# Design and Development of User Friendly Robot

**Shruti Barange[1], Chaitali Gatkine[2], Trupti Gadkari[3], Shweta Darange[4], Sudaivi Nagapure[5], Prof. Nutan Sonwane[6]**

[1, 2, 3, 4, 5] Dept of Computer Science and Engineering

[1, 2, 3, 4, 5] Rashtrasant Tukdoji Maharaj Nagpur University,

Dr Babasaheb Ambedkar College of Engineering and Research, Nagpur, Maharashtra, India.

***Abstract-*** *Robotics is one of the most important advanced and arising technologies in the era of digitization. Robotics develops machine that can be used to substitute human and will copy human actions. Robots can be used in many situations and for many purposes to help human making their work more easier. Robots can be used in dangerous environments, manufacturing processes or where humans will not be able to survive. The aim of this project is to detect and follow the commands given through the Bluetooth Module with the help of mobile Application . We have seen in our day to day life, there is difficulties to carry items in many places or during COVID time it would be difficult to go in any crowded place to carry things or it would be very dangerous for any human to be in contacting with the crowded places so this robot will be used. This robot can be used in field may be in Medical or any small Industrial work etc. The main objective of this project is to implement and control the movement of the robot by giving proper commands and inputs so that it could achieve better performance.*

***Keywords****- Ultrasonic sensor, Motor driver shield, Arduino Uno, Gear motor, Servo motor, Bluetooth module HC-05, Infrared sensor, Jumper Wires, 2 Li-ION Battery and its holder.*

## I. INTRODUCTION

A Robot is any machine which is completely automatic, i.e. it starts on its own, decides its own way of work and stops on its own. It is actually a replica of human being, which has been designed to ease human burden. User friendly robot-User friendly robot is an robot which will follow our command with the help of code which is inserted in Arduino UNO and will react to it with the help of HC-05 Bluetooth Module and Arduino Bluetooth Controller APP. So this robot comes under IOT domain.. Internet of Things is a network of physical objects or people called "things" that are embedded with software, electronics, network, and sensors that allows these objects to collect and exchange data. IOT basically provides a platform for devices to interact and collaborate with each other. So this user friendly robot is important in this Covid situation. It will carry things and will help where human avoid or is difficult to go. This user friendly robot is defined as it is an robot which will together

with human safely, friendly and efficiently. This robot is easy to use and cheap to built . It can be controlled by simple electronic control device.
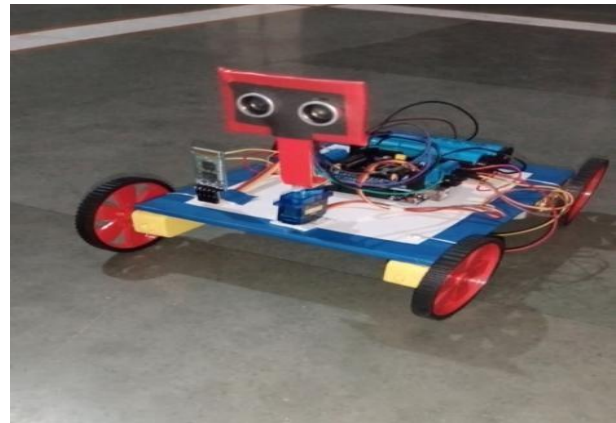
## II. SYSTEM MODEL



**Figure 1:** Model of User Friendly Robot with Connections.

### *Motor driver*

The model of the motor is L293D.The range of the voltage is 4.5 volt to 36 volt and output current is 600 mA.The peak output current is 1.2A. Motor driver will work according to the instructions of the Arduino UNO

### *Bluetooth*

The model name of the Bluetooth is HC-05.It is IEEE 802.15.1 standardized protocol. There are many applications of the Bluetooth. It will receive the voice command from the mobile app and forward to the Arduino UNO.

### *Arduino UNO*

It is like a human brain. According to our need we programmed it. It is very useful for the project and hacking. We feed the code inside the arduino module with the help of IDE software.IDE software is a platform for the arduino.programming. We install the code inside the arduino board with the help of USB cable. Arduino software IDE is an open source. The Arduino board is occupied with the circuit, USB port , input output port etc. There are many kinds of LED

for giving signals to the user. It is consist of different kinds of pins which is play key role for the input and output.
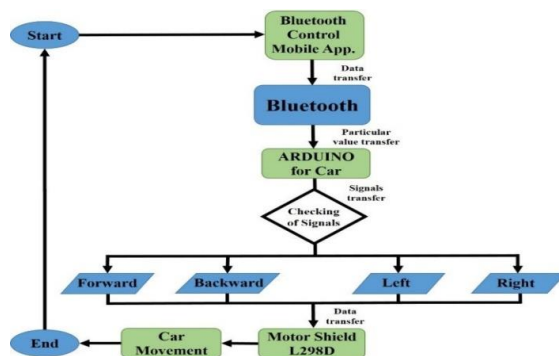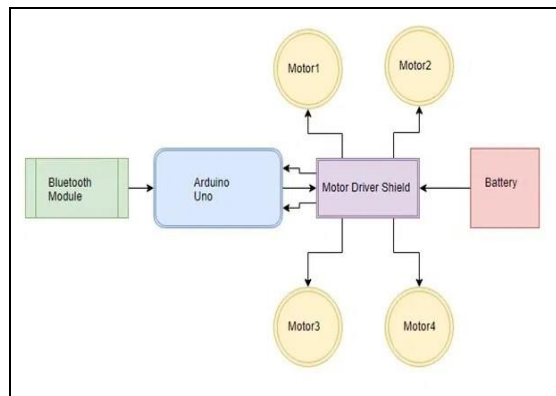
### Standard Commands

Forward is used to go forward. Back is used for go back. Left is used for go left. Right is used to go right. Stop is used to stop the car.

### List of the Equipments :

- Arduino UNO
- Bluetooth HC-05
- Motor driver
- Jumper wire
- Wheel
- Power source

## III. SYSTEM FLOW

.





Flow diagram works from top to bottom, its gives simple overview of working principle. First It consists of three phase. First phase tells about mobile bluetooth and second phase tells about car bluetooth antenna and other components. Third phase is all about power supply.

### A. Application and Objective

1. It can be used into Defence.
2. This system is useful in places where humans find difficult to reach.
3. It can be used for security system.
4. It is useful for the disable People.
5. Application of automation and robotics.
6. Telephone assistance system.
7. It can be used into virtual reality
8. It can be used in different kinds of machines.

### B. Features

- It uses low power.
- Long life
- User friendly
- High speed

## IV. WORKING METHODOLOGY

We have made an user friendly robot by studying the COVID 19 pandemic. And had also studied the problem statement regarding "IOT" and working of different sensors. We have used specific techniques, tools such as some hardwares and some softwares to acquire the specific result of the project. So that this User friendly Robot will be easy to use and performs its work for which it is made. Following are the steps given to this project to run-

Step 1 :

We have taken an acrylic sheet and had placed all 4 TT gear motors with 4 wheels on that sheet to make it move like a Robot whenever it will get an input from the source that is lithium battery. After this connect all the jumper wire coming from each TT gear motor that is +ve & - ve with the help of soldering to the Motor Driver Shield. And below that placed Arduino Uno board for implementation of the input. Connect them properly so that they will not show any error while performing.

Step 2 :

Now take Ultrasonic Sensor and one Infrared sensor if needed connect the Pins of ultrasonic sensors VCC,TING,ECHO and GND to the pins of 5V, A0 ,A1, Gnd of Motor Driver Shield with the help of jumper wires.

Attached the pins of infrared sensor VCC,GND,OUT to the pins of 5V ,GND, A5 of Motor Driver Shield with the help of jumper wires.

Step 3 :

Now take Bluetooth Module HC-05 connects its pins RX, TX, G, V to the pins TX, RX, GND, 5V of Motor Driver Shield Also take   an Servo Motor and connect it to the three pins of Motor Driver Shield. At last take 2 two 18650 LI-ION BATTERY and its holder and connect it to the pins +M, GND of Motor Driver Shield.

Step 4:

Now input the code in Arduino UNO with the help of small USB cable wire through ARDUINO IDE application. After this give command to the Robot through AMR Voice Controller APP And hence it will follow the command and gives it specific result and the project is ready to implement and use.

## V. RESULTS AND DISCUSSION

The robot is controlled only through voice commands from a mobile phone. We have used an Android App that can convert voice commands into text. The App have an interface that displays the converted text .The text converted from voice will be sent to the robot through wireless Bluetooth communication i,e. Bluetooth Module HC-05.This project User Friendly Robot helps to control robot through voice commands received via android application. The integration of control unit with Bluetooth device is done to capture and read the voice commands. Speech Recognization Process & Movement of the Robot according to the Voice Command :- By using the android app the voice content was transmitted to the Arduino using Bluetooth through mobile phone handsets which had built-in microphones to process the signal and the robot made movement according to voice .The robot was able to move forward, backward, left and right according to the input given to robot it follows the commands and move according to it.

## VI. CONCLUSION

As this project operated on human voice with android application. The implementation of this project is easy, so this robot is beneficial for human life . This type of Robots will evolve every year with the help of new technology introduced in every year. This type of robot is used to reduce human work as they are designed to replace human in some task/work .This is our project main objective .In methodology we have used Bluetooth Module HC-05 to receives the data from the host system that is Arduino UNO .Ultrasonic sensor acts as the eye of robot and IR sensor to detect infrared radiation .TT gear motor will start to move as it gets power supply and will help the robot to move according to the command given by user. It is an safe easy sterializable, accurate.

## REFERENCES

[1] A mechanism for human - robot interaction through informal voice commands, D'Mello, S.; Lee McCauley, ; Markham, James Robot and Human Interactive Communication, 2005. ROMAN 2005. IEEE International Workshop, DOI:10.1109/ROMAN.2005.1513777, Publication Year: 2005

[2] Rong-Jyue Wang, Jun-Wei Zhang, Jia-Ming Xu and Hsin-Yu Liu, "The Multiple-function Intelligent Robotic Arms", IEEE InternationaL Confer- ence on Fuzzy Systems, FUZZ-IEEE, Jeju Island, pp. 1995 - 2000, August 2009, ISSN:1098-7584.

[3] Arti Paswan1, Ajay Kumar Gautam2, Bhartendu Vimal3, Farheen4, Arun Kumar Mishra5 "Voice Robotic Vehicle" Ijsrr, Volume 07, Issue03, March 2019, Pp.1536

[4] P R Bhole1, N L Lokhande2, Manoj L Patel3, V D Rathod4, P R Mahajan5 "Voice Command Based Vehicle Control" Ijraset, Volume 5, Issue Xi, November 2017, Pp. 1079

[5] Mr. Vedant Chikhale, Mr. Raviraj Gharat, Ms. Shamika Gogate, Mr. Roshan Amireddy "Voice Controlled System Using Arduino Microcontroller" IJNTR, Volume-3, Issue-4, April 2017, Pages 92-94
https://www.google.co.in/arduinouno/