

# IOT BASED ROBOTIC CAR USING RASPBERRY

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**Abstract** - *Developing surveillance and monitoring systems can be quite challenging at times, since the systems should be designed with consideration of the environment to be monitored. Good surveillance systems need to have dynamic features, e.g. monitoring cameras. Monitoring such a large area would also be a challenge for the security officers, as they will need to spend too much time to patrol covering all places. To address the challenges like surveillance of a large building with many levels, which would insure a high cost to install many cameras at many places dynamic surveillance systems include dangerous areas.*

## 1. INTRODUCTION

This Raspberry Pi is a card sized computer. It functions almost same as a computer. There are different types of surveillance systems available such as camera, CCTV etc., In these types of surveillance systems, the person who is stationary and is located in that particular area can only able to view what is happening in that place. Whereas, here, even if the user is moving from one place to another, he/she can keep track of what is happening in that particular place at exact time. Also, another advantage is that it offers privacy on both sides since it is being viewed by only one person. The other big advantage is that, it is a easy and simple circuit for understanding and designing. The operating system used here is Raspbian OS. Raspbian OS has to be installed so that the image can be transmitted to the smart phone Closed circuit television monitoring system has now become an indispensable device in today's society.

## 2. METHODOLOGY

This is the internet of things (IOT) based project, where we are particularly uses the Raspberry Pi, USB web camera and two DC motor with Robot chassis to build this Robotic car setup. It has a web camera mounted over it, through which we will get live video feed and the interesting part here is that we can control and move this robot from a web browser over the internet. As it can be controlled using webpage, means it can also be controlled by using the other smart devices where we can control through the webpage. We built a webpage in HTML which has Left, Right Forward Backward links clicking on which we can move the robot in any direction. Here we use the term "Motion" for getting live Video information from USB camera and used "Flask" for sending commands from webpage to Raspberry

Pi using python script to move the Robot. The webcam will capture live data with regards to its surroundings and then send it to a desired device through internet. The user will be observing this data on the monitor at the user end. According to the desired movement, the user will control the robotic vehicle through the webpage available at the user end.

## 3.Objective

Objective of this work is to develop an online decision-making algorithm to cross an urban intersection autonomously. The autonomous system can dynamically change its decision to adapt to the behaviour of other agents.

## 4. BLOCK DIAGRAM

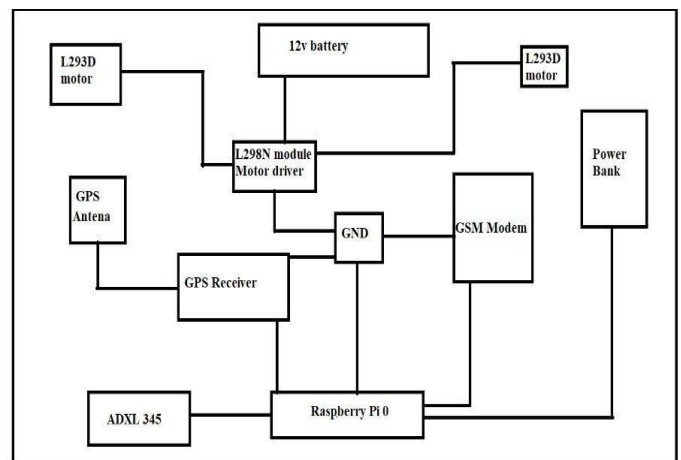


Fig 1: Block diagram of robotic car

## 5.Working

The design of the Raspberry Pi L298N Motor Driver Interface Circuit is very simple. First connect 12V Power Supply to L298N Motor Driver Module. Then, make the GND terminals of Raspberry Pi and L298N Motor Driver Module common (connect them together).

The power supply for raspberry is given through the power bank. Then check whether the raspberry pi is connected to the Wi-Fi in VNC viewer and in Raspbian OS we can find the coding through terminals.

The design of the Raspberry Pi L298N Motor Driver Interface Circuit is very simple. First connect 12V Power Supply to

L298N Motor Driver Module. Then, make the GND terminals of Raspberry Pi and L298N Motor Driver Module common (connect them together). Now, since we are controlling a single DC Motor, we need to use a single channel of the L298N. In order to do that, connect the ENA pin of L298N to Physical Pin 22 (GPIO25) of Raspberry Pi. Coming to the Inputs of the Motor, connect the IN1 and IN2 of L298N Module to Physical Pins 16 and 18 (GPIO23 and GPIO24). That's it. The rest of the job is done by the Python Script.

## 6. HARDWARE AND SOFTWARE REQUIREMENT

### a. Raspberry Pi 0



Fig 2:Raspberry Pi 0

Raspberry Pi is used for making robot wireless and web based. ge Raspberry Pi and then the videos are transmitted wirelessly from the robot to the user's monitor, from where the user can conveniently control the robotic vehicle's movement and also the robotic arm movement. Raspberry pi is connected with the dongle which enables raspberry pi to transmit over the web network. Raspberry-Pi Module Raspberry Pi uses an SD card for booting and for memory as it doesn't have an inbuilt hard disk for storage.

### b. Motor Driver (L298N Module)

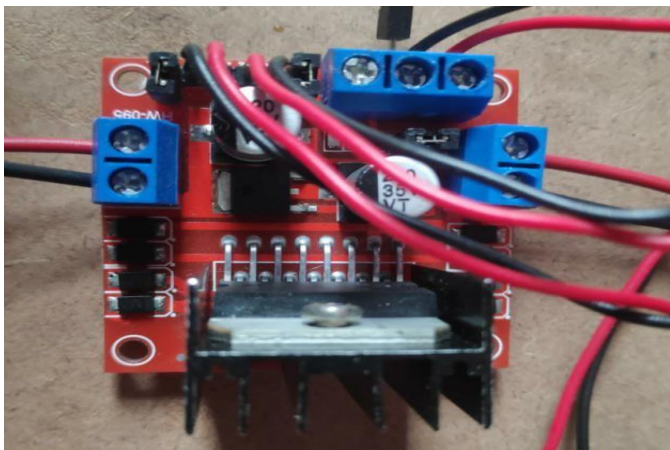


Fig 3: Motor Driver (L298N Module)

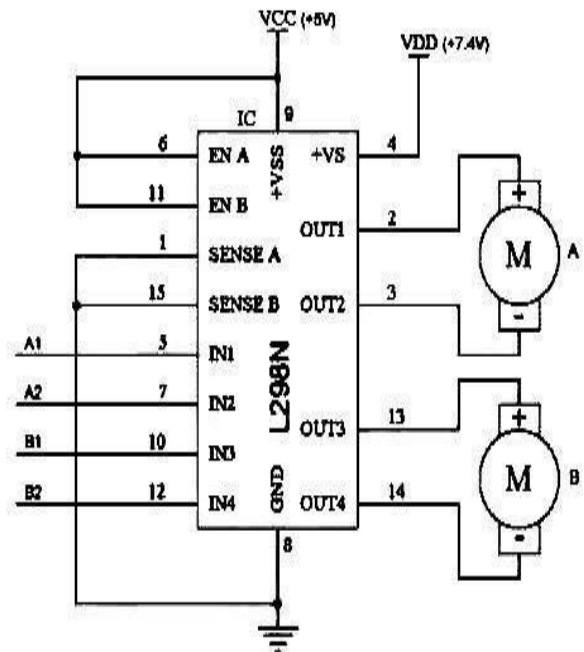


Fig 4: Block Diagram of L298N

### C. DC Motors (L293D,12v 500rpm)

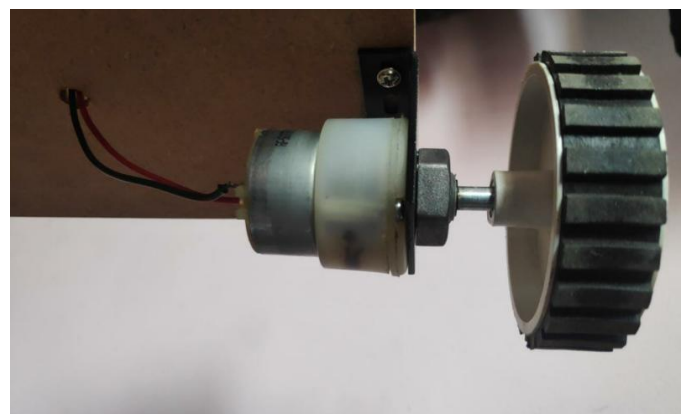


Fig 5: DC Motors (L293D,12v 500rpm)

- 500RPM 12V DC motors with Gearbox
- 3000RPM base motor
- 6mm shaft diameter with internal hole
- 125gm weight
- Same size motor available in various rpm
- 0.25kgcm torque
- No-load current = 60 mA(Max), Load current = 300 mA(Max)

#### D. ADXL Sensor

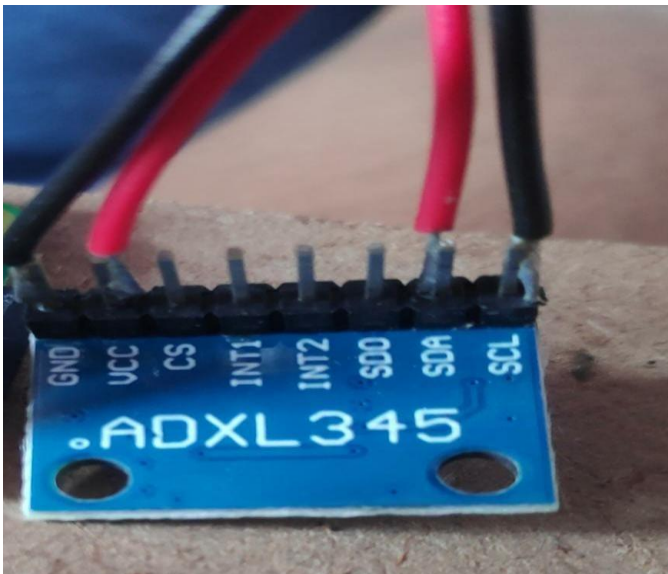


Fig 6: ADXL Sensor

Acceleration deflects the moving mass and unbalances the differential capacitor which results in a sensor output voltage amplitude which is proportional to the acceleration.

#### E. 8GB Memory Card



Fig 7: 8GB Memory Card

By 2005 however, SD/MMC had nearly taken over Smart Media's spot, though not to the same level and with stiff competition coming from Memory Stick variants, as well as CompactFlash.

#### F. GPS Receiver

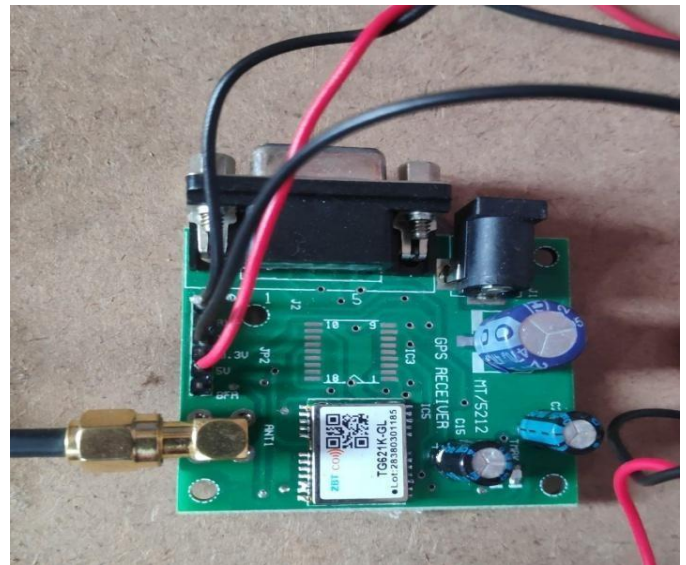


Fig 8: GPS Receiver

#### G. Raspbian PI OS

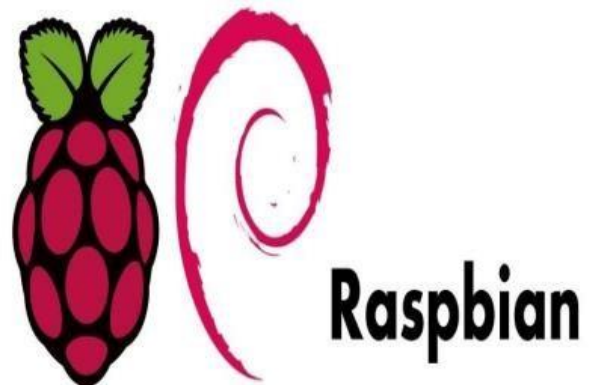


Fig 9: Raspbian PI OS

Raspberry Pi OS (formerly Raspbian) is a Debian-based operating system for Raspberry Pi. Since 2015, it has been officially provided by the Raspberry Pi Foundation as the primary operating system for the Raspberry Pi family of compact single-board computers. The first version of Raspbian was created by Mike Thompson and Peter Green as an independent project. The initial released build was completed.

## F. VNC Viewer



Fig 10: VNC Viewer

VNC works on a client/server model. A server component is installed on the remote computer (the one you want to control), and a VNC viewer, or client, is installed on the device you want to control from. This can include another computer, a tablet, or a mobile phone. When the server and viewer are connected, the server transmits a copy of the remote computer's screen to the viewer.

## 7. Coding

```
pi@raspberrypi: ~/Desktop/final_Project
File Edit Tabs Help
GNU nano 3.2 chek1.py
GPIO.setmode(GPIO.BCM)
GPIO.setup(pin, GPIO.IN, pull_up_down=GPIO.PUD_UP)
def gsm_send(msg, num):
    gps.write(b'AT\r\n')
    time.sleep(0.4)
    gps.write(b'AT+CMGF=1\r\n')
    time.sleep(0.4)
    gps.write(b'AT+CMGS="7892843804"\r\n')
    time.sleep(0.4)
    gps.write(str.encode(msg))
    time.sleep(0.4)
    gps.write(b'\x1A')
    time.sleep(10)
print("message sent")
```

Fig 11: Coding for GSM

```
GNU nano 3.2
#from ubidots import Apiclient
import RPi.GPIO as GPIO
import time
in1=40
in2=38

in3=33
in4=31

GPIO.setmode(GPIO.BOARD)
GPIO.setup(in1, GPIO.OUT)
GPIO.setup(in2, GPIO.OUT)
GPIO.setup(in3, GPIO.OUT)
GPIO.setup(in4, GPIO.OUT)
```

Fig 12: Coding for motor driver

## 8. Result



## 9. Conclusion

In this project we used raspberry pi working on Raspbian OS. As the communication is done with the help of internet so limitation of range of operation does not arise and thus, we can monitor any remote areas. One can easily monitor as well as control the activity of the robotic unit.

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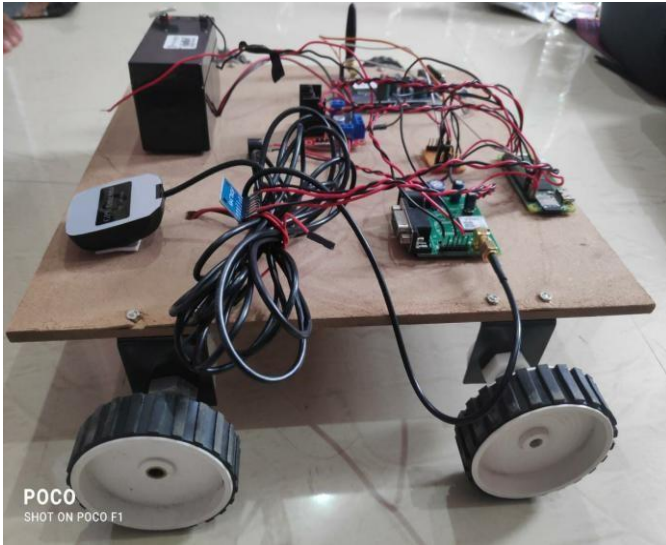


Fig 13: Complete model of robotic car

## REFERENCES

- [1] www.electronicsforu.com
- [2] www.circuitdigest.com/webcontrolled robotic surveillance car
- [3] International general of Computer Applications – March 2015
- [4] International Journal of Emerging Technology and Advanced Engineering
- [5] Website: www.ijetae.com (ISSN 2250-2459, Journal, Volume 5, Issue 10, October 2015)

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