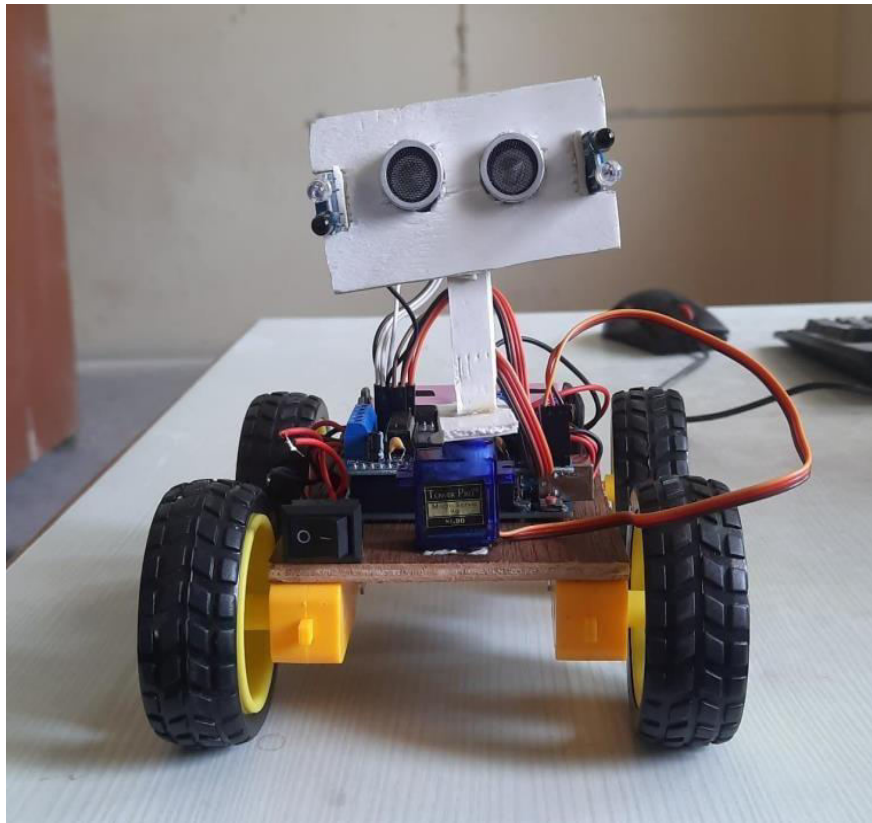
COMPONENTS SPECIFICATION

1. Arduino with cable
2. Arduino Motor driver
3. DC Motor
4. Ultrasonic sensor
5. IR sensor
6. Servo motor
7. Rubber wheels
8. Li-ion Battery
9. Switch

IV. FLOW CHART



V. CONCLUSION



A successful implementation of a prototype of human following robot is illustrated in this paper. This robot does not only have the detection capability but also the following ability as well. While making this prototype it was also kept in mind that the functioning of the robot should be as efficient as possible. Tests were performed on the different conditions to pinpoint the mistakes in the algorithm and to correct them. The different sensors that were integrated with the robot provided an additional advantage.

The human following robot is an automobile system that has ability to recognize obstacle, move and change the robot's position toward the subject in the best way to remain on its track. This project uses Arduino, motors, different types of sensors to achieve its goal. This project challenged all the separate parts to cooperate with each other, communicate, and expand understanding of electronics, mechanical systems, and their integration with programming.

The significant point of this framework was to plan and develop a devotee automated truck utilizing ultrasonic sensor which can follow the objective individual in unstructured conditions. The devotee automated truck is accomplished utilizing ultrasonic sensor, drivers and microcontroller. The framework gives another approach in the field of advanced mechanics. This truck would be useful in lessening work while playing out certain assignment. The follower automated truck has a better degree sooner rather than later

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