

Android App Based Vehicle Control using IoT

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Abstract— Nowadays android smart phones are the most popular gadget. There are multiple applications on the internet that integral hardware in these mobile phones, such as Bluetooth, Wi-Fi and ZigBee technology to control devices. Wi-Fi technology aims to swap data wirelessly at a short distance using radio wave transmission comprising features to create ease, awareness and controllability. In this project we have designed a robot that can be controlled using an application running on an android phone. It sends control command through android app which has hard features like controlling the speed of the motor and sharing the information with android phone about the direction and distance of the robot from the next obstacle. The aim of our project is to design a Mobile Remote Control RoboCar. The working is based on Android OS, Arduino micro-controller, motor drivers, a Wi-Fi module. Arduino is an open-source prototyping platform. This is a very simple remote control car, with an Arduino and Wi-Fi modules. The idea is to first code the entire working using our previous knowledge of programming. The code will then be simulated on software and later be interfaced with the hardware. The controlling remote can be any smart device with android. All the controls of the vehicle will be on the app on that device.

Keywords: Wi-Fi Module, Arduino, Driver IC

I. INTRODUCTION

The aim of Project is to make use of mobile phone to control robot movement.

The movement is controlled by pressing applicable keys on a mobile phone that makes a call to another mobile phone attached to the robot. One of the results is Internet enabled robot that can be controlled over the internet with some kind of interface between the robot and the controller system.. Mobile device screen is located on the remote control to displays the direction, mode and distance to plan on the distance, direction and mode by a button. This project proposes a method for controlling a Robotic arm using an application build in the android platform. The android phone and arduino board is connected through Wi-Fi. As the name suggest the robotic arm is designed as it performs the same activity as a human hand works. A signal is generated from the android app which will be received by the arduino board and the robotic arm works according to the predefined program. The android application is the command center of the robotic arm. The program is written in the 'c' language in the arduino board. The different data will control the arm rotation. We know that all manual operations have been replaced by automated mechanical operations. Our main objective of our project is to develop an Android app for controlling the robot using wifi. The DC motors are widely used for providing variable speed drive system in industrial applications resembling automation, electrical traction, military instrumentality, fixed disk drives, thanks to their

high potency, noise-free operation, compactness, dependability and low maintenance and cost.



Fig. 1: Block Diagram

Block Diagram of Wi-Fi controlled robot is shown in above figure. We mainly used a Arduino and ESP8266 Wi-Fi module. ESP8266 Vcc and GND pins are in a straight line connected to 3.3V and GND of Arduino and CH_PD is also connected with 3.3V. Transmitter and Receiver pins of ESP8266 are directly connected to pin 2 and 3 of Arduino. Software Serial files is used to allow serial communication on pin 2 and 3 of Arduino .A L293D Motor Driver IC is use for driving DC motors. Input pins of motor driver IC is in a straight line connected to pin 8, 9, 10 and 11 of Arduino. And DC motors are connected to output pins. Here we have used 12 Volt battery for driving the Circuit and DC motors. The robot in the project can be ready to move in all the four directions using the android application.



Fig. 2: Arduino Uno

Arduino is an open-source hardware and software company, project and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices and interactive objects that can sense and control both physically and digitally.

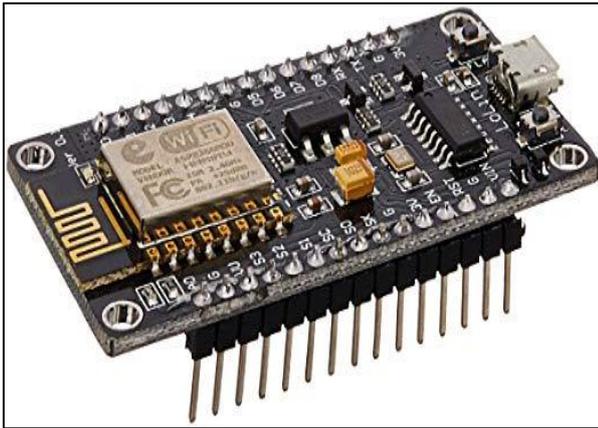


Fig. 3: ESP8266

The GPIO's pins shown in blue box (1, 3, 9, 10) are mostly not used for GPIO purpose on Dev Kit ESP8266 is a system on a chip (SoC) design with components like the processor chip. The processor has around 16 GPIO pins, some of which are used internally to interface with other components of the SoC, like flash memory. Since several pins are used internally within the ESP8266 SoC, we have about 11 GPIO pins remaining for GPIO purpose. Now two pins out of 11 are generally reserved for RX and TX in order to communicate with a host PC from which compiled object code is downloaded. Hence finally, leaves just 9 general purpose I/O pins i.e. D0 to D8. As above figure shows that Node MCU Dev Kit. We can see Rx, Tx, SD2, SD3 pins are not mostly used as GPIOs since this pins are used for other internal process. But we can try with SD3 (D12) pin which mostly to respond for GPIO/PWM/ like functions. Note that D0/GPIO16 pin can be only used for GPIO read/write, no special functions are supported on it. The most way to use the ESP8266 module is to use serial commands, as the chip is basically a Wi-Fi/Serial transceiver. However, this is not convenient. Arduino ESP8266 Wi-Fi is a modified version of the Arduino IDE that you need to install on your computer. So it is very convenient to use the ESP8266 chip as we will be using the well-known Arduino IDE.

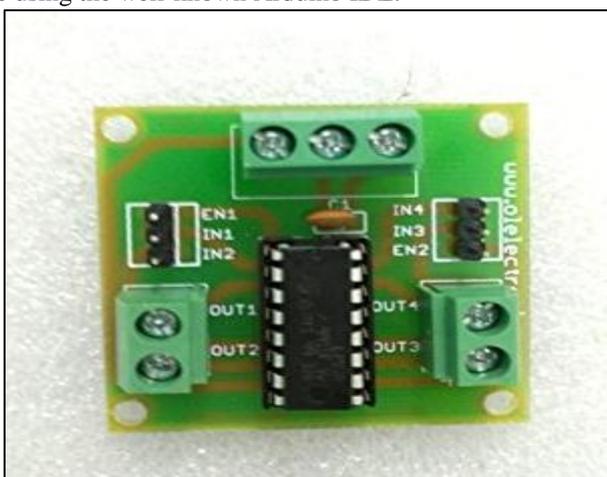


Fig. 4: Driver Circuit

L293D is the most generally used driver for bidirectional motor energetic applications. L293D is a 16 pin motor driver IC which is use to drive the two motors. L293D IC is a dual H-bridge motor driver. It can be used to drive direct current on any direction. It is used as a current speaker

since it takes low current control signal as the input and provides high current signal as output. L293D IC can be used to drive undersized as well as big motors as well. L293D motor driver is available for providing user with ease and user responsive interfacing for embedded applications. It is simply compatible with any of the systems. In fig1 we can see that, it supports external power supply pins for motors.

II. RELATED WORK

In Previous few papers they are used Bluetooth technology and we have used Wi-Fi technology.

[1] International Journal of Computer Applications March 2015 Ketan Dumbre, Snehal Ganeshkar, Ajinkya Dhekne. "Robotic Vehicle Control using Internet Webpage and Keyboard". In this paper The webcam will confine live data with regards to its environs and then send it to a desired device through internet. The user will be observing this data on the monitor at the user end.

[2] IEEE Xplore: July 2017 Daniel M.Lafaro Utilizing the Android Robot Controller for robots, wearable apps, and the Hotel Room of the Future. In this paper Unless the given research is specifically on teleportation, navigation, or other related control problems, typically researchers want an easy way to drive the robot around and give it "start/stop" commands.

[3] IEEE May. (2011) Gaowei ChenScott A. King Michael Scherger Robot Remote Control Using Bluetooth and a Smartphone Augmented System In this paper, we present an innovative robotic system with augmented Smartphone. We propose a Smartphone accelerometer Controlled differential steering algorithm and implement it on a two-motor driven robotic vehicle with real-time video rendering.

III. CONCLUSION

Now our world is moving towards digitalization, so if we want to do some changes in the previously used system we have to use the new techniques. This technology provides smart phone control robot over long range data transmission and reception. It saves time, cost of cables, and size of the system. Data can be sent from Wi-Fi and arduino control the robot using android app .Username and password type authentication system is provided for adding securities.

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