



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Arduino Obstacle Avoiding And Voice Control And Bluetooth Control Robot

Prof. Londhe K.P.^{*1}, Rahul Patil^{*2}, Anand Tabke^{*3}, Rohit Ingole^{*4}

Electronics & Telecommunication Engineering JSPM's Bhagwant Institute Of Technology - [BIT],
Barshi, India.

ABSTRACT

The project is design to build an obstacle avoidance robotic vehicle using ultrasonic sensors for its movement. A microcontroller (ATmega328) is used to achieve the desired operation. A robot is a machine that can perform task automatically or with guidance. The project proposes robotic vehicle that has an intelligence built in it such that it directs itself whenever an obstacle comes in its path. This robotic vehicle is built, using a microcontroller of AT mega 328 family. An ultrasonic sensor is used to detect any obstacle ahead of it and sends command to the microcontroller. Depending on the input signal received, the micro-controller redirects the robot to move in an alternate direction by actuating the motors which are interfaced to it through a motor driver. Some of the project is built with the IR sensors has its own application so in our project those application is not compactable so we are using ultrasonic sensor.

I. INTRODUCTION

1.1 History of Robotics:

Robots are the combination of electrical, mechanical and automated systems that are used to perform specific and complex tasks that are given by humans. Robot's growth from scratch has been tremendous over the years. The concept of developing a robot originated when people begun to think that their work has to be done in a given period of time without any human help. Turning ideas into reality they developed remotely operated robots with wiring system, and then they developed as wireless robot in the form of antenna which covers over a certain distance only. Around 10th century BC the mechanical automated robot was built that could sing and dance. It

was built by an artisan named Yan Shi and the machine had lifelike organs like muscles, joints and bones. The ancient Chinese built the clock towers that automatically ring the bell for every hour.

used in this project helps to detect the obstacles present in front of the robot. In the presence of obstacle the robot stops. Then, the robot waits for the user to provide next command regarding in which direction it needs to move. Our robot is a semi-automated robot, in future our robot can be upgraded from chassis structure to prototype humanoid robot with addition of motorized hands and legs.

1.5 Task of the Robot:

1. When the robot gets power supply, the robot starts to move.
2. When the obstacle comes in front of robot, it senses the obstacle and stops.
3. Then the robot waits for the user to provide the next command.
4. The command of the user are “forward”, “go backward”, “left” and “right”.
5. Depending upon the command given by the user, the robot works according to it.

Table 1.1: Tasks of the robot.

INPUT (User speaks)	OUTPUT (Robot does)
FORWARD	Moves forward
GO BACKWARD	moves back
RIGHT	turns right
LEFT	turns left

II. LITERATURE SURVEY

2.1 Robot management vogue exploitation humanoid Smartphone Authors: Prathamesh Mule, Suraj Ingale, Saurabh Veer, Aftab Sayyad, Shrinivas Andhare: The motivation behind this paper is to furnish very good machine humanoid stages with easier mechanism instrumentation vogue. This paper depicts the suggests that thanks to management a mechanism utilizing transferable through Bluetooth communication, some highlights regarding Bluetooth innovation, segments of the versatile and mechanism. It presents associate audit of mechanisms unnatural by smart phone by suggests that of moving the automaton upward, reverse, left and right side by the humanoid application, as an example, Arduino, Bluetooth.

2.2 Smart Phone Controlled mechanism exploitation ATMEGA328 Microcontroller. Authors: Prathamesh Mule, Suraj Ingale, Saurabh Veer, Aftab Sayyad, Shrinivas Andhare In this paper have structured a mechanism which can be controlled exploitation associate application running on associate humanoid smartphone. It sends management order by suggests that of Bluetooth that has sure highlights like dominant the speed of the engine, police work and sharing the data with phonephone regarding the bearing and separation of the mechanism from the closest hindrance.

2.3 Humanoid Controlled Bluetooth mechanism exploitation 8051 Microcontroller. Authors: Prathamesh Mule, Suraj Ingale, Saurabh Veer, Aftab Sayyad, Shrinivas Andhare: A mechanism is is sometimes associate electromechanical machine that's radio-controlled by laptop computer and electronic programming. varied robots unit of measurement worked for producing reason and can square measure found in production lines around the globe. This paper builds up the remote fastens within the humanoid application that management the mechanism movement with them.

2.4 Robot Controlled automobile exploitation Wi-Fi Module Authors: Prathamesh Mule, Suraj Ingale, Saurabh Veer, Aftab Sayyad, Shrinivas Andhare: This paper, deliberate the because of management robot controlled vehicle utilizing Wi-Fi module through humanoid application of associate humanoid smart Phone. it's also show that the apparatuses would possibly even be controlled even whereas not associate humanoid phone phone by inflicting a customary SMS. This task is additionally adjusted effectively to include a covert agent camera too that's in a very position to stream the recordings to the consumer over wireless local area network. daylight primarily based cells unit of measurement rather than the customary metal battery for the venture.

2.5 Bluetooth Controlled mechanism exploitation pic microcontroller Authors: Prathamesh Mule, Suraj Ingale, Saurabh Veer, Aftab Sayyad, Shrinivas Andhare: Bluetooth Controlled mechanism This project is employed to manage mechanism motion exploitation Bluetooth and humanoid application. User send management commands from humanoid app to Bluetooth that's connected with pic microcontroller. Microcontroller measurement connected with microcontroller through motor driver

circuit remarked as L298N. Bluetooth Controlled mechanism involved building a mechanism that is in a position to receive commands via Bluetooth therefore execute those commands. Associate humanoid app was accustomed send the commands via Bluetooth. Commands were received by Bluetooth module connected to microcontroller and to boot the microcontroller then dead those commands.

III. METHODOLOGY

3.1 Block Diagram:

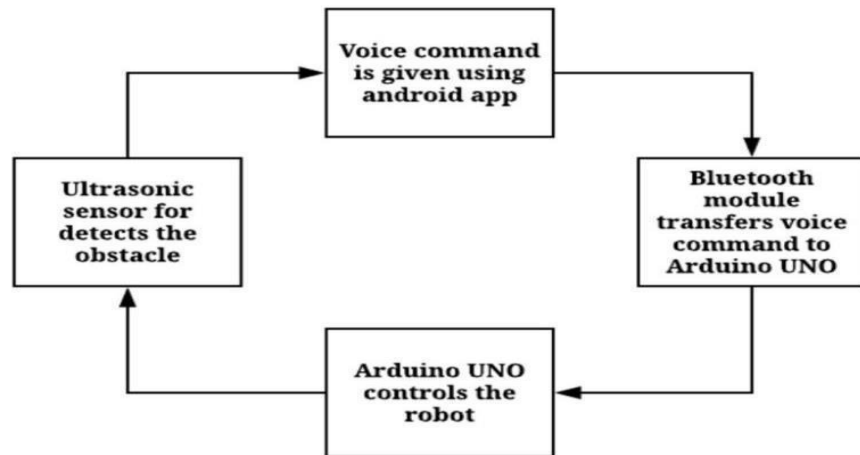


Fig 1: Block Diagram

Initially the command is given using android app. The command is in the form of voice using Google voice search method. The given voice input transmits to Arduino UNO via Bluetooth module HC-05. Then Ultrasonic sensor starts to work with the information provided by the Arduino UNO from android app. Then, the Ultrasonic sensor transmits sound waves and if the sound waves hits any object, it then return back and the Ultrasonic sensor receives the sound waves and detect where the obstacle within the given limit with the help of servo motor.

3.2 Project Flow:

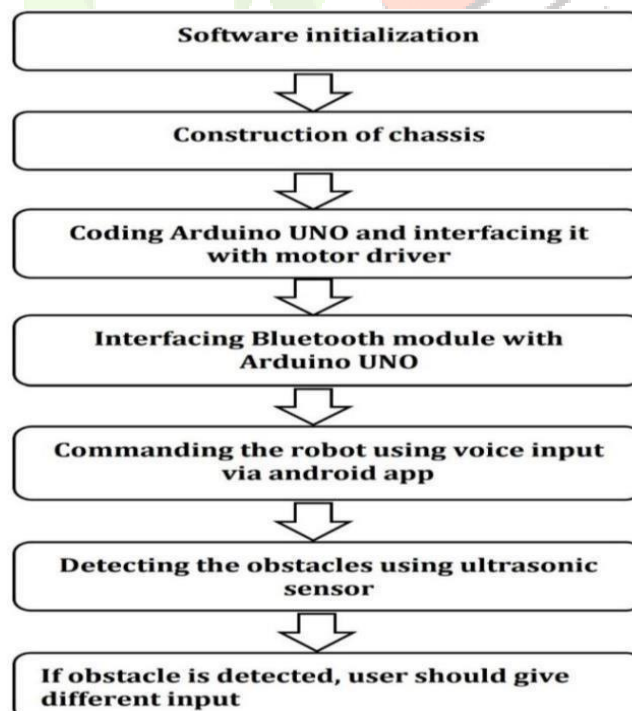


Fig 2: Project Flow

The robot is constructed using chassis and android application is used as a software initialization here. Bluetooth module, Arduino UNO, ultrasonic sensor and motor driver are the components used here. The overall flow of the voice controlled obstacle avoiding robot is explained .

IV. IMPLEMENTATION

4.1 Circuit Assembly:

Assemble every part in accordance with the schematic. Make that the Arduino UNO is properly interfaced with the motor driver, Bluetooth module, and ultrasonic sensor.

4.2 Programming:

Write the code to combine Bluetooth connectivity, motor control, and obstacle detection. This code will consist of:

- a) Obtaining distance information using an ultrasonic sensor.
- b) Bluetooth signal interpretation.
- c) Utilizing received orders and sensor data to control the motor driver.

4.3 Testing and Calibration:

To guarantee correct operation, test every component separately. To ensure precise distance measurement, calibrate the ultrasonic sensor. Check the dependability and range of the Bluetooth module. For best results, change the direction and speed of the motor.

4.4 Integration and Testing:

Put all the features together and test the robot in different settings. Make sure the robot obeys spoken instructions accurately and effectively avoiding.

V. OUTPUT

5.1 Obstacle Avoidance:-

Within a preset range, such as 50 cm, the robot is able to recognize impediments with success. It halts its motion to prevent collisions upon detection and waits for more commands.

5.2 Voice Command Fulfillment:-

"Go Ahead": The robot advances until it encounters a barrier.

"Go Back" is the command, and the robot turns around.

Order: "Turn Left"; the robot makes a left turn.

"Turn Right" is the command, and the robot does so.

```

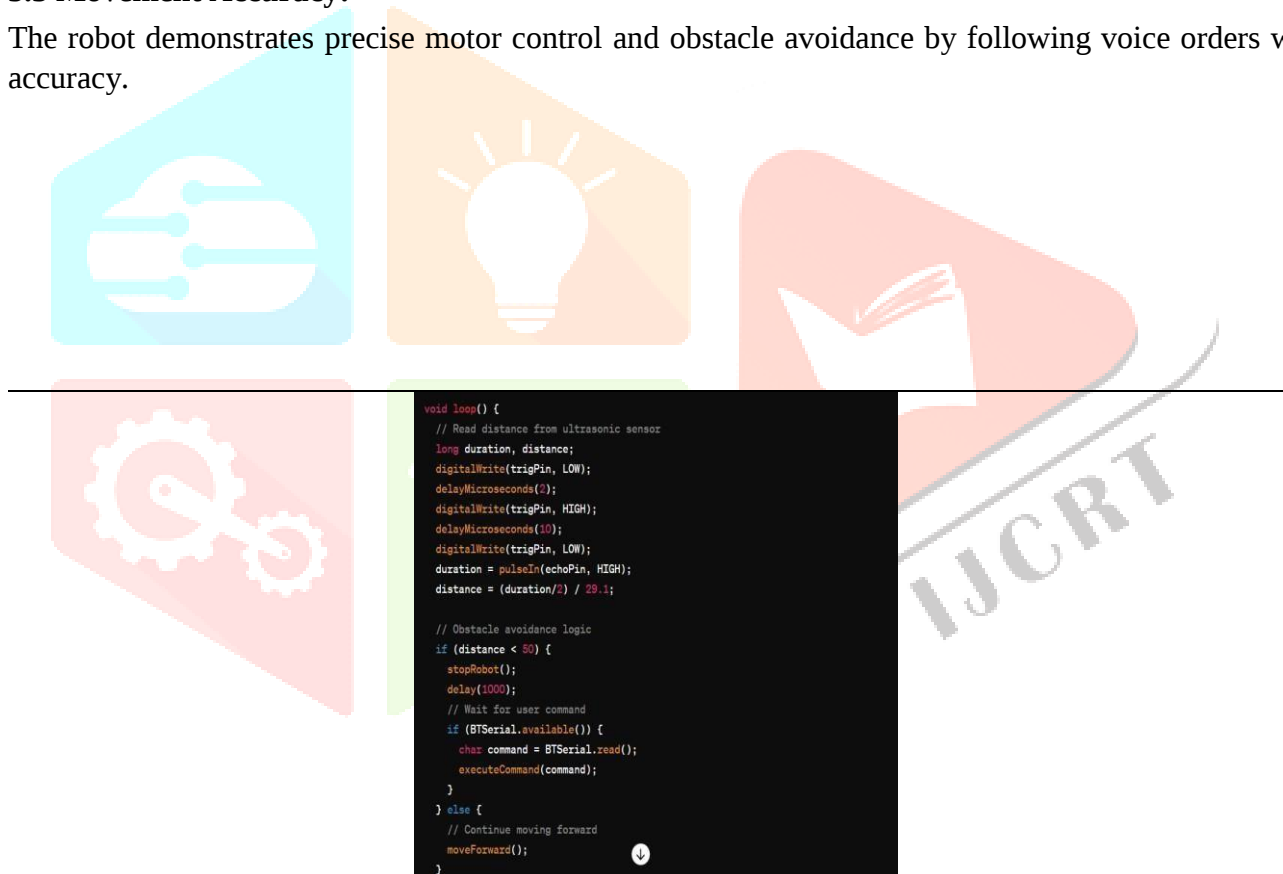
void voicecontrol() {
  if (Serial.available() > 0) {
    value = Serial.read();
    Serial.println(value);
    if (value == 'F') {           // forward direction if value is F
      forward();
    } else if (value == 'B') {    // forward direction if value is B
      backward();
    } else if (value == 'L') {    // forward direction if value is L
      L = leftsee();
      servo.write(spoint);
      if (L >= 10) {              // left see and chack distance is less
        than 10 cm
        left();
        delay(500);
        Stop();
      } else if (L < 10) {
        Stop();
      }
    } else if (value == 'R') {    // forward direction if value is R
      R = rightsee();
      servo.write(spoint);
      if (R >= 10) {              // Right see and chack distance is less
        than 10 cm
        right();
        delay(500);
        Stop();
      } else if (R < 10) {
        Stop();
      }
    } else if (value == 'S') {
      Stop();
    }
  }
}

```

Fig 3:

5.3 Movement Accuracy:

The robot demonstrates precise motor control and obstacle avoidance by following voice orders with accuracy.



```

void loop() {
  // Read distance from ultrasonic sensor
  long duration, distance;
  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);
  duration = pulseIn(echoPin, HIGH);
  distance = (duration/2) / 29.1;

  // Obstacle avoidance logic
  if (distance < 80) {
    stopRobot();
    delay(1000);
    // Wait for user command
    if (BTSerial.available()) {
      char command = BTSerial.read();
      executeCommand(command);
    }
  } else {
    // Continue moving forward
    moveForward();
  }
}

```

Fig 4:

VI. RESULTS

Thus, our voice controlled obstacle avoiding robot is able to detect the obstacles and make the movement to the required direction by using the user's voice command. Our project has a good accuracy as Bluetooth module which is used for communication is very efficient within the short Range as the robot is able to move within two seconds for the given input.

Table 7: Controlling parameters of robot

S.No	Conditions	Presence of Obstacles	Possible voice command
1.	Distance<50cm	Yes	“go backward” “left” “right”
2.	Distance>50cm	Yes	“forward” “go backward”
		No	“left” “right”

1. When the Distance<50cm and obstacle is presents the possible voice commands are given as “go backward”, “left” and “right”.
2. When the Distance>50cm and whether the obstacle is present or not the possible voice commends are given as “forward”, “go backward”, “left” and “right”.

VII. CONCLUSION

Thus, the voice controlled obstacle avoiding robot is successfully designed and it is concluded that voice Controlled robots are undeniably going to be a future market for many industrial applications and domestic purposes Related to automation in daily activities. These robots is most suitable for the industries as firefighting robots, as automated plant watering robots. It is also use ful formilitary purposes and many military soldiers can save their lives. Further this project can be developed as a fully automated humanoid robot which is used to detect the enemies in war field and shot them.

VIII. REFERENCES

- [1] Byoung-Kyun Shim; Yoo-Ki Cho; Jong-Baem won;Sung HyunHan Control, Automation and System (ICCAS),2011A study on real-time control of mobile robot with based on voice command, 11th International Conference on Publication Year: 2011 www.migi.com for selecting motors and other robotic concepts.
- [2] A paper on Arduino Based Voice Controlled Robot, K.Kannan,PG Scholar, Embedded System Technology, SRM University, Tamilnadu, India, Dr. J. Selvakumar, AP(S.G), ECE Department, SRM University, Tamilnadu, India.
- [3] A. K. and R. C. , ‘Voice Controlled Robot,’ International Journal Of Innovative Research In Technology , vol.1, no.11, pp.338- 344, 2014.
- [4] International Journal of Advanced Research in Computer and Communication Engineering, vol. 4, no. 9, pp. 212-216, September 2015.
- [5] J. and D. , ‘Home Automation and security system using android adk,’ International journal of electronics communication, 2013.