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Mobile Bluetooth Control Car

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Abstract: ***Our project aim is to design Bluetooth control car which are going to interface with the android app. To developed an android application android studio application is used. In that application we have given the movement to move a Bluetooth car like left, right, turn left, turn right etc. Next step is creating that car which is connected to android app via Bluetooth module HC-05. Our main part to control car using Arduino software.***
In that software we havewritten our code and upload it on the Arduino uno whichis connected to car. Power supply is given by 12V lithium-ion battery. Operational range of Bluetooth module that is used is around 10 meters approx. Next main part is motor driver circuit to connect the tt gear motors to it. In this project we are actually trying to analyse the working of car how that is controlling via Bluetooth. How all part is working with co-ordination with each other. At last, we have tested the movement of Bluetooth car using android application.
Keywords: Microcontroller, sensor, MDF, lithium-ion, Bluetooth Master and slave.

I. INTRODUCTION

The main goal of our project is to develop a Bluetooth car using wireless technology. In this project Bluetooth module HC-05 is used to connect hardware and software part. With help of that command movement of car is controlled.Thus, we can able to achieve our target.
Bluetooth controlled car is an Arduino based project which controlled using android application that we have created. In that app we made some arrow to give movement to the Bluetooth car like forward, backward, left, right etc. so by this way android app is working as transmitter and Bluetooth module which is mounted on car is work as receiver. to transmit the command, we have connected Bluetooth to that app.
When we give command via app Arduino will that command then it further give command to driver module to control desired motion. in this the microcontroller used is Atmeg8 in which serial communication is achieved using Bluetooth. android application is using java, kotlin a programing language. This project can be made in to the bigger scale for real time vehicles.

II. LITERATURE REVIEW

[1] Robots are divided into three categories such as industrial robots, mobile service and personal robot. In this paper according to International Federation of Robotics, there are one million industrial, 50000 mobile and over four billion personal robots are used across the globe. Thus, it is concluded that robotics, especially personnel robots will have significant role in the future. Robots are very important because it can perform various important or dangerous task such as exploring dangerous environment (oil mine) cleaning house, also in the defence sector. It actually saves our time and energy.Bluetooth operates in 2.4 GHz with maximum speed of 3 Mb/s.
[2] In this paper along with car design they have used different types of advanced sensor. They have developed such android application that can access the sensors data. The car is programmed with obstacle detection and prevention algorithm based ultrasonic sensor.Car is actually capable of transmitting live information through webcam, which helps to monitor the control the movement remotely.
[3] The Bluetooth module system contains an RF transceiver baseband that can be divided into Slave and master and with serial communication mode. Another method used in this paper to Control car is by the gravitational sensor.
[4]As corona (COVID-19) spread across the world. All healthcare workers had faced various challenges with pandemic. it aims to design such system which can minimize the physical contact with infected people. This paper they have design Bluetooth control car which was used by healthcare workers to help the corona patient.
As we all know healthcare workers were affected in hospitals during COVID-19 across the world. With the help of wireless Bluetooth car, it is possible to avoid direct contact With COVID patients.
With the help of Android application user can send commands to Robot. Healthcare workers can give various command like move,stop,deliver food, water and medicines without directly coming contact with them.

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Block Diagram:

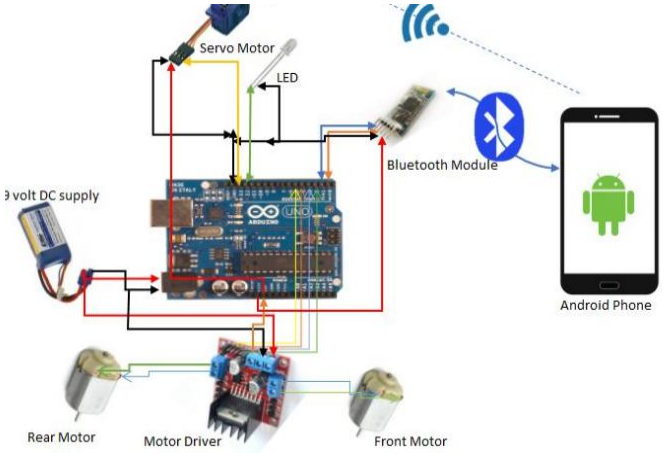


Figure 1 shows system block diagram where

Description of the components used:

A. Arduino Uno

Fig.1 Microcontroller

To communicate with Arduino first we have installed software. Then we have installed required libraries. This software is generally used to write code in the c language to control movement of car that is left, right, forward, backward etc.
The Arduino uno is an open-source microcontroller board which developed by atmega328 microcontroller by arduino.cc this board has analog i/p and o/p pins. This board has 14 digital I/O pins and 6 analog pins. This board has a crystal oscillator which has the frequency of 16 MHZ, a DC power jack, USB connection and reset button. This board has two out pin such as RX and Tx.it also have GND pin and VCC. This board was the main part of our project. This board is used to control motion of car or we can say that it controls the tt gear motor. In our project we used 6 digital pins and 2 and 5 number pins used to control the motor. so, this is all about this Arduino uno.

B. HC-05 Bluetooth Module

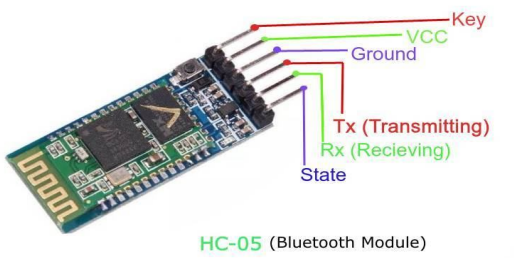


Fig.2 Bluetooth Module

HC-05 is a Bluetooth module which used for wireless communication within short range. This module uses master and slave configuration with serial communication. This module communicates with microcontroller. The power requires to operates this module is in between 3.6-6V. Thismodule has a pin like VCC, GND,TXD, RXD,State. VCC pin is connected to 5V or 3.3 V of Arduino pin. TXD transmit data and RXD receive data wirelessly and State pin talks about module is connected or not.
This device has a frequency of 2.4 to 2.5 GHz. This module is used because it provides high accuracy, small size, good transmitting and Baud rate.it is used for many applications such as Alexa,wireless toys,wireless mouse and keyboard etc. It has a range up to <100m which is actually depend on Tx and Rx.

C. Motor Driver Module L298N

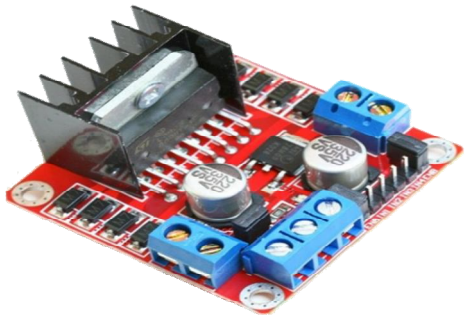


Fig.3 Motor Driver circuit

This L298N is an integrated circuit which provide high voltage and current which is used to driving tt gear motor. This module is used because it provides feature like High operating voltage upto 40V and uses a standard logic signal to control. This above fig.3 module can drive two motors.
This module uses the popular L298 motor driver IC that require 5V regulator which can be able to supply to an external circuit. In our project it used to connect tt gear motor so that it can control its motion very accurately.

D. Grippy Wheels

Fig. Grippy wheels

In our project we used 4 grippy wheels. The reasons behind using grippy wheels because it has its great use at the time of turning. We have connected these wheels to a tt gear motor by wiser to each wheel.

E. MDF Board

The next component used is MDF board which is considered as the cassis of the Bluetooth car. First, we have taken measurement using components then that board is cut according to our requirements.

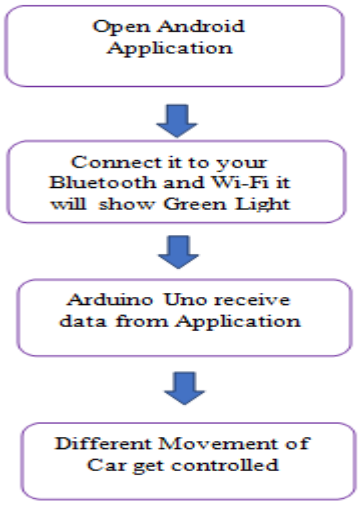
Fig5.MDF boards

F. Rechargeable 12 v lithium-ion battery

Fig.6 Li ion batteries

We have use above 12v lithium-ion battery which is used to give power to motor. The main thing is that we can recharge this battery using charger. This battery is very effective in the field of robotics. Also, in the modern age the demand of this battery is increasing day due emerging of electric vehicle tesla.it is basic part of electric car. In the tesla motors this type of battery are used. It is connected with the help of copper strip .in tesla car 3000 such battery is used to generate high amount of power. While using this battery we need to take some kind safety. Always keep away positive and negative part away from each other. If connect there is chance of power loss.

Flow Chart of project:



Flowchart Explanation

First Open the Android application from your smart phoneWhich looks like that is shown in Fig No.7. which has different moment arrows like left, right, forward, Backward, turn left, turn right etc. After connect it to Bluetooth if connected it will show green light. If we press that arrow it will send that data/command to microcontroller then it will process that command transmit it to a motor Driver 298N
Thus, Different Movement of car get controlled.

III. METHODOLOGY/EXPERIMENTAL

First, we have collected all the components required to make our project. Then we cut MDF paper in to the car like shape. then connected wire to 4 tt gear motor and connected it to a chassis of vehicle and then we also connected motor driver circuit,Arduino uno, 12 v battery, Bluetooth-HC-05, switch to on-off car. Then fromRC controller android app we connected to Bluetooth. By this way we have made our whole Bluetooth control car model.
Android application:
Android is an open-source mobile application development platform. TheseApplication is build using android application RC controller using popular language java and cotlin.

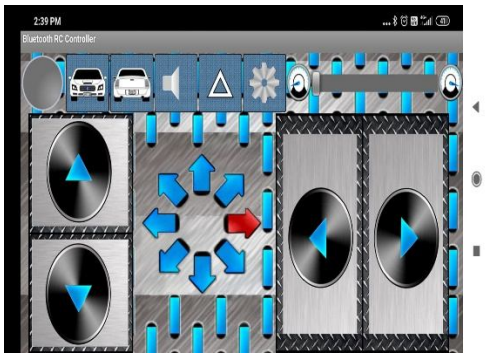


Fig.No7 android application

After model is ready the next thing is working, we checked it by giving different command from that app and car worked fine motion like left, right, forward, backward.

IV. RESULTS AND DISCUSSIONS

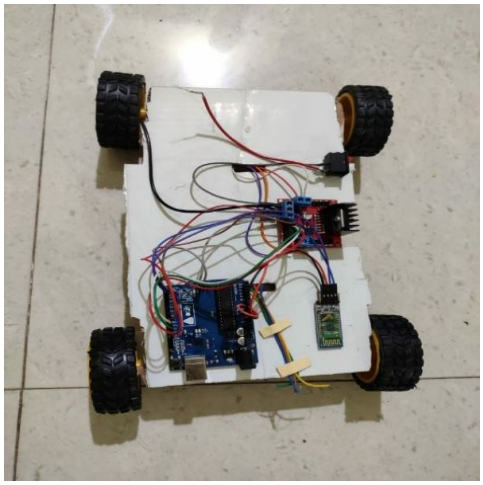


Fig.No.8 Final Prototype

We have successfully implemented the Bluetooth Control Car and performed all the directions.

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V. CONCLUSION

Wireless is one of most prominent technology that is used in different industries that actually save our cost. During this project we got familiar with different use cases of wireless technology. Most important thing was that we got to know about Arduino uno Hardware part as well as Software part. Different types of Arduino are used. The main conclusion is that Bluetooth module has its limited range. if we go > 100 it gets automatically disconnected. The instructions from Android Application are given to microcontroller via Bluetooth Module. Microcontroller process that instruction within fraction of second it will send toMotor Driver so that motor can rotate thus it has given different movement results.

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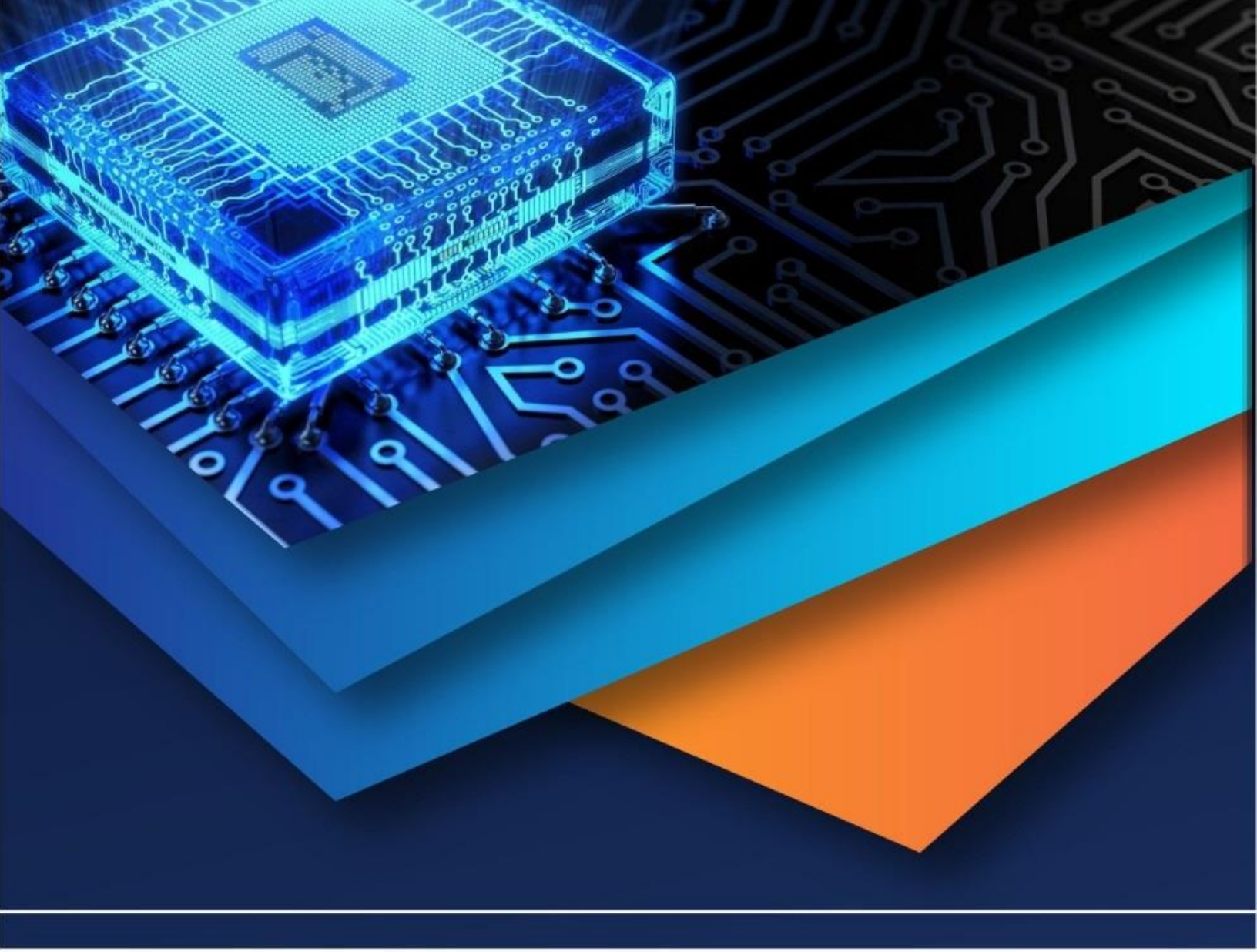

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