International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 07 Issue: 05 | May - 2023 SJIF 2023: 8.176 ISSN: 2582-3930

HUMAN FOLLOWING ROBOT
(For smart trolley and smart stretcher)

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Abstract*— Human following robot as the name propounds will follow a human within a precise range. With the advancement in automation like everything is going smart, we are using this concept of human following robot to implement in smart stretcher and smart trolley. Smart stretcher will be tremendously used for dealing with covid 19 patients. It will accompany the ward boy without any contact. And smart trolley will be utilized for loading heavy goods. It will minimize the use of muscle power and make the work hustle free. We have made a prototype using Arduino uno as the brain of the system which can be enhanced in the future with more advance components to increase its efficiency. This prototype can be modified by structure by adding more components like camera, solar battery for power supply, tracking device etc. This robot will have high demand in near future.

Index Terms— ***Arduino uno, Embedded C, Microcontroller, ultrasonic sensor***

I. INTRODUCTION

Human following Robot is the interaction between Human and Robot with the help of sensors. It is a programmable robotization device that replaces human interference from daily actions. This robot which follows a human within a certain distance. We have used ultrasonic sensors whichsends and reflects ultrasonic pulses. These pulses help to measure the duration and distance between robot and human.In this fast-growing world we need automated devices to perform our day-to-day activities to make our life easier and convenient.

We are making this robot mainly for hospitals (smart stretchers) and in Industries i.e., smart trolleys (for loading and unloading of heavy weights). This robot is instructed by the people for proper functioning. For example - In covid pandemic people get infected by touching objects so this robot will provide great solution.

II. METHODOLOGY

A. Hardware

Our system consists of a four-wheel robotic vehicle mounted with a separate microcontroller and control unit along with different sensors and modules i.e., ultrasonic sensor, servo motor, motor driver which helps the device to move with respect to people and objects in their surroundings. The above sensors work together with each other and helps the robot in its operation to navigate its path by avoiding the obstacles and maintaining a specific distancefrom the human. We have used ultrasonic sensor for obstacleavoidance and to maintain a specific distance from the human.

B. Software

To make the hardware parts workable we need to program the microcontroller (brain of our system). So, to program it we will need a platform. Here we have used Arduino IDE for giving instructions by using embedded c language. If the range is less than 5 cm, then the system will move backwards to avoid collision. If it's between 10 cm and 20 cm to it will move forward and beyond 40 cm no movement. We have given 160-degree angle to move to right and left direction. In this way our system will traverse the path in every direction.

III. MODELLING AND ANALYSIS

Components:

1. 4WD car kit
2. Arduino Uno
3. Servo motor
4. Ultrasonic sensor
5. L298N Motor Driver
6. 7-12V DC Battery
7. Jumper Wires
8. Bread board
9. Switch
10. Tools needed.

4WD Car Kit:

Fig. 1: 4WD car kit

Servo Motor:

Fig. 3: Servo motor

Arduino Uno:

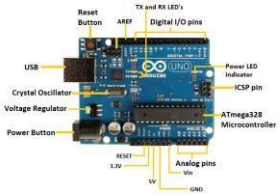


Fig. 2: Arduino Uno

Ultrasonic Sensor

Fig. 4: Ultrasonic sensor

L298N Motor Driver:

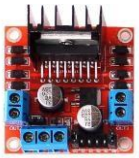


Fig. 5: L298N motor driver

Jumper wires:

Fig.7: Jumper wires

DC Battery:

Fig. 6: Li-poly RC batter

Switch:

Fig.8: Switch

Bread Board:

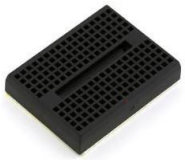
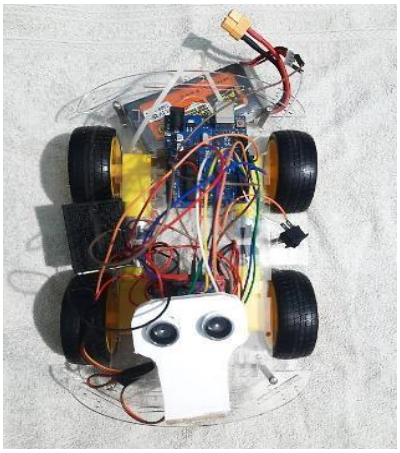


Fig.9: Bread Board

Tools Needed:

1. Glue gun
2. Soldering Iron
3. Cutter
4. Knife
5. Screwdriver
6. Needle nose Pliers
7. Wire Strippers

IV. RESULT



We have successfully made the human following robot prototype which will be used to mount in smart stretcher and smart trolley. This prototype uses ultrasonic range sensors to calculate the distance. The test was performed on the ultrasonic sensor to check that the sensor was working accurately within the range of 10 cm. An ultrasonic sensor is used to move the robot forward and backward. Servo motor is used to move the system in the left or right direction respectively. Then we test the serial communication of Arduino and driver motor. It took several weeks to complete this project. We faced some of issues regarding the code, which was rectified eventually. Servo motor rotation was stopped due to lose connection. Finally, after lots of effort and time our objective to make a prototype which follows human efficiently was achieved.

V. CONCLUSION

A successful execution of a prototype of human following robot is adorned in this paper. This robot not only have the detection proficiency but also the following ability as well. In this Human following Robot, we can add Global System for mobile communication (GSM) so that it will give location of the robot, camera (to capture images), and wireless remote controller to access the system from distance. our project can be used in many fields like in hospitals (smart stretchers), in industries (for loading and unloading of heavy weights). It is possible in future to develop this by adding more efficient sensors which gives more accuracy and have high efficiency.

VI. ACKNOWLEDGMENT

We would like to thank our sir Mr. Rajat Kumar for valuable discussion. We are also grateful to our HOD sir Mr. Bipin Pandey, Bhanu ma'am and Priya ma'am for support and guidance.

We also want to express our gratitude to our parents for providing us time and money for this project. And finally, we would like to thank each other for giving 100% effort and hard work for successful completion of this project.

VII. REFERENCES

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