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 opensource 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 This is a very simple and easy type form of remote control car, where the ordinary micro-controller has been replaced by Arduino and IR sensors has been replaced by a Bluetooth module.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 :- Arduino Uno, Arduino IDE, Motor Driver, Battery and Motor.

I. INTRODUCTION

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of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of boards.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 Multi watt 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 from2.4 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[1-2].

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.

II. LITERATURE REVIEW

According to 'Tashi Rapden Wangchuk' , "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 they found out a lot about the Arduino, and how it has made us easier to convert digital signals into physical movements"[3].

According to 'Rajesh Bhatt and Subankar Roy' , "The Wireless control is one of the most important basic needs for all the people all over the world. But unfortunately the technology is not fully utilized due to a huge amount of data and communication overheads. Generally many of the wirelesscontrolled robots use RF modules. But our project for robotic control makes use of Android mobile phone which is very cheap and easily available. The available control commands are more than RF modules."[4]

According to 'Ms. S.T. Shibe and . Prof. S.S.Joshi' , "The robotics and automation industry which ruled the various sectors from manufacturing to household entertainments robotics is widely used because of its simplicity and ability to modify to meet changes of needs. The project is designed to develop android application based a robotic vehicle for remote operation. This is a kind of robot can be helpful for mobility aid for elderly and disabled people."[5]

According to 'Everton Rafael da Silva and Breno Lisi Romano' , "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 to cognitive development, for future users can learn to insert custom paths that can process logic issues and more complex mathematics allowing the prototype perform the desired movements. Analyzing the financial costs of design, it is believed that it is feasible to construct this type of prototype because it presents a low cost of the components used, particularly if they choose in a large scale production. It is worth noting that both the Java programming language as the language for Arduino in development are free, not burdening additional costs for the development of the project, pointing out that this applies also the tools used for development[6-7].

III. METHODOLOGY

A. Components Used

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 computercode 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 bypulse width modulation (PMW).Figure 1 shows the circuit diagram.
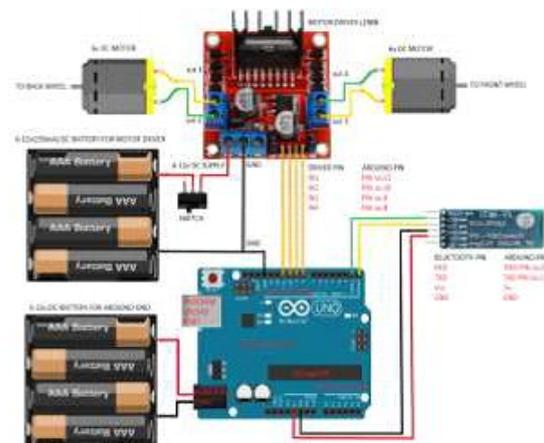

Figure 1. Circuit diagram

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 twomotor 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 runthe motor in any direction.

ACTUAL VIEW OF PROJECT
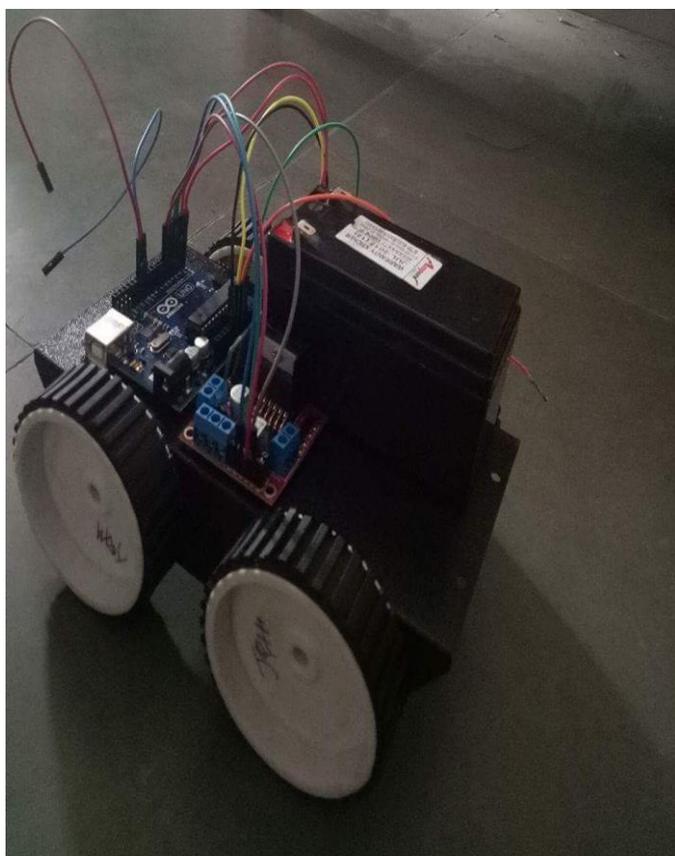
IV. CONCLUSION

The Arduino is an open source device that has been the brain for numerous 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 microcontroller because of its efficiency and user friendly property.

V. FUTURE SCOPE

What the Arduino platform has done is to take what was once a fragmented and expensive market for robotics and microprocessors and become the major platform, largely by virtue of much lower cost and ease of use, leading to higher volume and popularity, and community support behind it. Arduino has made it simple to program their boards with any computer via USB and simple to integrate with a wide array of sensors and devices. The Arduino is great for hobbyists, prototypers, and people just starting out in robotics because of its low cost, ease of use, and large following online. It's easy to learn and teach people to be able to do basic things with the Arduino, yet it's capable enough to do fairly sophisticated things if you as a developer have the capability to take advantage of it. It's allowing people to develop projects inexpensively to build and control their own devices, such as sensors that send data to the Internet and control systems for all kinds of things. It's also reducing the cost of development by allowing companies to develop prototypes much more quickly and with less initial investment.

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