

**A Project Based Learning Report On**  
**“HUMAN FOLLOWING ROBOT”**  
Submitted Towards The  
Partial Fulfillment of The Requirements of  
**B.Tech Robotics and Automation Sem IV**  
For the Subject  
**Manufacturing Technology- II**  
*Academic Year: 2022-23*



Bharati Vidyapeeth's  
(Deemed to be University)  
College of Engineering, Pune 411043

*Ranked 96<sup>th</sup> by NIRF  
credited with “A” grade by NAAC*

**Submitted by-**

<b>NAME</b>	<b>ROLL NO.</b>	<b>PRN</b>
GAURI KADBANE	11	2014111275
ROHIT PATIL	24	2014111289
ANAND K. PATIL	25	2014111290
SHIVANI SHINDE	30	2014111295

**Faculty Supervisor**  
**Prof. P.V. Jadhav**

**Bharati Vidyapeeth's  
(Deemed to be University)  
College of Engineering, Pune 411043  
*Ranked 96<sup>th</sup> by NIRF*  
*Accredited with "A" grade by NAAC***

**CERTIFICATE**

This is to certify that the project entitled "Human Following Robot " is a bonafide work carried out by the following students and it is submitted to the Bharati Vidyapeeth Deemed to be University College of Engineering, Pune for the partial fulfillment of the requirement for the of Semester IV Robotics and Automation Bachelor's of Technology Degree for the subject *Manufacturing Technology- II* Project Based Learning (PBL) in the of Semester IV Robotics and Automation Engineering .

NAME	PRN
GAURI KADBANE	2014111275
ROHIT PATIL	2014111289
ANAND K. PATIL	2014111290
SHIVANI SHINDE	2014111295

**Prof. P.V. Jadhav**  
(Faculty Supervisor)

**Dr.K.B.Sutar**  
(Head of Department)

## DECLARATION

We, here by declare that the project titled "HUMAN FOLLOWING ROBOT" Being submitted by us towards the partial fulfilment of Bachelor of Technology ,is a project based learning work carried by us is our own work.

Date:

NAME	PRN	Signature
GAURI KADBANE	2014111275	
ROHIT PATIL	2014111289	
ANAND K. PATIL	2014111290	
SHIVANI SHINDE	2014111295	

# **CONTENTS**

<b>TITLE</b>	<b>PAGE NO.</b>
I. Certificate	II
II. Declaration	III
III. Acknowledgement	1
IV. Abstract	2
V. Introduction	2
VI. Working Principle	3
VII. Components Required	4
VIII. Specifications	5
IX. Applications	6
X. Conclusion	7

## **ACKNOWLEDGEMENT**

We thank our gratitude to our Correspondent Tearcher **MR. P.V. JADHAV**, for his words which inspired us a lot in completingthis project work successfully.

We Thanks our regards to **Mr. K.B. SUTAR**, Head of theRobotics And Automation Engineering Department, Bharti Vidyapeeth College Of Engineering Pune, for providing necessary facilities to carry the project.

I also thank all our faculty members and my friends for their kind support and providing necessary facilities to carry out the work.

Last but not least we are heavily indebted to our beloved **PARENTS** for their continuous source of encouragement.

## **Abstract:**

Human Following robots have been investigated and actively developed throughout the decades in current contemporary age because to their numerous uses in everyday life and manufacturing. The human robot must use a variety of strategies, including a robot control algorithm, human target identification, and obstacle avoidance. Ultrasonic sensors, infrared sensors, voice recognition sensors, laser range sensors, camera charging-coupled devices (CCD), and other human-following robotic processes have been proposed. These innovations can distinguish between a versatile robot and a person in the general region. We provide another method for identifying the location of a human robot using an ultrasonic and infrared camera in this study, which is an important step in the robot's human evolution. In our undertaking, the robot is outfitted with a ultrasonic sensor which catches and identifies a person. A basic application carried out progressively utilizing a PI regulator shows benefits of the proposed technique.

## **Introduction:**

Many people think of robot as machine that imitates a human. However much these robots capture our imagination, such robots still only inhabit Science Fiction. People still have not been able to give a robot enough 'common sense' to reliably interact with a dynamic world. The types of robots that you will encounter most frequently are robots that do work that is too dangerous, boring, onerous, or just plain nasty. Most of the robots in the world are of this type. They can be found in auto, medical, manufacturing and space industries. In fact, there are over a million of these types of robots working for us today. Some robots like the Mars Rover Sojourner and the upcoming Mars Exploration Rover, or the underwater robot Caribou help us learn about places that are too dangerous for us to go. Simply put, a robot can be described as a system that contains sensors, control systems, manipulators, power supplies and software all working together to perform a task. Designing, building, programming and testing a robot is a

combination of physics, mechanical engineering, electrical engineering, structural engineering, mathematics and computing. The human following robot uses 2 IR sensors and an ultrasonic sensor. IR sensors are used to follow the human or object and ultrasonic sensor is used to move back the robot

## **Working Principle:**

Ir sensor works on infrared light which can also detect the object near to it. so there is two IR sensor one is at the left side of ultrasonic sensor and other is at the right side of the ultrasonic sensor. when anything comes near to the left sensor Arduino got the information that there is something is near to the left sensors and according to the code, the robot will turn to the left. And the same process for the right sensor. So this is how the human following robot works.

This Arduino robot having a sensor that can detect any object near it and can follow this object. If you come in front of the robot it will start following you. This robot consists ultrasonic sensor and IR sensor which help to follow the object.

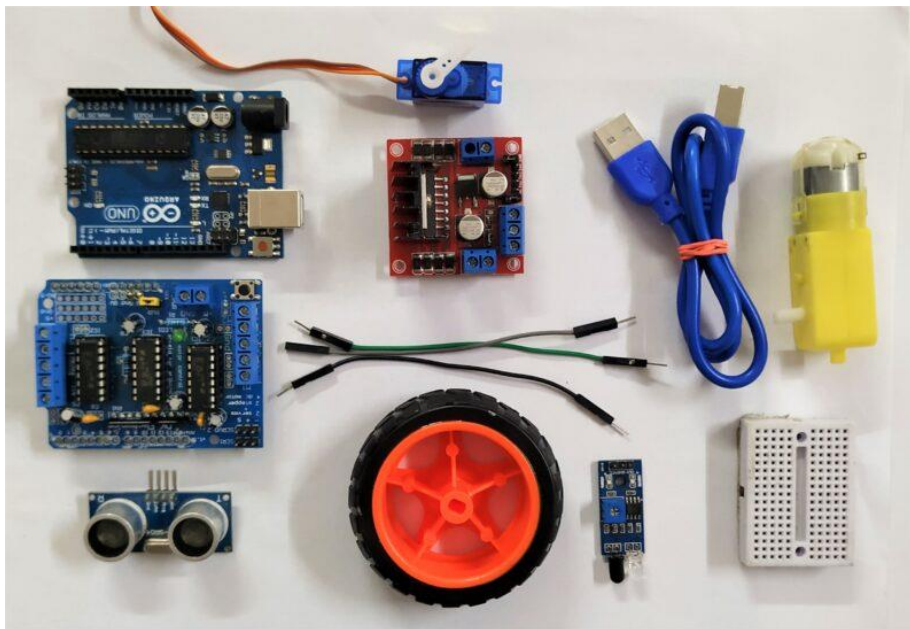
When you come near to the robot starts to follow you. there are 4 wheels in the robot. and 4 motors attached to the chassis. now there are three sensors on the robot one is an ultrasonic sensor and two IR sensor which arranges like two sensors left and right to the ultrasonic sensor. and when you put your hand near to the ultrasonic sensor the robot will start forward.

If you turn your hand to the left side the Arduino robot moves on the left side, and if you put your hand in the right the robot will move in the right direction. so, how the whole system works we will talk about this.

When you put your hand in from of the ultrasonic sensor then the sensor detects you and sends this information to the Arduino. there is some distance prefix in the Arduino so if your hand is away from the sensor it will not read that. and if your hand is near to the sensor it will read it.

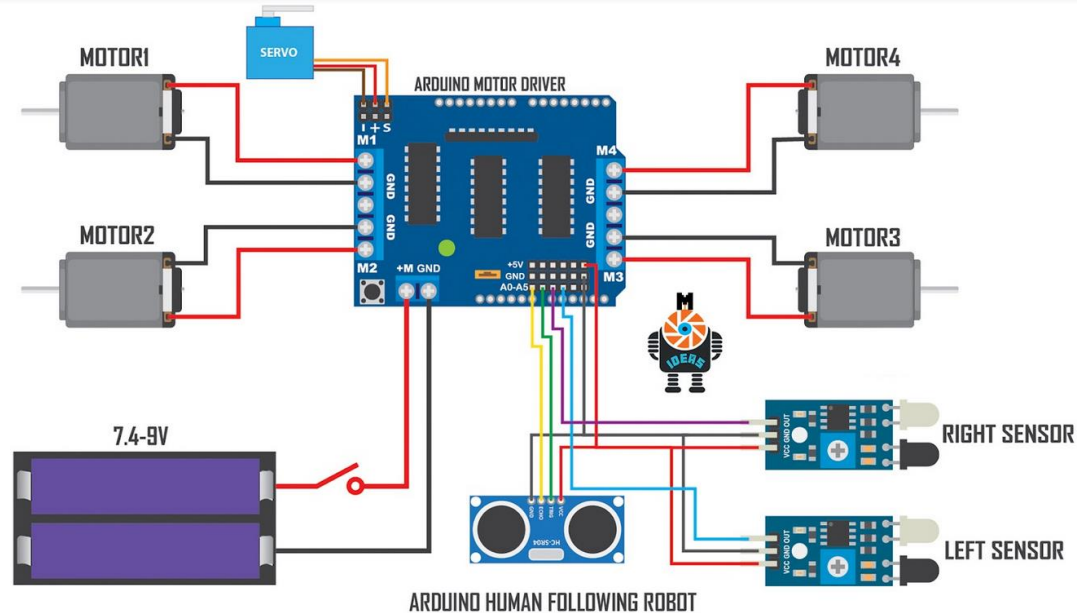
## Components Required:-

- Arduino Uno
- Arduino Motor Driver shield
- Jumper wires
- 4 BO motors
- Hook up wires
- 9V battery
- 4 wheel
- Chassis
- Ultrasonic sensor
- 2 IR Sensor
- on-off switch
- servo motor
- Ultrasonic sensor holder





## Circuit diagram:



## **SPECIFICATIONS:**

### BO Motor:

- Volt:DC 3-9V
- No Load:60RPM
- Torque:0.5Kg-cm
- Current:0.01A (NL)
- Protect Feature:Enclosed
- Speed:Constant Speed
- Function:Control



### IR sensor:

- operating voltage: 5VDC
- I/O pins – 3.3V & 5V
- range: 20 centimeters
- supply current:20Ma



### Ultrasonic sensor:

- Working Voltage: 5V (DC)
- Static Current: Less than 2mA
- Output Signal: 5V
- Sensor Angle: Less than 15 Degrees
- Detection Distance: 2 cm to 450 cm
- High Precision: Up to 2 mm
- Input Trigger Signal: 10 $\mu$ s TTL impulse



### Servo motor:

- 3 pole ferrite, all nylon gear
- Top ball bearing
- Operating Voltage: 4.8V~6.0V
- Operating speed: 0.12sec/60 degree
- Output torque: 1.6kg/cm 4.8V
- Dimension: 21.5 x 11.8 x 22.7mm
- Weight: 9g



## Applications:

Such a robot can be used for many purposes. With a few changings, the robot can act as a human companion as well. Some other applications of this robot are

- Can assist in carrying loads for people working in hospitals, libraries, airports, etc.
- Can service people at shopping centers or public areas.
- Can assist elderly people, special children and babies.
- Can follow a particular Vehicle.

## **CONCLUSION**

A successful implementation of a person follower robot is illustrated in this research. This robot does not only have the detection capability but also the tracking and following ability as well. The tracking is basically performed on the tag and the human is followed on the basis of that detection. It was also kept in mind that the „following“ capability of the robot should be as efficient as possible. The tests were performed on the different conditions to pin point the mistakes in the algorithm and correct them. The different sensors that were integrated with the robot added an additional advantage.