

Wi-Fi Control First Person View (FPV) Robot Using Arduino Uno

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Abstract

A project is designed to develop a robot using wi-fi applications for remote operation attached with wireless camera or mobile camera for monitoring purpose. The robot along with camera can transmit real time video with night vision capabilities. This is kind of robot can be helpful for spying purpose in war fields. The wi-fi technology is relatively new as compared to other technologies and there is used potential of its growth and practical applications. The wi-fi application loaded on mobile device can connect with security system and easy to GUI. The robot can move automatically to monitor the dead zones and capture the images by using the camera. In this project we used an ESP module wi-fi router which is used as proto shield for Arduino and another component IC L293D which is H-bridge motor known as servomotor which control the left right movement of the robot. IP camera which is used for taking pictures and via commands gives from the internet programming in HTML via C programming language. The robotic parts made in this project using many tools like Hand saw, Screw driver, Ruler, Utility knife, Drilling machine, Sandpaper, soldering iron, A computer. Those tools were used to produce robot's mechanical structure, assembly of the robot and connection of electronic components.

Keywords: Wi-fi, Arduino Uno, ESP module 8266, camera

INTRODUCTION

Robot is an electro-mechanical machine that is controlled by computer program to perform various operations. In this type robot can capture video and picture information from the surroundings and sends to remote station through RF signals. We show how to design a remotely controlled two wheeled robots over wi-fi. Network using an Arduino Uno connected to an ESP 8266 wi-fi module and DC gear motors. The robot can be controlled from an ordinary internet browser using a HTML design interface. An Android smart phone is used to broadcast video and audio from the robot to operators control in this we used Arduino as a main controller. Arduino is an open source hardware and software company, project and user community that designs and manufacture kits for building digital devices and interactive objects that can sense and control the physical world.

WIDE FIDILITY (WI-FI)

Wi-fi is a term that most of us hear almost every day and is a service most would consider an integral part of our lives from our smartphones to our game consoles and computers, most devices on the market today are equipped to use wi-fi. While wi-fi has become critical to routines of many, a large portion of us don't know anything more than the basics. Wi-fi is a local area wireless technology that allows an electronic device to participate computer networking using 2.4Ghz UHF and SHF ISM radio bands.

The wi-fi alliance defines wi-fi as any & wireless local area network & (WLAN) product based on the institute of electrical and electronics engineers. However, the term wi-fi is used in general English as a synonym for & WLAN since most modern

WLANs are based on these standards. Wi-fi is a trademark of the wi-fi alliance.

ESP MODULE 8266

The ESP 8266 is a low cost wi-fi chip with full TCP/IP stack and MCU capability produced by shanghai-based Chinese manufacturer. The chip first came to the attention of western makers in august 2014 with ESP-01 module made by a third-party manufacturer, Ai-thinker this small module allows microcontrollers to connect a wi-fi network and make simple TCP/IP connections using Haye style commands.

However, at the time there was almost no English-language documentation on the chip and the commands it accepted. The very low price and the fact that there were very few external components on the module which suggested that it could eventually be very inexpensive in volume attracted many hackers to explore the module chip and the software on it.

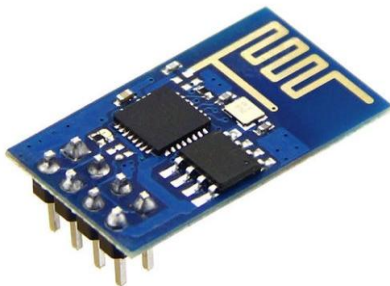


Fig-(a)

- 32-bit RISC microprocessor core based on the tense diamond standard 106 micro running at 80MHz.
- Up to 16 MB is supported external QSIP flash.

Arduino UNO

An open source computer hardware and software company, project and user community that designs and manufactures kits for building digital devices and interactive objects that can sense and

control the physical world Arduino boards may be purchased or preassembled.

- Operating voltage-5v
- Analog input pins-6
- Input voltage(recommended)-7 to 12v
- Input voltage(limits)-6 to 20v

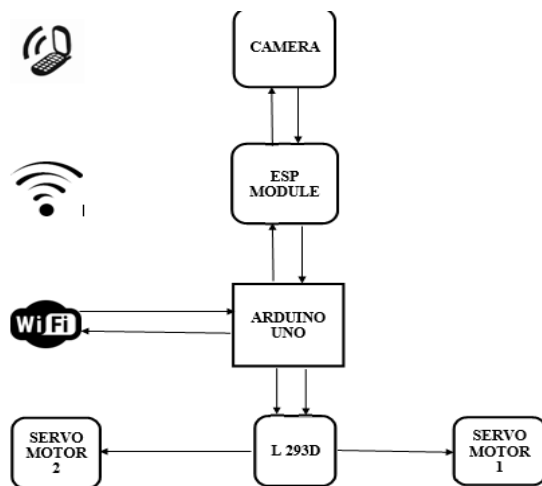


Fig(b)

Working

The connection between all the components are shown in the block diagram. The main controller of the project is Arduino which is nothing but a mini computer for many applications. In Arduino Uno atmega328p IC is used to give input. There are two IC pins analog pin and digital pin. Analog pin can be used as an input. Digital pin can be used as input as well as output between 0 to 5v input from the analog pins and the output of this pin can be given at different pins and dc pins are used to control the voltage level of the Arduino board. First step is to connect the mobile or computer via internet which is having control as remote to control the command of robot. the mobile camera or computer can be connected to a ESP module 8266 which is having function as a proto-shield of Arduino. By arranging the SSIP address and password of the module we can use this for controlling the servo motor and this is connected to IC L293D which is H-

bridge module. This controls the wheels of the robot. This is logic1 and logic0 which is given by the voltage source and left and right rotation of the robotic wheel and giving command to camera to take pictures and giving the reverse command to collect the data. The interfacing between Arduino and the ESP module is main for this project via internet or user given command as shown in block diagram. The Arduino is as at center which controls all the connected components in this project. Mainly Arduino has its own voltage at digital pins and input at analog pins so when input is applied to Arduino controller that is atmega328p which controls the L293D H-bridge module which control the left right motion of the servo motor and the ESP.



Fig(c)

CONCLUSION

It has proven to allow for meaningful two-way communication between the Wi-Fi and the robot which will allow a non-expert to interact with and adjust the functionality of a system which uses atmega328p controller a single board microcontroller intended to make the application of interactive objects or environment becomes more accessible.

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