PROJECT REPORT

ON

"Bluetooth Controlled Car with Arduino"

THIS PROJECT & RESEARCH REPORT HAS BEEN INDEPENDENTLY DEVELOPED BY ME AND IS NOT SUBMITTED TO ANY COLLEGE OR UNIVERSITY FOR ACADEMIC EVALUATION

Developed by

Name:-Suzen Kumar Mohanty (**Reg.No**.2421331063)



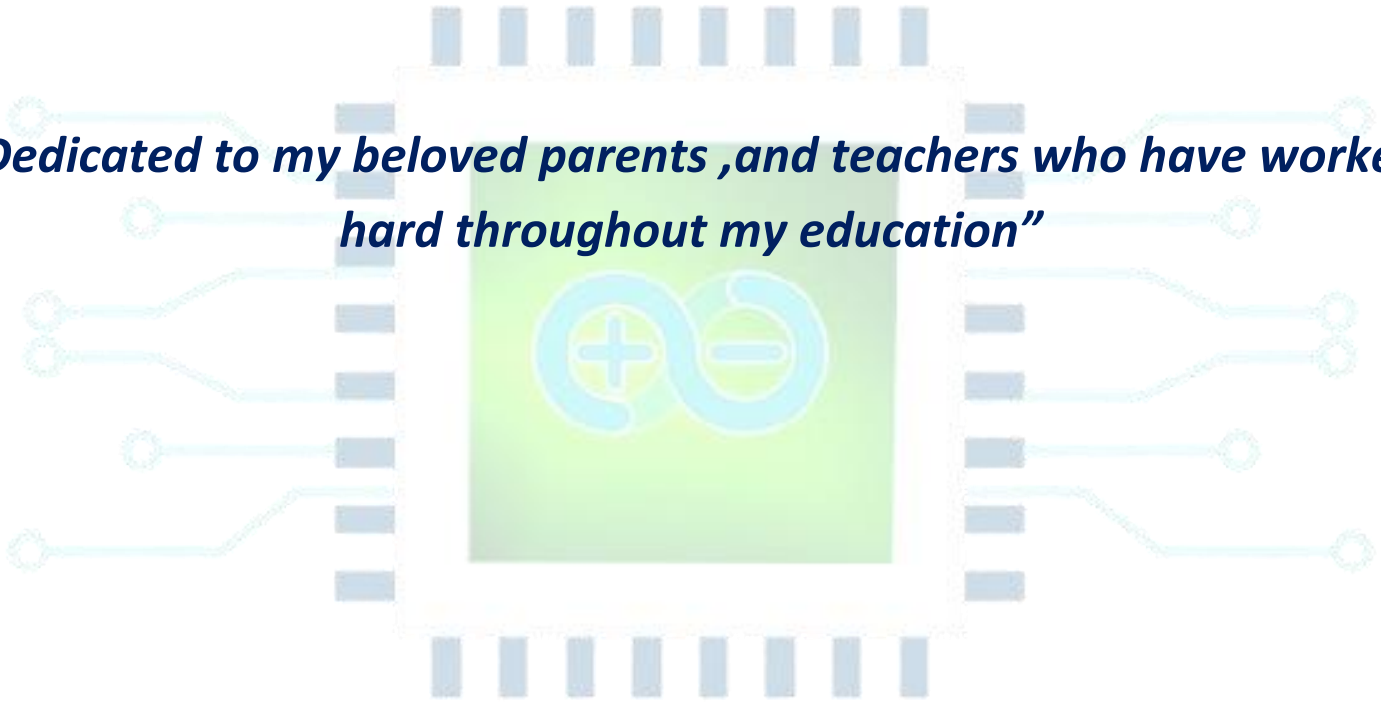
SKMP PROJECT MANAGEMENT

DEPARTMENT OF IOT

POLISHLINE.BALASORE, ODISHA, INDIA

FEB-2023

“Dedicated to my beloved parents ,and teachers who have worked hard throughout my education”



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CERTIFICATE

This is to certify that the project entitled"

Bluetooth Controlled Car with Arduino"

Has been independently developed and completed by Suzen Kumar Mohanty for the purpose of enhancing technical knowledge, skills, and practical understanding.

This project is a self-initiated work carried out with person al interestand research. It has not been submitted to any college, university, or institution for the award of any degree or diploma.

The work presented in this project is genuine and has been completed by the developer himself.



Suzen Kumar Mohanty

(Project Developer)

Date: 31/02/2023

SELF ATTESTATION

I here by declare that I have personally worked on the project entitled " **Bluetooth Controlled Car with Arduino**"All the data, analysis, and implementation presented in this project are the result of my own efforts and genuine work .Any external sources of information, if used, have been properly acknowledged.

This project is created solely for learning , skill development ,and professional improvement, and has not been submitted to any institution for academic purposes.



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Suzen Kumar Mohanty

(Project Developer)

Date: **31/02/2023**

Place:Balasore,Odisha,India

DECLARATION

I hereby declare that the project titled "**Bluetooth Controlled Car with Arduino**"is an original work carried out by me based on my own idea, research, and implementation.

This project that has not been submitted previously ,in part or in full, to any college, university, or institution for the award of any degree, diploma, or certification.

I confirm that all the information presented in this project is true to the best of my knowledge. Any references or sources used have been properly acknowledged.

I take full responsibility for the authenticity and originality of this work.

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Name: Mr. Suzen Kumar Mohanty

Branch: Computer Science And Engineering

Institution:[Srinix Collage Of Engineering ,Independent]

Date:[**31/02/2023**]

ACKNOWLEDGMENTS

I would like to express my sincere gratitude to everyone who contributed, directly or indirectly, to the development of this project, "**Bluetooth Controlled Car with Arduino**."

This project is the result of my personal interest, dedication, continuous learning, and exploration of electronics, automation, sensor technology, and control systems.

I am thankful to the developers of Arduino, the creators of open-source hardware and software resources, and the technical communities whose documentation, tutorials, and knowledge-sharing platforms helped me understand and implement the concepts used in this project.

I would also like to acknowledge the importance of self-learning, practical experimentation, and problem-solving throughout the development process. These experiences helped me strengthen my technical knowledge and improve my understanding of real-world automation systems.

Finally, I am grateful to everyone who supports innovation, DIY engineering, and independent technical projects. This work reflects my enthusiasm for learning, creating, and exploring new possibilities in technology.

Developed By:

Suzen Kumar Mohanty

ABOUT MYSELF



I am Mr. Suzen Kumar Mohanty , a passionate and dedicated Web Developer and SOC Analyst (Level 1) from the field of Computer Science and Engineering, with strong expertise in HTML, CSS, JavaScript, and I specialize in building scalable, responsive, and high-performance web applications that deliver seamless user experiences across all devices and screen sizes.

With a keen eye for detail, I focus on writing clean, maintainable, and well-structured code. My development approach is centered around Creating intuitive user interfaces, ensuring both functionality and aesthetic quality. I follow modern front-end development practices such as component-based architecture, responsive design principles, and performance optimization techniques to build efficient and user-friendly applications.

Beyond web development, I actively work on IoT-based solutions, where I integrate hardware and software to create smart, real-world systems. I have hands-on experience with Arduino Uno and various sensors, enabling me to develop projects such as environmental monitoring systems, smart automation solutions, and real-time data tracking applications.

One of my key strengths lies in connecting IoT devices with web technologies. I build interactive dashboards that allow real-time data visualization, giving users the ability to monitor, analyze, and control devices remotely. My work focuses on bridging the gap between the physical and digital world by transforming raw sensor data into meaningful insights.

I am deeply interested in developing innovative, data-driven solutions that combine web technologies with embedded systems. My goal is to create impactful applications that solve real-world problems while improving efficiency, automation, and user experience.

With a strong passion for continuous learning and innovation, I consistently explore new tools, frameworks, and technologies to enhance my skills and deliver high-quality, future-ready solutions.

Name: Mr. Suzen Kumar Mohanty

Branch: Computer Science And Engineering

MyPortPolioLink:-https://suzen-kumar-mohanty-8fdv.vercel.app/

ABSTRACT

A remote-controlled vehicle is any mobile machine controlled by means that are physically not connected with the origin external to the machine. In this project, we make use of Bluetooth technology to control our machine car. We do not call this a robot as this device does not have any sensors. Thereby, senseless robots are machines. The project aims are to design a Bluetooth control Arduino car and write a program into the Arduino microprocessor. Arduino car contains an Arduino microcontroller with basic mobility features. In this project, we make use of Bluetooth technology to control our machine car. After doing this only we can say that we have been able to create as per our goal described. The device can be controlled by any smart device with android. The major reason for using a Bluetooth-based tech is that we can change the remote anytime – mobile phones, tablets, and laptops and physical barriers like walls or doors do not affect the car controls.

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List of Abbreviation

ROS COSMOS: Russian FederalSpaceAgencyTechnology,Space, Astronomy

RC: Radio/Remote Control

LCD: Liquid-crystal display

LI-ON Battery : Lithium-Ion Battery

NASA: National Aeronautics and Space Administration.

USB: Universal Serial Bus

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Chapter-01

Introduction

Background:

Wireless or Bluetooth control cars are developed to make our day-to-day life easy and simpler. Today for striving in this modern era it is necessary to use modern technology to simplify our day-to-day activities. Thousands of people die because of driving vehicles. If it can be remote-controlled, we will be able to save thousands of lives. The drone started a revolution in this regard. Bluetooth-controlled cars can be a revolutionary project for our upcoming future. It can be used for low-range mobile surveillance devices, (military Applications where no human intervention will be needed), Assistive devices (like wheelchairs), home automation, etc. It is aimed to bringa huge groundbreakingchange in societybyovercoming the hurdles we are facing today. Driverless cars are providing mobilityto many people who cannot drive which isan added advantage to commuters who wish to use cars on dailybasis. Bluetooth control cars are thegadget of the future.

Problem statement:

Bluetooth Control cars can be a helping hand for the cripples, or for the ones who want to drive but are unable due to many physical inabilities, where human life is at risk, we can use it from a very distance as it is fully wireless.

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Project Overview:

The main processing unit consists of Arduino UNO to perform specified operations. Arduino UNO board is used as the main microprocessor of the device. It will run and will control the movement of the vehicle through the use of the motor driver who will control the wheels. The Programs are compiled using Arduino IDE and then the sketch is uploaded to the board using a pc and a USB cable. Speed variations can be achieved bymaking slight changes to the sketch. It is based on a 4-wheel drive platform integrated with an ultra-sonic sensor to avoid obstacles and line tracer sensors. It also has an infra-red remote controller for the manual steering of the vehicle. The car is upgradable and can replace, upgrade and expand the input sensors and add other functionality by adding other modules.

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Chapter-02

LiteratureReview

Wireless control is one of the most important basic needs for all people all over the world. Bluetooth is oneofthemost used wireless technologies.A Bluetooth control caris such acarthat can be controlled wirelessly using a Bluetooth control system and Arduino. With thecombinationofArduino, andBluetoothwecancontrolmanyotherthings,likehome Lighting, air conditioners, and many more through our cell phones. The Arduino can also contribute at largeto the Smart Home system. Nowadays it has made us easier to convert digital signals into physical movements with such microcontrollers.

Today people are using autonomation in every sector. There are many benefits, for example, it reduces theriskofinjury, it is fast, it can work daylong, it is reliable,etc. This Bluetooth controlcar is just an example of autonomation. This type of car is used in law enforcement and military engagements for some the reasons like Hazard exposure which is controlled from a location of relative safety. Such vehicles are used by many police department bomb squads to defuse or detonate explosives.

These vehicles are also used in space exploration, by using such vehicle NASA. ESA and ROSCOSMOShaveexploredandcollectedmanydatafromspace,themoon,andmars.Inrecent days giant companies are using remote control vehicles to deliver their products. And Many of the giant factories have their transportation which is remotely controlled.

Herewehaveconnected this4-wheeler withArduinoandBluetoothModule/Thereisan Android application that is already installed in the remote device. We send our instruction to the vehicle with that application, that application is connected with the module in the vehicle. Bluetooth module transfer that instruction as a signal to the Arduino, and Arduino works with that signal.In the Arduino, we have installed the code which can work with the signals and convert those instructions to the pre-defined signals. Signals were transferred to the motors, and the car started running.

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This car does not have advanced features but we can attach any kind of features like line detecting,orobstacledetecting,eventhoughwecanattachthecameratothevehicleandwatchit with the remote. This one is just a basic prototype of a remote-control car, we can add a lot of advanced features and get an armed/especially capable RC Car.

This project aimed to design an automated vehicle prototype built with Arduino and controlled with software developed on Android that can perform manual or automatic paths. Until now research and analyzing the simulation of experiments shown, it is believed that it is feasible to use the prototype designed for cognitive development, for future users can learn to insert custom paths that can process logic issues and more complex mathematics allowing the prototype to perform the desired movements. Analyzing the financial costs of design, it is believed that it is feasibleto construct thistypeofprototypebecauseit presents alow cost ofthecomponents used, particularlyiftheyare chosen in a largescale production. It is worth noting that both the Arduino programming language and the language for Arduino in development are free, not burdening additional costs for the development of the project, pointing out that this applies also to the tools used for development.

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Chapter-03

Methodology

Tools:

- **Chassis(Including motors and wheels):**

The main body of the carconsists of the chassis.Alongsidetherewillbefourmotorsforthefour wheels which will lead down the car.



Figure-01:Chassis(Includingmotorsandwheels)

- **Arduino Uno:**

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino. cc. The board is equipped with sets of digital and analog input/output pins that maybe interfaced with various expansion boardsand other circuits.



Figure-02:ArduinoUnoR3

- **L293D Motor Driver Shield:**

The Motor Driver is a module for motors that allows you to control the working speed anddirectionoffourmotorssimultaneously.ThisMotorDriverisdesignedanddeveloped based on L293D IC. L293D is a 16 Pin Motor Driver IC. This is designed to provide bidirectional drive currents at voltages from 5 V to 36 V. Rotation of a motor depends on the enabled pins.



Figure-03:L293DMotorDriverShield

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- **Jumper Wires:**

A jump wire (also known as jumper, jumper wire, DuPont wire) is an electrical wire, or group of them in a cable, with a connector or pin a teach end (or sometimes without them – simply "tinned"), which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering.



Figure-04:JumperWires

- **Battery:**

A battery is an energy source consisting of one or more electrochemical cells and terminals on both ends called an anode (-) and a cathode (+). Here for the project, a 9V battery has been used. (In figure 5)

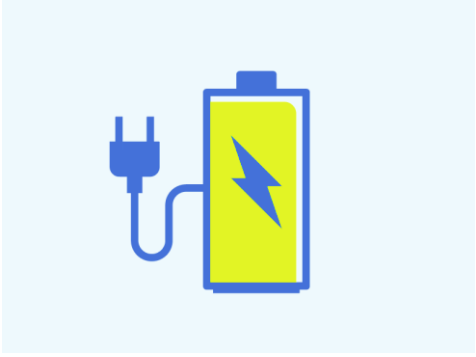

Figure-05:Battery

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- **Switch:**

  Infigure06,A switch is used for turning on the power of the vehicle .It controls the battery connection of the vehicle.



Figure-06:Switch

- **Bluetooth Module:**

  In figure 7 HC-05 6 Pin Wireless Serial Bluetooth Module is a Bluetooth module for use with any microcontroller. It uses the UART protocol to make it easy to send and receive data wirelessly. The HC-06 module is a slave-only device. This means that it can connect to most phones and computers using Bluetooth technology.

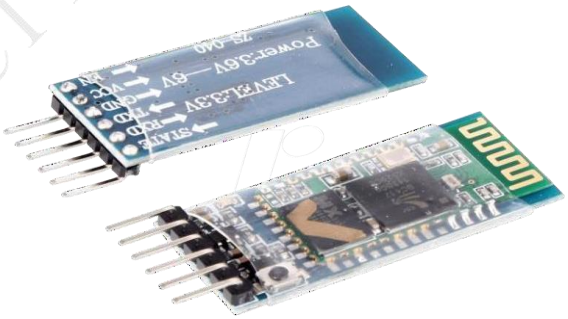

Figure-07:BluetoothModule

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Pin Diagram &Connection:

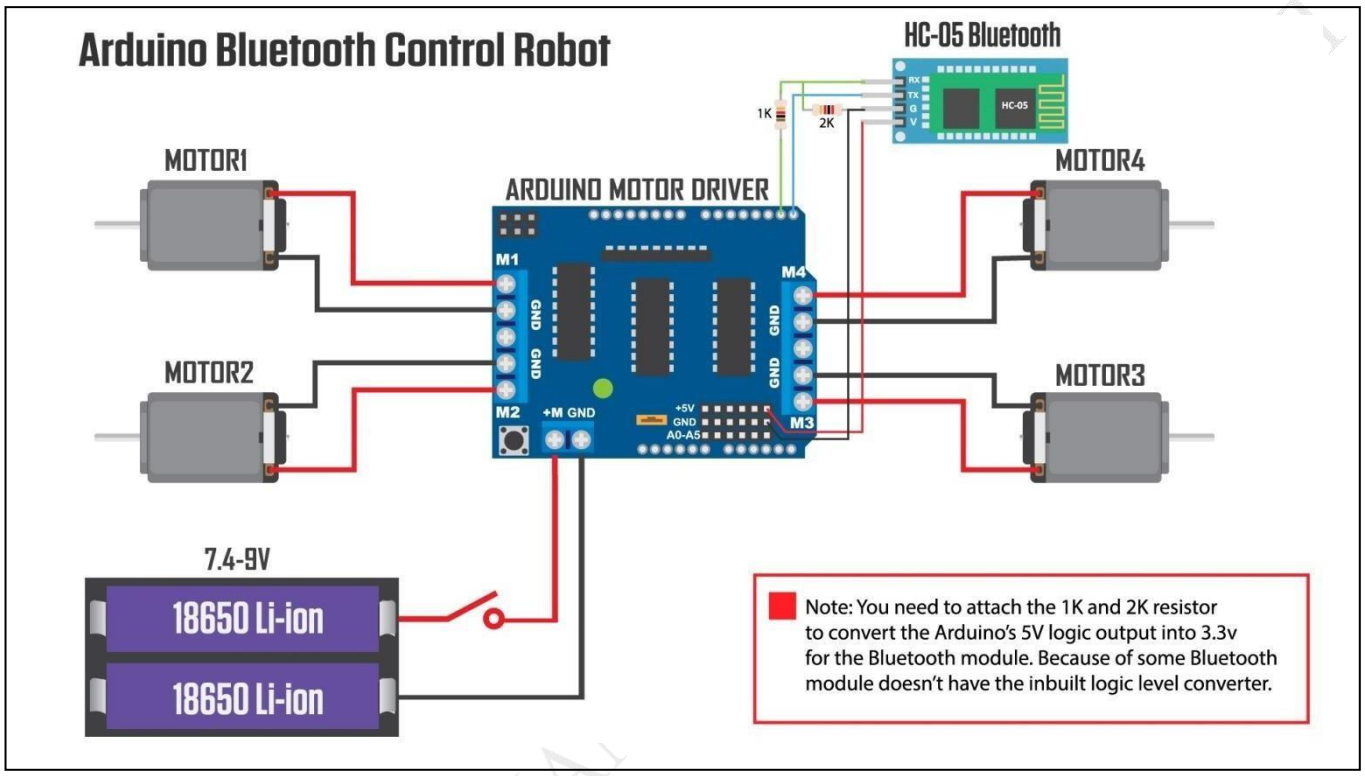

Figure-08:PinDiagram&Connection

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Source Code:

```
#include<AFMotor.h>

//initialmotorspin
AF_DCMotormotor1(1,M
OTOR12_1KHZ);
AF_DCMotormotor2(2,M
OTOR12_1KHZ);
AF_DCMotormotor3(3,M
OTOR34_1KHZ);
AF_DCMotormotor4(4,M
OTOR34_1KHZ);

charcomma

nd;void

setup()
{
Serial.begin(9600);//SetthebaudratetoyourBluetooth module.
}


void loop(){
if(Serial.available ()>0)

{
command=Serial.read();
```

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```
Stop();//initializewithmotorsstoped
//Changepinmodeonlyifnewcommandisdifferentfromprev ious.
//Serial.println(co mmand);
 switch(command){
     case
     'F':
     forwa
     rd();
     break
     ;
     case
     'B':
     back(
     );
     break
     ;
     case'
     L':
     left(
     );
     break
     ;
     case'R
     ':
     righ
```

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```
        t();
        brea
        k;
              }
        }
}
```

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```
voidforward()
{
    motor1.setSpeed(255); //Define maximum
    velocity
    motor1.run(FORWARD);//rotatethemot
    orclockwise motor2.setSpeed(255);
    //Define maximum velocity
    motor2.run(FORWARD);//rotatethemot
    orclockwise
    motor3.setSpeed(255);//Define maximum
    velocity
    motor3.run(FORWARD);//rotatethemot
    orclockwise
    motor4.setSpeed(255);//Define maximum
    velocity
    motor4.run(FORWARD);//rotatethemot
    orclockwise
}

voidback()
{
    motor1.setSpeed(255); //Define maximum
    velocity
    motor1.run(BACKWARD);//rotatethemo
    toranti-clockwise
    motor2.setSpeed(255); //Define maximum
    velocity
```

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```
    motor2.run(BACKWARD);//rotatethemo
    toranti-clockwise
    motor3.setSpeed(255); //Define maximum
    velocity
    motor3.run(BACKWARD);//rotatethemo
    toranti-clockwise
    motor4.setSpeed(255); //Define maximum
    velocity
    motor4.run(BACKWARD);//rotatethemo
    toranti-clockwise
}

voidleft()
{
    motor1.setSpeed(255); //Define maximum
    velocity
    motor1.run(BACKWARD);//rotatethemo
    toranti-clockwise
    motor2.setSpeed(255); //Define maximum
    velocity
    motor2.run(BACKWARD);//rotatethemo
    toranti-clockwise
    motor3.setSpeed(255); //Define maximum
    velocity motor3.run(FORWARD);//rotate
    the motor clockwise
    motor4.setSpeed(255); //Define
```

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```
    maximum velocity
    motor4.run(FORWARD);//rotatethe motor
    clockwise
}

voidright()
{
    motor1.setSpeed(255); //Define maximum
    velocity motor1.run(FORWARD); //rotate
    the motor clockwise
    motor2.setSpeed(255); //Define maximum
    velocity motor2.run(FORWARD); //rotate
    the motor clockwise
    motor3.setSpeed(255); //Define maximum
    velocity
    motor3.run(BACKWARD);//rotatethemo
    toranti-clockwise
    motor4.setSpeed(255); //Define maximum
    velocity
    motor4.run(BACKWARD);//rotatethemo
    toranti-clockwise
```

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```
}

voidStop()
{
    motor1.setSpeed(0); //Define minimum velocity
    motor1.run(RELEASE);//stopthemotorwhe
    nreleasethebuttonmotor2.setSpeed(0);
    //Define minimum velocity
    motor2.run(RELEASE); //rotate the
    motorclockwisemotor3.setSpeed(0);
    //Define minimum velocity
    motor3.run(RELEASE);//stopthemotorwhe
    nreleasethebuttonmotor4.setSpeed(0);
    //Define minimum velocity
    motor4.run(RELEASE);//stopthemotorwhe
    nreleasethebutton
}
```

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Flow chart of Implementation:

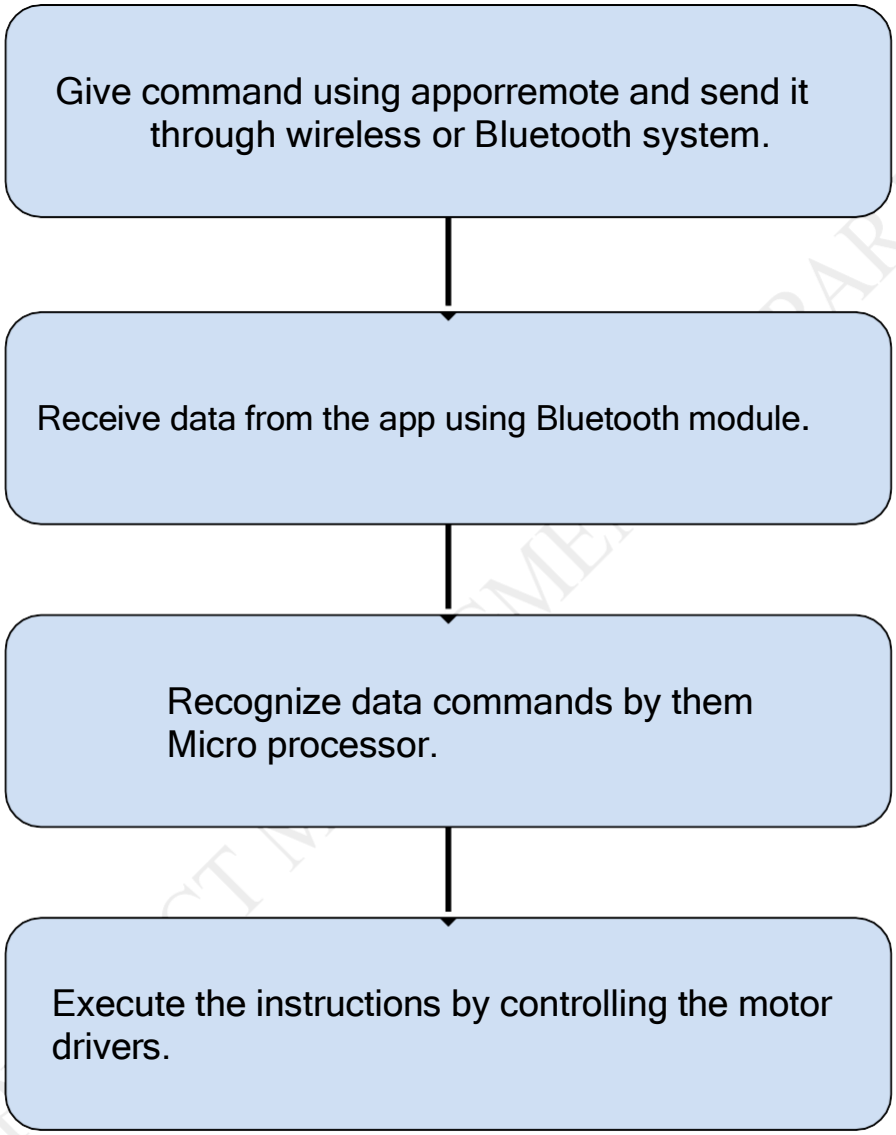

Figure-09:FlowchartofImplementation

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Components of Bluetooth Control Car:

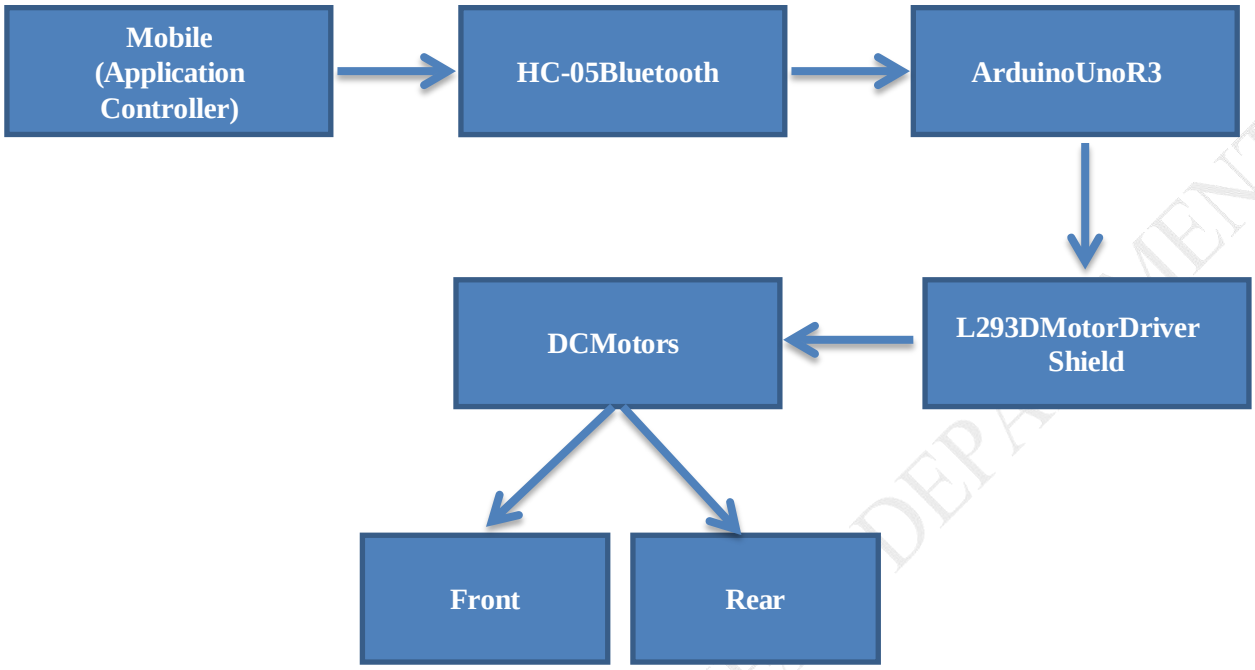

Figure-10:ComponentsofBluetoothCar

Application Controller:

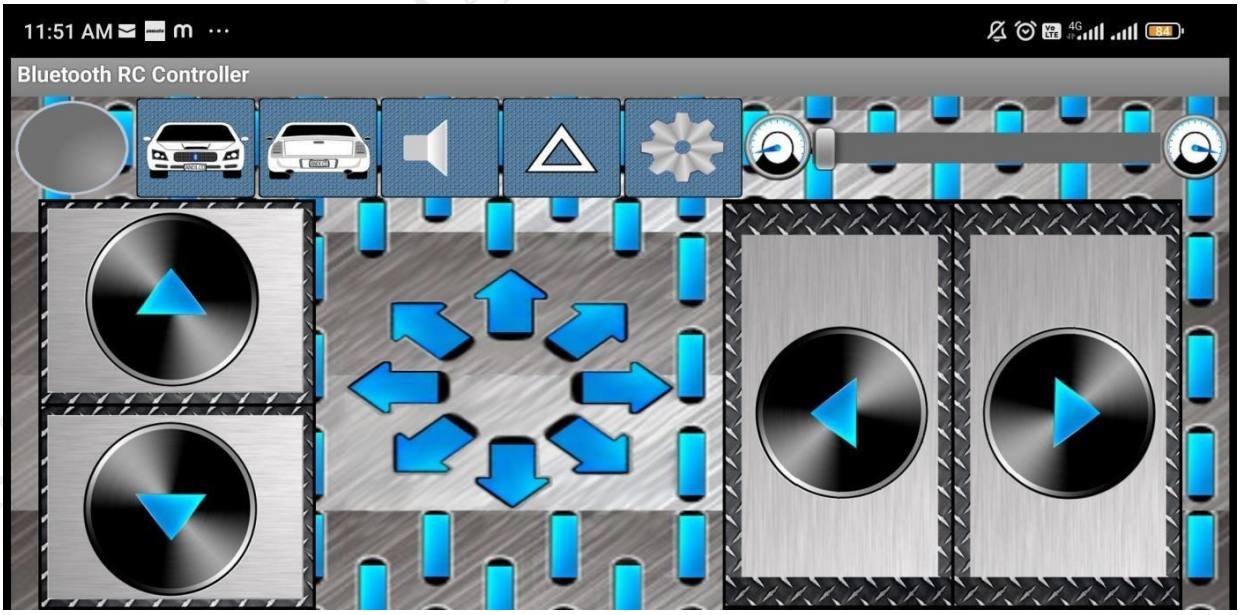

Figure-11:MobileApplicationController

Chapter-04

ResultandDiscussion

The prototype is created using 4 DC motors driven by an H-bridge with dual output, connecting the two left wheels and the two right ones to its outputs. The car is remotely controlled either by Bluetooth an app or by infrared. Some extra functionalities can be added to the software.

Better line tracking mode: When the robot finds an object in front placed on the line, it will try to go around it until it finds the line again, continuing afterward. This function can be added using an ultrasonic sensor.

Custom mode: Theabilityto program the prototype from the app has not been implemented, as it is relatively easy to use the custom mode by modifying the code.

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Conclusion

This project consists of a basic prototype of a Bluetooth control car above stated. The prototype car can recognize commands from users and can turn the car left, right, and stop with great accuracy. It can be further improved by using different sensors like ultrasonic or infrared and with various levels of coding.

Our Bluetooth control car has a range of 10-20 meter with the mobile Bluetooth controlling system. The range mostly depends on the receivers transmission level.

In the future, we could use rechargeable batteries like Ni-Cd Batteryor Li-ion batteries thatcould avoid the present disadvantage. Also, we could make use of this RC Motor Car as a surveillance system or rovers by adding a few more sensors and updating the code. This would make them into robots. These robots could self-monitor under any human supervision, thereby reducing manpower. These are just the alternatives, on which this project could be improvised and updated.

IoT or the internet of things is a very important part of both computers and our daily lives. The above model describes how the Arduino programs the car motor module and by IoT, we rotate the wheels and give direction to the car. IoT allows us to work with different platforms and it helps us to create various interesting modules to work on.

With the ever-increasing problems, our knowledge has to expand to adapt better to the changes all around us. In the same way, it is hoped that this activity is a small step that would lead us to further enhancements and goals.

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References:

1. Website:

   https://www.washingtonpost.com/local/trafficandcommuting/driverless-cars-promise-far-greater-mobility-for-the-elderly-and-people-with-disabilities/2017/11/23/6994469c-c4a3-11e7-84bc-5e285c7f4512_story.html

   AccessDate:15thMar,2024

2. Website:

   https://www.arduino.cc/en/Guide/Introduction

   AccessDate:15thMar,2024

3. Website:

   https://www.academia.edu/37091561/Bluetooth_Remote_Controlled_Car_using_Arduino

   AccessDate:17thMar,2024

4. Website:

   https://create.arduino.cc/projecthub/samanfern/bluetooth-controlled-car-d5d9ca?ref=similar&ref_id=382865&offset=0

   AccessDate:20thMar,2024

5. Website:

   https://www.engpaper.net/arduino.htm

   AccessDate:1stApr,2024

6. Website:
   https://www.engineersgarage.com/arduino-l293d-motor-driver-shield-

   tutorial/AccessDate:1stApr,2024

7. Website:
   https://en.wikipedia.org/wiki/Jump_wire

   AccessDate:1stApr,2024

8. Website:
   HC-05BluetoothModulePinout,Specifications,DefaultSettings,Replacements&Datasheet (components101.com)

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AccessDate:8thApr,2024

9. Website:
LCD 16X2 : Pin Configuration, Commands, Interfacing & Its Applications(watelectronics.com)

AccessDate:8thApr,2024

10. Website:
https://create.arduino.cc/projecthub/theSTEMpedia/4-wheel-robot-made-with-arduino-controlled-using-dabble-4650f7

AccessDate:8thApr,2024

11. Website:
(4) Bluetooth Remote Controlled Car using Arduino | International Journal of ScientificResearchinScience,EngineeringandTechnologyIJSRSET-Academia.edu

AccessDate:8thApr,2024

12. Website:
https://www.researchgate.net/publication/355085611_Bluetooth_Car_Controlled_Using_Arduino

AccessDate:8thApr,2024

13. Wang,B.Y.(2009)SummaryofIoTTechnologyResearch.JournalofElectronic Measurement and Instrument, 12, 1-7.

14. J. Gubbi, R. Buyya, S. Marusic, M. Palaniswami, Internet of things (IoT): a vision architecturalelementsandfuturedirections,FutureGener.ComputerSyst.29(7)(Sep. 2013) 1645–1660.

15. A. Ibrahim, D. Ibrahim, Real-time GPS-based outdoor WiFi localization systemwith map display, Adv. Eng. Software. 41 (2010) 1080–1086.

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