

Design & Fabrication of Manless Defense Robot

K. Venkatesh¹, K. Sudheer Kumar², L. Vamsi Sai³, N Venu Gopal Naik⁴, S. Mahesh Kumar⁵,
Dr. R. Vaikunta Rao⁶

⁶Guide

Abstract: A robot can be a much more practical and efficient option in industries, medical, and other fields where risky, unmanageable, and varied tasks are difficult to handle by humans. Hence, there is a need for an object, which can physically handle the task. Internet of Things (IoT) is the term used to denote the act of connecting different systems so that they may work in tandem with each other, sharing data and process variables. There is an ongoing revolution in the overall industrial environment, which is often referred to as the fourth Industrial Revolution or as 'Industry 4.0'. It has taken the world by storm, affecting not only the manufacturing industries but also the technology industries. It can be used by military SWAT teams to keep human soldiers safe that would normally perform this type of operation. The robot enhances the capabilities of law enforcement and first - responders by allowing them to safely and quickly inspect treacherous situations. Integration of Robotics in Manufacturing will lead to a giant leap in output and worker satisfaction. The current work emphasizes the application of IoT in the design of a prototype Robot model, developed by additive manufacturing. Now we propose a unique feature of Robot to control a robot called IOT, which can control from world wide area.

Keywords: IoT, Nodemcu, wireless control, robotics, unmanned ground vehicle, military robots, application of AI, Wi - Fi module, Defense Robot

1. Introduction

The technology has rapidly evolved these days with the implementation of real - time projects and the development of efficient work methods. This paper presents multipurpose functionalities of wireless robots. A robotic vehicle can replace soldiers at border areas to provide surveillance. Various technologies are being used today to control and develop robots, including ZigBee protocols, RF modules, Touch screens, WI - FI modules, etc By the implementation of this project, we will solve the problem of replacing humans with surveillance robots, thus reducing the harm caused to human resources. In today's world, robots that are based on mobile phones with cameras are becoming more popular. Using this camera robot can observe the surrounding. A robot of this size can usually go into tunnels, mines and small areas. By using various research papers we discussed what has been developed in robotics for field surveillance and defense robots, as well as our proposed work forth following paper. There are various defense robot based on the different communication technology.

a) Zig bee based robots

Zig bee uses the IEEE standard 802.15.4, which is low cost, low power, highly secure, and suitable for wireless personal area networks. Using CMOS/USB/TTL source, zig bee can be used to transmit and receive data at 9600/4800 baud rate. The transmission distance range is 10 to 100 meter. For establishing the communication between devices, Zig bee relies on digital radios. Zigbee networks consist of devices that set up the network and manage the information about each node within the network as well as the information transmitted and received. In Zig bee - based robots, Zig bees are used to communicate between the robot and computer.

b) RFID Based Robots

Usually, RFID refers to technologies that use radio waves to automatically identify people and objects. RFID consists of a digital tag, a reader, and an antenna. RFID comes in three forms: active, passive, and half active. The main purpose of

RFID is to track or monitor systems.

Parameter	Zigbee	Wi - Fi	Bluetooth
Range	10 – 100 meter	50 - 100 meter	10 meter
Frequency band	2.4GHz	2.4GHz	2.4GHz
Battery life	Very low	High	Medium
Data rate	50 – 60 Kbytes	>1000 Mbyte	250 Kbyte
Complexity	Low	High	Medium

2. Procedure

Components used

Nodemcu

A low - cost open source IoT platform called NodeMCU is available for download. The firmware runs on the ESP8266 Wi - Fi SoC from Espressif Systems, and the hardware is based on the ESP - 12 module. A 32 - bit MCU, the ESP32, was added later.



Figure: NODEMCU

- Wi - Fi Module – ESP - 12E module similar to ESP - 12 module but with 6 extra GPIOs.
- USB – micro USB port for power, programming and debugging
- Headers – 2x 2.54 mm 15 - pin header with access to GPIOs, SPI, UART, ADC, and power pins
- Reset & Flash buttons
- Power: 5V via micro USB port
- Dimensions: 49 x 24.5 x 13 mm

DC motor

A DC engine is delineated as a class of energetic motors that convert direct current energetic strength into mechanical energy. From duplicate description, we can decide that some energetic engine namely conducted using direct current or DC is named a DC engine.



Figure: Side Shafted DC motor

This Johnson Geared Motor from Robu. in provides torque which falls intermediate to the torques by center shaft gear motors and side shaft dc gear motors.

These “Grade B Johnson DC Motors” are in fame for their performance even at a low price compared to “Grade A Quality Johnson DC Motors”. (to know the difference between the two motors please read the Note below)

It is a simple DC motor featuring metal gearbox for driving the shaft of the motor, so it is a mechanically commutated electric motor which is powered from DC supply. The Johnson Geared Motors are known for their compact size and massive torque - speed characteristic.

The Johnson Motor comes with side shaft also known as an off - centered shaft and six M3 mounting holes. The shaft of the motor equips metal bushes which makes these DC gear motors Shaft wear resistant. The shaft of the motor has a hole for better coupling.

The motor will run smoothly between the voltage range 6 to 18 V DC and give you 60 RPM at 12V supply. It provides the torque of 7.5 kg - cm at 60 RPM.

Features:

- 1) The motor has sturdy construction.
- 2) Shaft equips metal bushes for long life.
- 3) It comes with High - Quality gears.
- 4) The shaft has a hole for better coupling.

L298 Motor Driving Module

The L298N is an integrated monolithic circuit in a 15 - lead Multiwatt and PowerSO20 packages. It is a high voltage, high current dual full - bridge driver de - signed to accept standard TTL logic level sand 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 in - put 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.

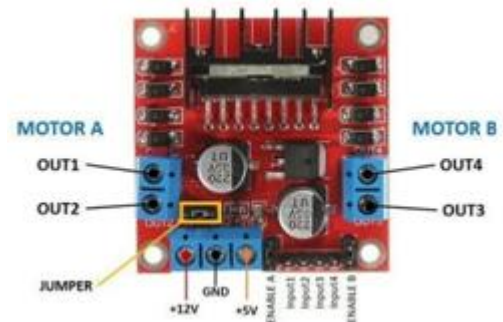
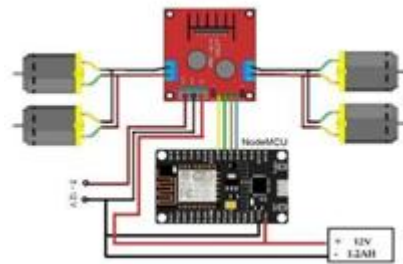


Figure: L298 MODULE

- 1) High operating voltage, which can be up to 40 volts;
- 2) Large output current, the instantaneous peak current
- 3) With 25W rated power;
- 4) Two built in H - bridge, high voltage, large current, full bridge driver, which can be used to drive DC motors, stepper motors, relay coils and other inductive loads.
- 5) Using standard logic level signal to control.
- 6) Able to drive a two - phase stepper motor or four - phase stepper motor, and two - phase DC motors.

Nodemcu Interfacing with L298 Module:



Blynk framework

Blynk is an IoT platform for iOS or Android smartphones that is used to control Arduino, Raspberry Pi and NodeMCU via the Internet. This application is used to create a graphical interface or human machine interface (HMI) by compiling and providing the appropriate address on the available widgets. Blynk was designed for the Internet of Things. It can control hardware remotely, it can display sensor data, it can store data, visualize it and do many other cool things.

There are three major components in the platform

Blynk App: It allows you to create amazing interfaces for your projects using various widgets which are provided.

Blynk Server: It is responsible for all the communications between the smartphone and hardware. You can use the Blynk Cloud or run your private Blynk server locally. It's open - source, could easily handle thousands of devices and can even be launched on a Raspberry

Blynk Libraries: It enables communication, for all the popular hardware platforms, with the server and process all the incoming and out coming commands. The process that occurs when someone presses the Button in the Blynk application is that the data will move to Blynk Cloud, where data magically finds its way to the hardware that has been installed. It works in the opposite direction and everything



Figure: Controlling Robot from Anywhere in the world

Final Stage with Fabrication

Today, military ground robots are used worldwide.

However, the significant growth of the current military robots comes as the nature of combat changes in every region. This proposed system gives an exposure to design a simple robot that can be used to do multifunction in defense. The system uses non-commercial standards for wireless communication. This robot works with wifi.



Figure: Lower Chases

Final Outcome of the military Robot:



IOT based Military Robot

3. Conclusion

We have decided from existent robot whole that, they have restricted range as they are based on various ideas technology secondhand to a degree Zig bee, Bluetooth, RFID. Also they are expensive on account of Expensive camera is secondhand for following. Therefore to avoid specific disadvantages we projected a system to sustain the assault life that way machine will not always wait in following mode even though at any time user wants to control android, they full of enthusiasm it on their choice otherwise it will continually wait in automatic way. Rather than utilizing high-priced camera, we favor Skype television calling for live gushing.

Acknowledgment

We are gratified to present "Military Defense Robot" as our project and take this time to express our deep appreciation to all those population the one assisted us in accomplishment

concerning this paper.

References

- [1] Technical Guidance Robocoupler Pvt Ltd, Andhra Pradesh, India
- [2] Sahil Bhatnagar¹, Shivam Kumar Gola " A Review on Rough Terrain and Defense Robot 10.18535/ijstrm/v4i10.092016.
- [3] Dilip kumar, Traunpreet "Wireless multifunctional robot for military applications" 10.1109/RAECS.2015.7453343.
- [4] Preamkumar Manoharan "UNMANNED MULTI - FUNCTIONAL ROBOT USING ZIGBEE ADOPTER NETWORK FOR DEFENSE APPLICATIONISSN: 2278-1323.
- [5] Saliya Khar, Riza Souilman Utilization of Mobile Technology for Mobile Robot ControllerDOI: 10.1109/ICOS.2011.6079301.
- [6] Interfacing NodeMCU to mq2 sensor. Retrived from "https://www.hackster.io/HARGOVIND/nodemcu-based-iotproject-connecting-mq2-sensor-dfb166".
- [7] Interfacing NodeMCU to GPS module. Retrived from "https://steemit.com/utopian-io/[at]kimp0gi/interfacing-gsm-and-gps-module-using-arduino-a-step-by-step-guide-tutorial-fortracking".
- [8] Interfacing NodeMCU with Flame sensor module. Retrieved from http://community.boodskap.io/2018/08/flamedetection-alert-system-using.html
- [9] http://ijaegt.com/wp-content/uploads/2014/04/409137-IJAEGT-576-583-Dhana.pdf
- [10] https://www.ijareeie.com/upload/2015/june/102_Radio.pdf
- [11] https://www.slideshare.net/divakark3/iee-conference
- [12] Bluetooth Technology Based Wireless War Field Robot with Night Vision Camera. https://www.ijedr.org/papers/IJEDR1704133.pdf
- [13] MULTIFUNCTIONAL ROBOT USING ZIGBEE. http://www.ijtre.com/images/scripts/2016030763.pdf
- [14] Surveillance Robot for Defense Environment. http://ijrar.com/upload_issue/ijrar_issue_20543647.pdf