Bluetooth Remote Controlled Car using Arduino

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Abstract — *This Work is based on Arduino, motor driver and Bluetooth module. Arduino is an open-source prototyping platform Based on easy-to-use hardware and software. Arduino uses an ATmega328 microcontroller. Since robotics has become a major part in our daily life and also in the engineering field and it plays a vital role in the development of new technology. This is a very simple and easy type form of remote control car, where the ordinary micro-controller has been replaced by Arduino and IR sensors has been replaced by a Bluetooth module. The remote can be any android or IOS cell phones. This project can be made in a bigger scale for real time vehicles.*

Keywords—.Microcontroller (ATMEGA32), motor driver, Bluetooth Module

I. INTRODUCTION

The Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again. "Uno" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of boards.

The L298 is an integrated monolithic circuit in a 15-lead Multiwatt and PowerSO20 packages. It is a high voltage, high current dual full-bridge driver designed to accept standard TTL logic levels and drive inductive loads such as relays, solenoids, DC and stepping motors. Two enable inputs are provided to enable or disable the device independently of the input signals. The emitters of the lower transistors of each bridge are connected together and the corresponding external terminal can be used for the connection of an external sensing resistor. An additional supply input is provided so that the logic works at a lower voltage.

Bluetooth is a wireless technology standard for exchanging data over short distances (using short-wavelength UHF radio waves in the ISM band from 2.4 to 2.485 GHz) from fixed and mobile devices, and building personal area networks (PANs). Range is approximately 10 Meters (30 feet).

These modules are based on the Cambridge Silicon Radio BC417 2.4 GHz Bluetooth Radio. This is a complex chip which uses an external 8 Mbit flash memory.

II. OUR WORK

This project of ours is controlling car not by using a sensors or transmitter but using Bluetooth which is a very simple communication medium in the present day. The remote in this project is an android device which has an inbuilt Bluetooth module. The Bluetooth is a serial communication medium through which we can connect two devices. Here we have inserted a Bluetooth module which gets connected to the phone's Bluetooth, that allows us to communicate and allows to take command over it.

The Bluetooth module does not work on its own in controlling the car. The main part in controlling the car is played by the Arduino UNO which houses the micro-controller ATMEGA32. Arduino has played a major role in the robotic section and has made it easier to convert digital and analog signal to physical movements.

The project is Bluetooth based because it gives us wider range of control and more efficiency. It also gives us the advantage of changing the remote anytime, meaning that we can use any android devices including phones, tablets, computers. Physical barriers like walls, doors, etc. do not effect in controlling the car.

WHY ARDUINO?
• We have used Arduino because it is an open source device which can be programmed through any operating system like Windows, Mac, Linux, etc.
• The language used is understandable and easy.
• Arduino can be used by beginner in robotics to professionals.

•Changing of program is easy.

•Shield (external circuits) are available for various purpose like, if we want to connect the arduino to a network then a wi-fi shield is available. For controlling the motor a motor shield is available, and for this project a Bluetooth shield is used.

Proposed System

- Power Supply: A power supply is an electronic device that supplies electric energy to an electrical load. The primary function of a power supply is to convert one form of electrical energy to another and, as a result, power supplies are sometimes referred to as electric power converters.
- Bluetooth module: It is small wireless serial communication module that can be connected with a Micro-Controller to receive and send data when connected with other Bluetooth devices.
- Arduino-UNO:Arduino is an open-source prototyping platform based on easy-to-use hardware and software. Arduino consists of both a physical programmable circuit board and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.
- Motor driver: It is a small circuit that hoists the motor driving IC, and can control two motors at the same time. It controls the motor speed by pulse width modulation (PMW).

Block Diagram

Two dc batteries are required. First supply of 5v dc is needed to power the Arduino board, and the second supply of 6-12v dc supply is needed to power the driver circuit. Once the device is all set up the Android Device require an application called "CAR BLUETOOTH RC" which sends the command to the Bluetooth Module connected with the Arduino. The Arduino receives these commands and transfers them to the Motor Driver from the digital I/O pins of the Arduino. The motor driver has two DC motor connected to it output terminals and it runs the two motor according to the commands send by the Arduino. The motor driver can run a single motor or both the motor at the same time in different direction. Which gives the user an advantage to run the motor in any direction?
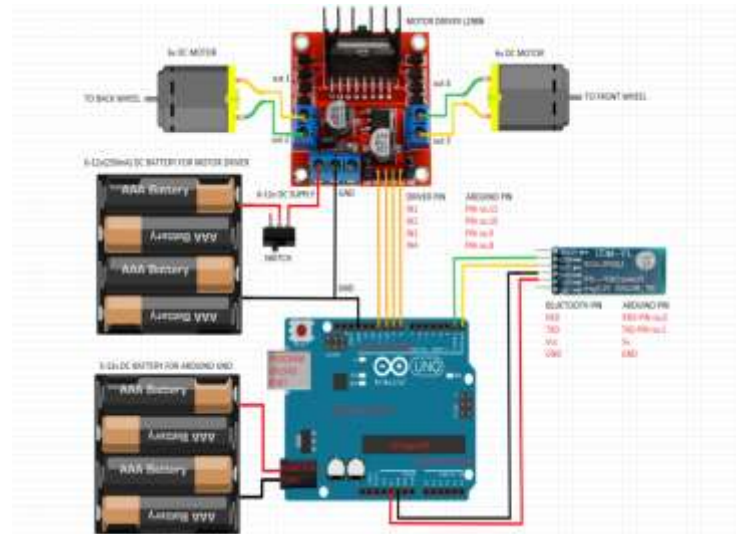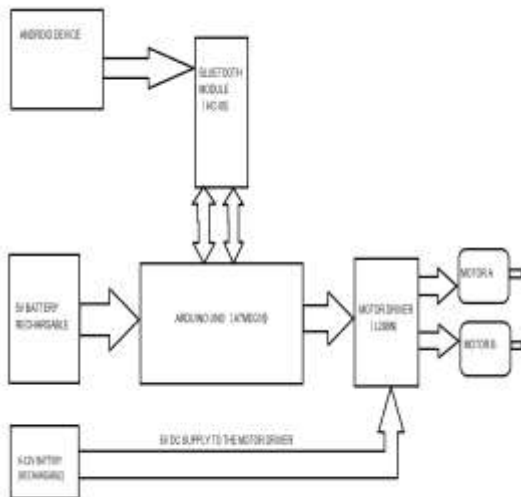
Circuit Connection and Description

Fig 2 shows the Circuit diagram.

CIRCUIT DESCRIPTION

As show in the diagram, two rechargeable batteries as supply is used which is connected to motor driver and arduino respectively. When the circuit is energized, we will have to first pair the android phone with the Bluetooth module through the phones Bluetooth setting the default password of the Bluetooth module will be '1234'. Once the phone gets paired open the application 'CAR BLUETOOTH RC' which we can download from 'Google play store'. on opening the application there will be sets of control displayed on the screen. If the device has not been connected the control will be locked meaning the control buttons cannot be pressed. When the car is at its initial position the the application automatically sends the command 'S' meaning stop. The stop command is put in a loop that keeps on repeating throughout the execution of the program. As the user presses any control buttons the stop command will be interrupted by the move forward, backward, right, left, depending on the user and the car moves like wise. The program is designed in such a manner that we can also give two commands at the same time i.e. move front and turn

right or left and same with the backward motion. The Arduino also stores the program in its memory so it does not require re-uploading of Program.

The IN1, IN2, IN3 and IN4 are the inputs for the motor driver that receives command from the Arduino for the two motors respectively. The motor driver should be grounded with the Arduino ground pin (GND). The motor driver requires minimum of 6v and above to run, any voltage below 6v the motor remains off.The RXD pin of the Bluetooth module is for receiving commands from the Android devices and sends to Arduino through this pin and the TXD is for transmitting or sending dates or information's. It is supplied with a 5v dc source from the arduino 5v pin. The main part of the above circuit diagram is arduino UNO. The power supply section is very Important. It should provide constant voltage to the devices for successful working of the project.

D. *Advantages:*
- Easy to install and low cost.
- Manually operate.

III.CONCLUSION:

The Arduino is an open source device that has been the brain fornumerous projects. The Arduino has everything that is required by the user which includes its inbuilt converter, i/o pins etc. With the combination of Arduino, and the Bluetooth Shield we can control over many other things, like home Lightings, air conditioner and many more through our cell phones. The Arduino can also contribute at large for the SmartHome system. By doing this Project we found out a lot about the Arduino, and how it has made us easier to convert digital signals into physical movements. One more advantage of Arduino is that once a program is burned we don't need to worry about the program getting erased as long as it is not

RESET. Arduino has also over all other micro-controller because of its efficiency and user friendly property.

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