Android Controlled Arduino Robot

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Abstract—

The project aims to design an android interface, Arduino bot and to write the program into the Arduino microprocessor. Arduino car contains Arduino UNO microcontroller with basic mobility features. Arduino programs contains instructions mediating between android controller and Arduino car. Android mobile controller uses different mobile sensors to supervise motion. An appropriate program in the Arduino microprocessor to interact with the android controller has to be created. The program has been successfully complied through Arduino IDE & uploaded in to it after proper checking of logic to decrease any loss/damage of hardware. We have to create an android application that will provide user an interface to interact with the Arduino powered car. The interface is easy to use and provide feedback from the Arduino microprocessor through the Bluetooth after giving instruction to Arduino for various actions through interface via Bluetooth module. The android application is to be created with the help of android studio that provide us with more capability & stability. After performing these procedures we have tested this project thoroughly and rectified the maximum no. of errors & wrong logic found in the microcontroller program. The Arduino Car has been designed and tested and found working satisfactorily and we can firmly say that we have been able to create the project as per our goal described.

Key words: ROBOT,Arduino

I. INTRODUCTION

This is an Arduino based, Bluetooth controlled RC car. It is controlled by a smart phone application. Bluetooth controlled car is controlled by using Android mobile phone instead of any other method like buttons, gesture etc. Here only needs to touch button in android phone to control the car in forward, backward, left and right directions. So here android phone is used as transmitting device and Bluetooth module placed in car is used as receiver. Android phone will transmit command using its in-built Bluetooth to car so that it can move in the required direction like moving forward, reverse, turning left, turning right and stop. Smartphone has quite changed the traditional ways of human to machine interaction. Smartphone is now a vital part of a person's life. Android is a software platform for mobile devices that includes an operating system, middleware and key applications. Android is a safe and secure operating system. All of its essential tools are combined in software called SDK which stands for Software Development Kit. We know that all manual operations have been replaced by automated mechanical operations. Our main objective of writing this paper is to develop an Android app for controlling the robot using Bluetooth. Bluetooth is used for its various advantages over other wireless technologies. Hardware technology utilized in smart phones has also greatly improved. Hence, we can say that Android smartphones will serve a great benefit for industrial, commercial and other general purpose applications.

Purpose of Plan

As most of the work in this area has been done regarding the Arduino & its application, what left out most of the time is the Android controller. In this project we are trying

to exploit the android open accessory Bundle so that we can give a) More realistic experience to the user.

b) Better Connectivity to the Arduino Chip.

c) Increasing the efficiency in controlling of Bot.

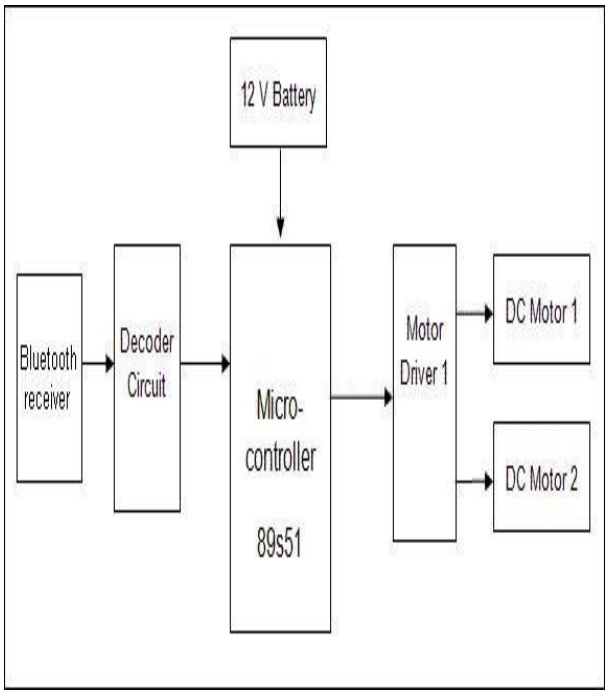
Project Objectives

In this project we will be constructing the android guided Arduino Car by extracting the powers of both the open-source technologies- Android and Arduino Programming.

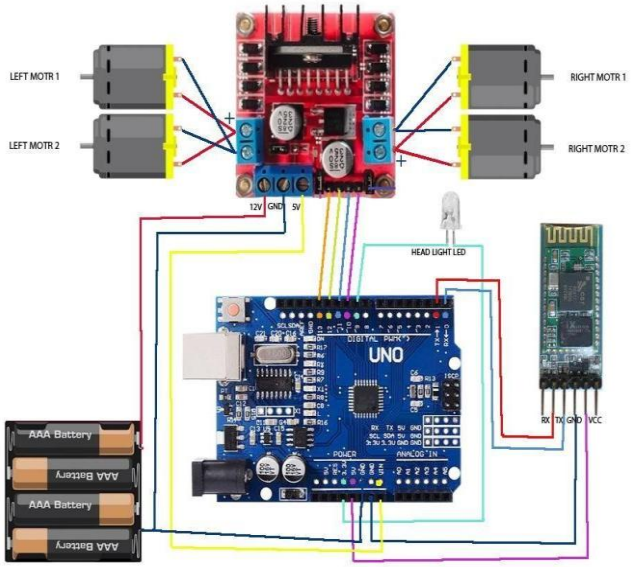
HARDWARE REQUIREMENTS AND SPECIFICATIONS

Components Required

1. Arduino UNO
2. HC – 05 Bluetooth Module
3. Motor Driver L298N
4. Jumper Wire
5. Drilling Machine
6. Soldering Gun
7. 4 X 5V Geared Motors
8. Connecting Wires
9. Battery holder
10. Power Supply
11. Android Phone



Block diagram and working principle



Circuit Diagram:

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 (I/O) pins that may be interfaced to various expansion boards (shields) and other

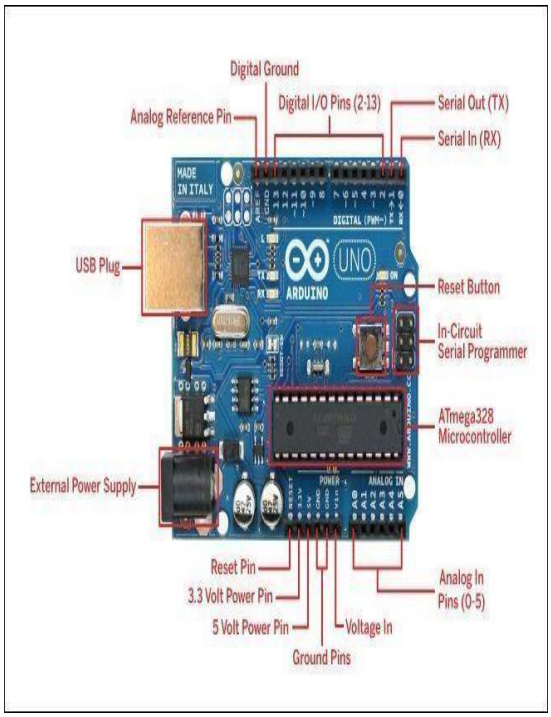
circuits. [1]. The board has 14 digital I/O pins (six capable of PWM output), 6 Analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable. It can be powered by the USB cable or by an external 9-volt battery, though it accepts voltages between 7 and 20 volts. The Uno board is the first in a series of USB-based Arduino boards; it and version 1.0 of the Arduino IDE were the reference versions of Arduino, which have now evolved to newer releases. The ATmega328 on the board comes pre-programmed with a bootloader that allows uploading new code to it without the use of an external hardware programmer. There are many versions of Arduino boards introduced in the market like Arduino Uno, Arduino Due, Arduino Leonardo, Arduino Mega, however, most common versions are Arduino Uno and Arduino Mega.

Arduino Uno Features and Pin Configuration

Uno means one in Italian, as uno is the first microcontroller

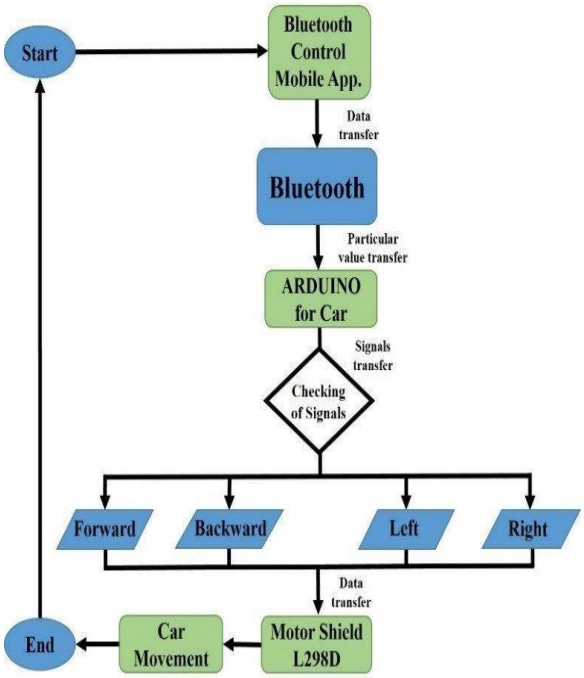
of arduino family. Features of Arduino Uno:- The operating voltage is 5V

- The recommended input voltage will range from 7v to 12V
- The input voltage ranges from 6v to 20V
- Digital input/output pins are 14
- Analog I/P pins are 6
- DC Current for each input/output pin is 40 mA
- DC Current for 3.3V Pin is 50 mA
- Flash Memory is 32 KB
- SRAM is 2 KB
- EEPROM is 1 KB
- CLK Speed is 16 MHz



Arduino Uno connections

DESIGN AND IMPLEMENTATION



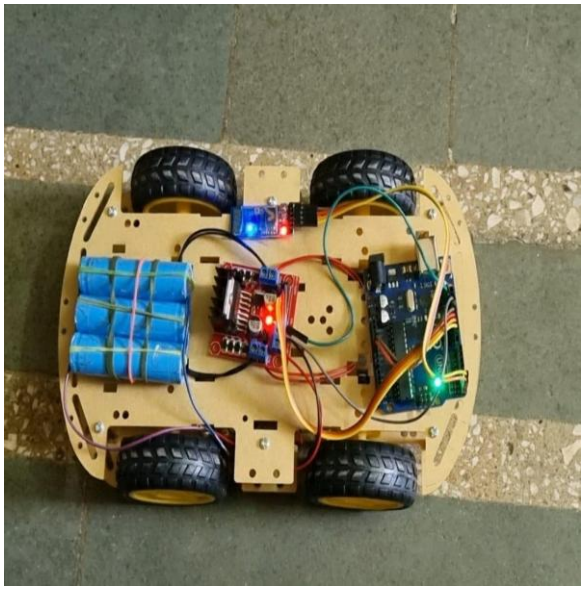
Flow diagram to control robot car with mobile-application

RESULT & ANALYSIS

Resultant and Analysis

Here we work on common mode and when we want to change settings of HC-05

Bluetooth module like change password for connection, baud rate, Bluetooth device‘s name etc. To do this, HC-05 has AT commands. To use HC-05 Bluetooth module in AT command mode, connect ―Key‖ pin to High (VCC). Default Baud rate of HC05 in command mode is 38400bps. Following are some AT command generally used to change setting of Bluetooth module. To send these commands, we have to connect



CONCLUSION & FUTURE SCOPE

To us the need of internet and the things which are internet based are very much important nowadays. IOT or internet of things is the very important part in both computer and our daily lives. The above model describes how the arduino programs the car motor module and by this we actually rotate the wheels and give direction to the car. It gives us the opportunity to work with different platforms and it helps us to create various interesting modules to work on. We also tested the applications used to drive the car. Due to the new concept of Wireless Controlled Car using Bluetooth, Wifi we were able to come up with various possibilities that can take place.

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 Smart Home 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.

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