

NETWORKING PROJECT REPORT



WIFI CONTROLLED ROBOT

By Yashwanth Sai and Sandpita Subir Khare

AUGUST 2021- DECEMBER 2021

1. Abstract	2
2. Introduction	2
3. Background	3-8
4. Challenges	8-9
5. Procedures	9-14
6. Future work	15
7. References	15

1. Abstract:

- 1.1. Because of high computation, big data and ai. IoT has a wide range of applications in future.
- 1.2. The purpose of the project is to understand networking concepts and make a bot that can be controlled by wifi. We used a raspberry pi, motor driver, batteries, PCA_9685 module and tracking sensor.
- 1.3. We tried to make the demo successful but we are facing issues it needs to be done further progress.

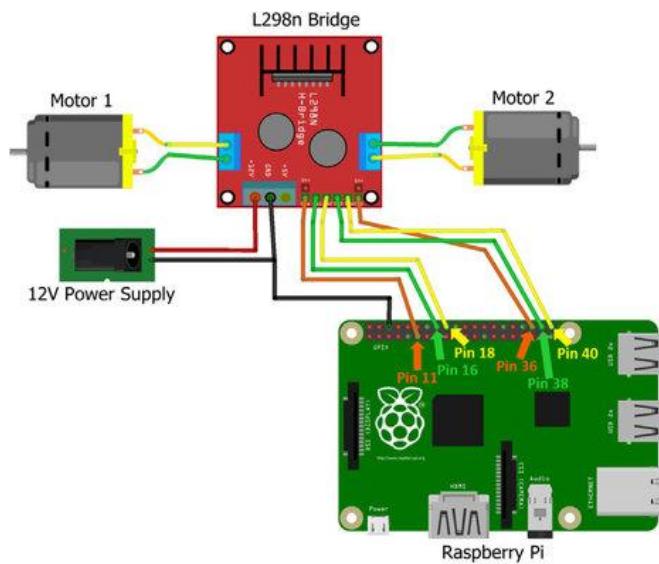
2. Introduction

- 2.1. IoT is so important in future it is proved in many areas like smartwatches, smart homes and smart military. Because of high computational power, fast micro and nanotechnologies, big data and ai. The IoT had become more powerful in today's world.
- 2.2. Coming to the applications they were used in smart houses, smart cars, electronic devices, even in rocket companies.
- 2.3. IoT is used in future research recently Elon musk neuralink company told that they were using smart sensors to collect the data.
- 2.4. Astro Pi mission space lab uses IoT and the internet to collect data in space.
- 2.5. Basically, we are not making any big innovation but we are making wifi controlled robot it uses ip address.

3. Background

- 3.1. We found the research paper on the research gate website. We took it as a reference and tried to make the bot.
- 3.2. The hardware we used were raspberry pi, L298N motor driver and batteries.

3.3. Design:



Motor 1		Motor 2	
L298n Bridge Pins	Raspberry Pi Pins	L298n Bridge Pins	Raspberry Pi Pins
ENA pin	11	ENA pin	36
IN1	16	IN1	38
IN2	18	IN2	40

Motor 3		Motor 4	
L298n Bridge Pins	Raspberry Pi Pins	L298n Bridge Pins	Raspberry Pi Pins
ENA pin	29	ENA pin	32
IN1	31	IN1	35
IN2	33	IN2	37

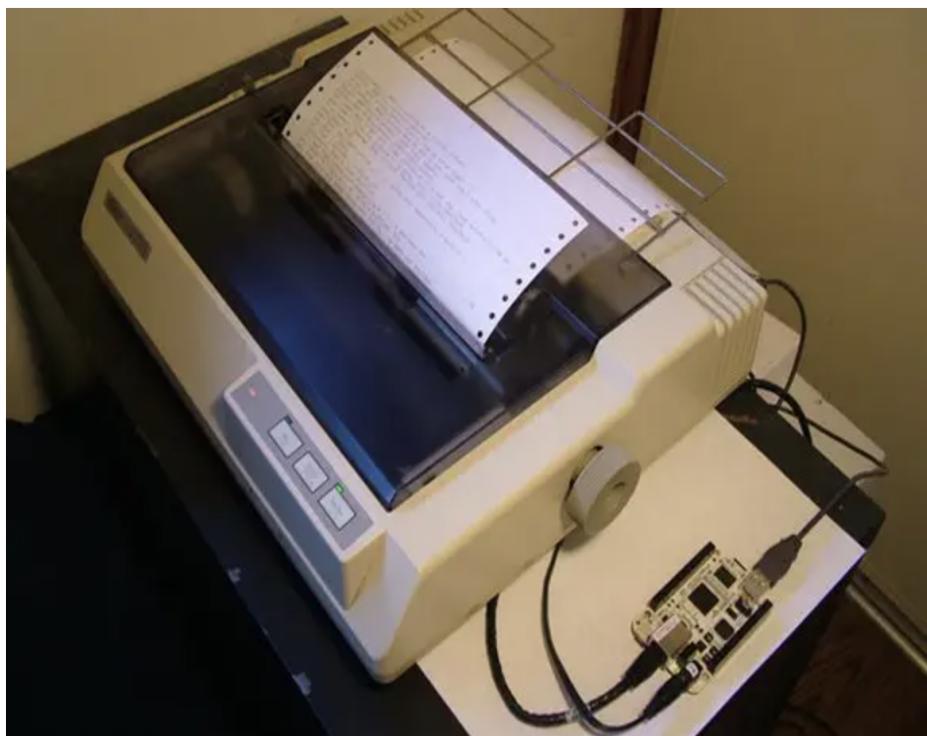
Motor 5	
L298n Bridge Pins	Raspberry Pi Pins
ENA pin	22
IN1	24
IN2	26

3.4. Raspberry pi usage:

3.4.1. Using as a bitcoin mining



3.4.2. Wireless print server



3.4.3. Extended home wifi

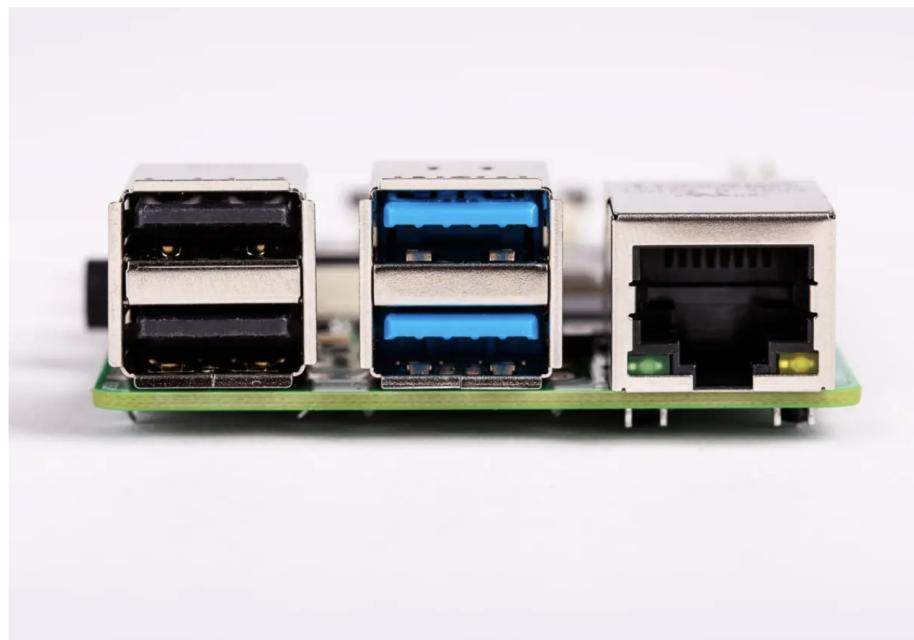
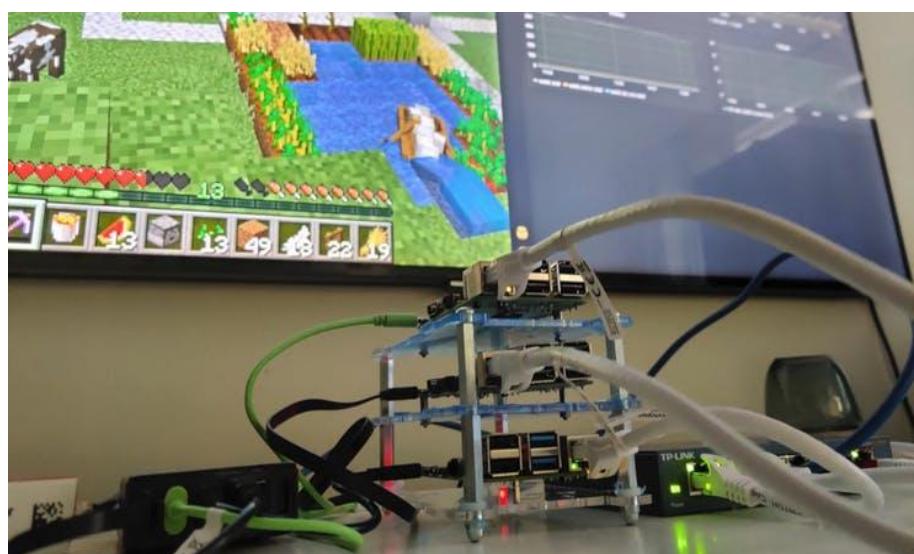
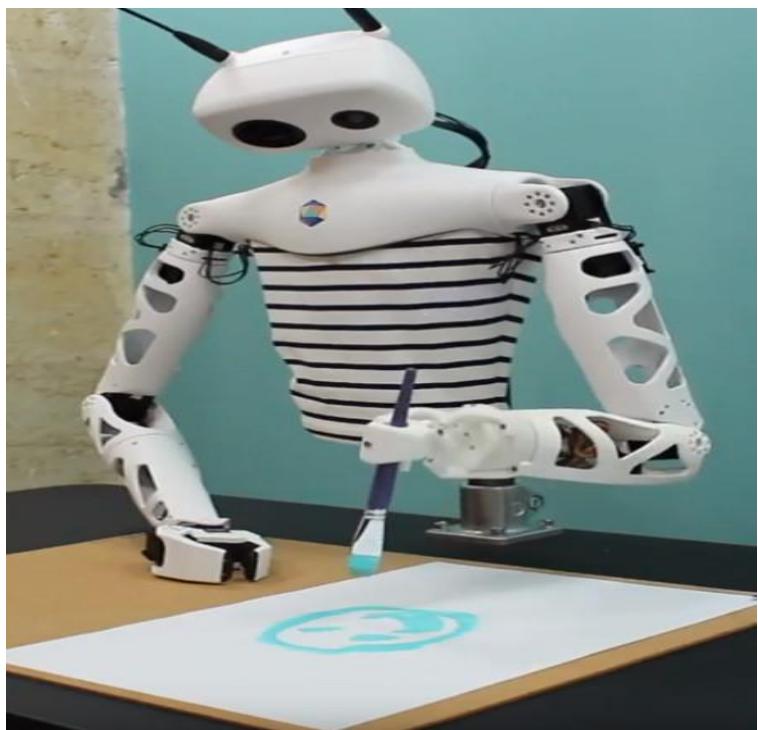


Image by Raspberry Pi

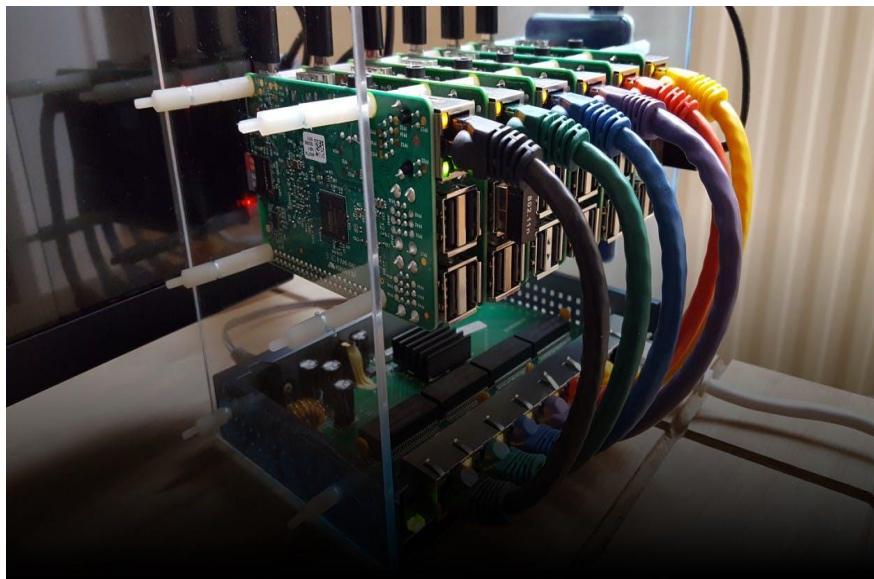
3.4.4. Game Servers



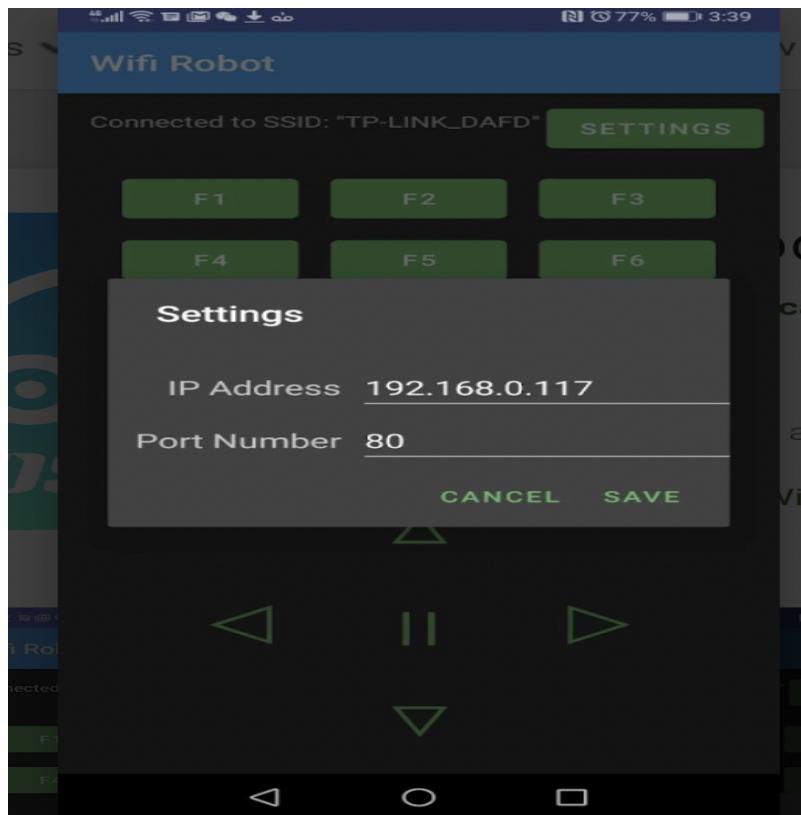
3.4.5. Robot Controller



3.4.6. Uses in Supercomputer.



3.5. We tried to connect all of them and use ip address to control the robot.



3.6. But during the trials, the circuit got burned due to high current fluctuations.

3.7. We even tried measuring with the voltage meter and current fluctuations but we found there was a problem with L298N.

4. Challenges:

4.1. First thing we burned the board so we learned how to not burn again and how to handle motor driver circuits.

4.2. We faced an error with the code but we fixed it with the help of internet forums.

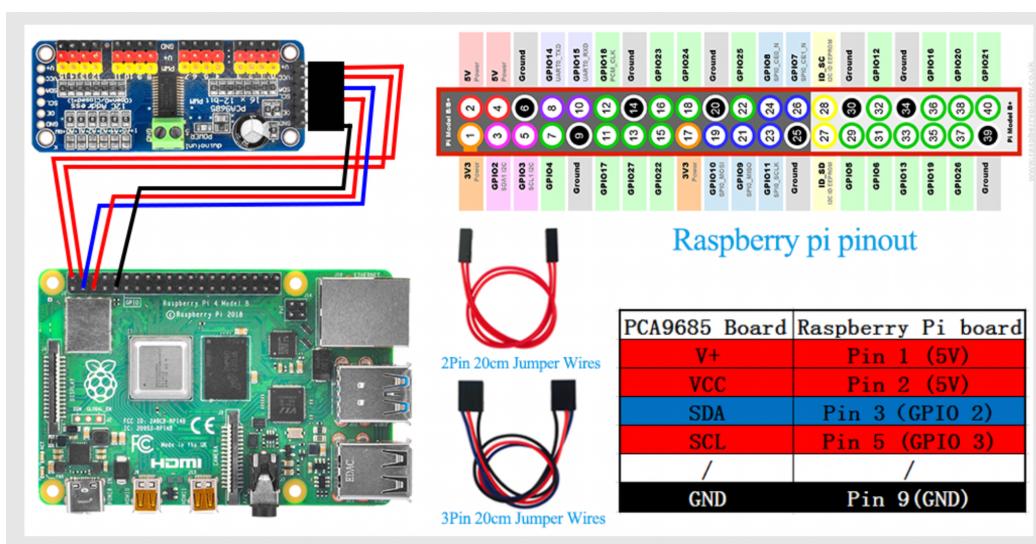
4.3. Still we are facing issues in the deployment part our next focus is to make a demo soon.

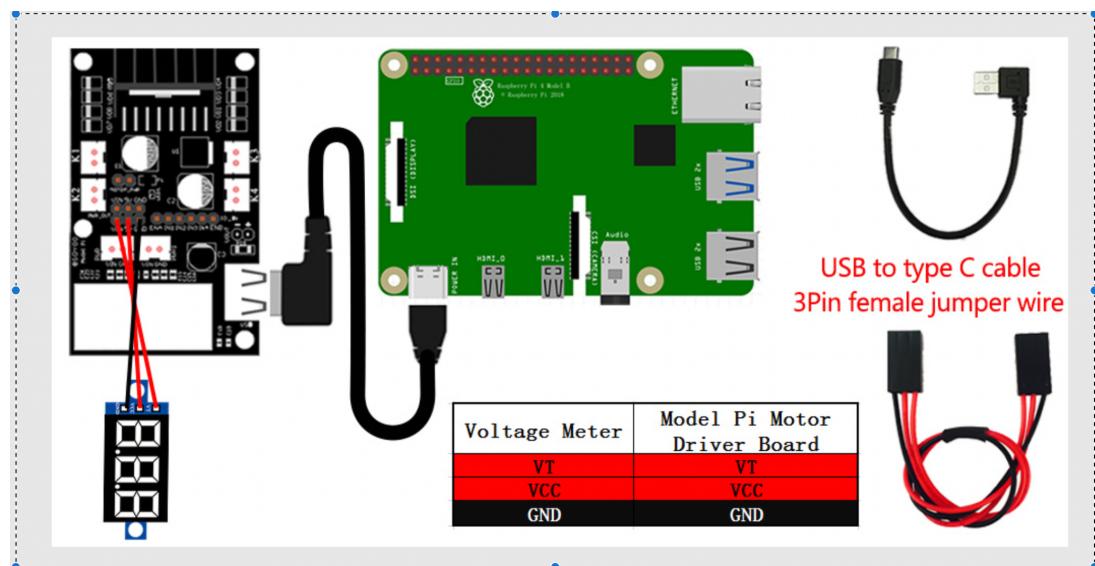
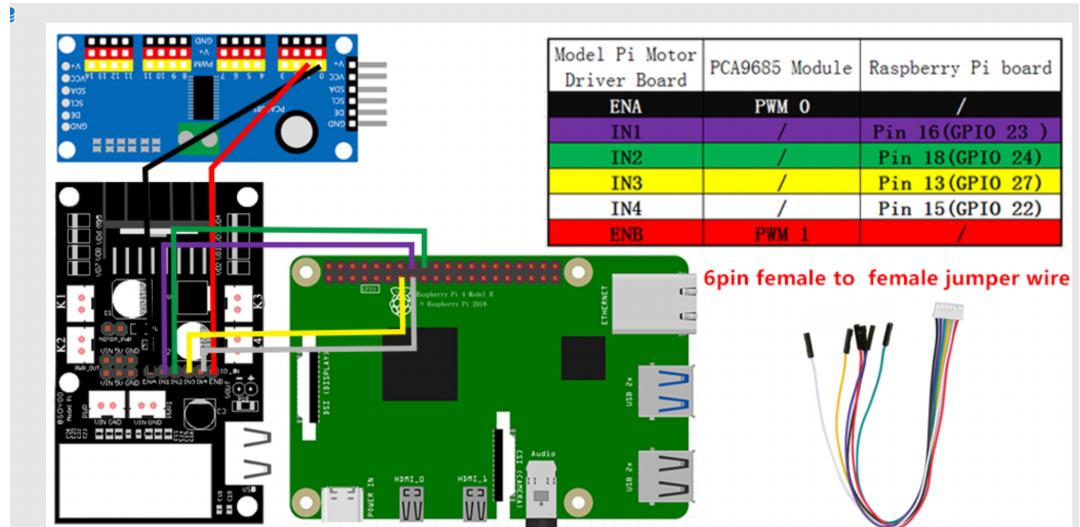
5. Procedures:

5.1. We finally got a suggestion in raspberry pi forums to use a different motor driver circuit.

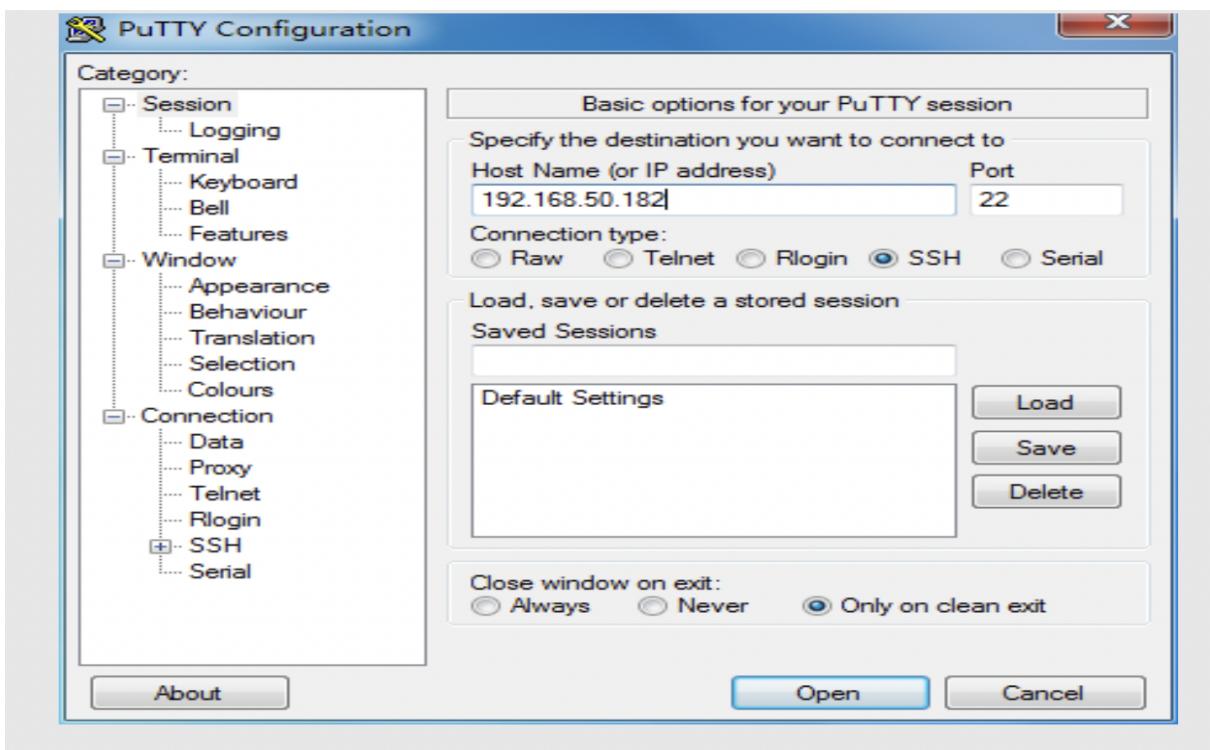
5.2. Now we are using the Osoyoos motor driver circuit, tracking sensor and PCA_9685 which is used to control the LED and servo driver.

5.3. Design





5.4. We connected everything and used putty to use the wifi IP address to control the bot.



```
pi@raspberrypi: ~
login as: pi
pi@192.168.50.182's password:
Linux raspberrypi 4.19.118-v7l+ #1311 SMP Mon Apr 27 14:26:42
BST 2020 armv7l

The programs included with the Debian GNU/Linux system are fre
e software;
the exact distribution terms for each program are described in
the
individual files in /usr/share/doc/*copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the ext
ent
permitted by applicable law.
Last login: Tue Sep 15 09:31:37 2020 from 192.168.50.207

SSH is enabled and the default password for the 'pi' user has
not been changed.
This is a security risk - please login as the 'pi' user and ty
pe 'passwd' to set a new password.

pi@raspberrypi:~ $
```

5.4. We installed adafruit_PCA9685 and GPIO modules to control the bot

```
sudo apt-get update
sudo apt-get upgrade
sudo apt-get install rpi.gpio
pi@raspberrypi: ~
```

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Wed Nov 11 10:04:01 2020

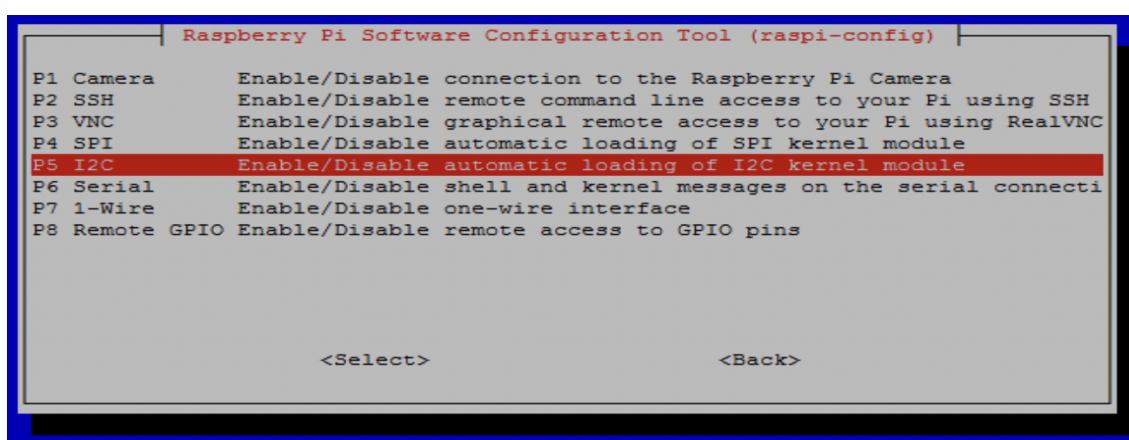
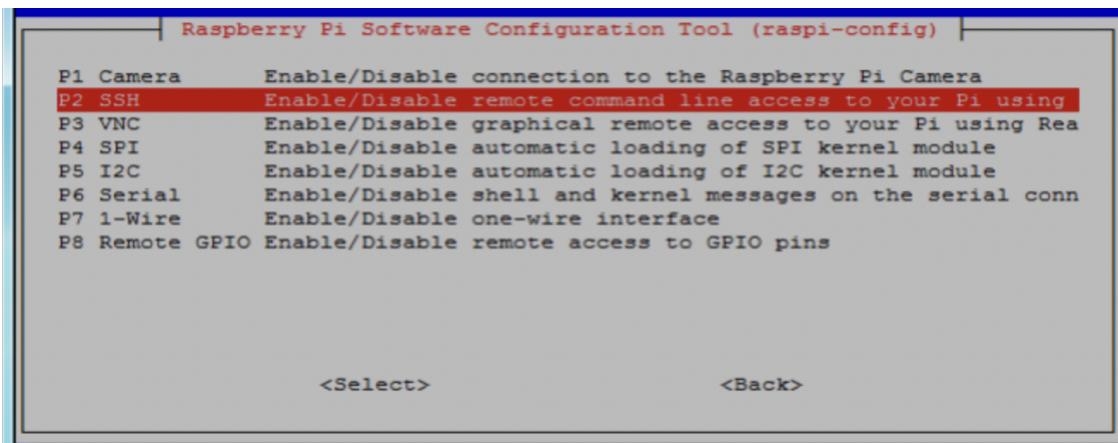
SSH is enabled and the default password for the 'pi' user has not been changed.
This is a security risk - please login as the 'pi' user and type 'passwd' to set
a new password.

```
pi@raspberrypi:~$ sudo apt-get update
Get:1 http://mirrors.tuna.tsinghua.edu.cn/raspbian/raspbian buster InRelease [15
.0 kB]
Hit:2 http://mirrors.tuna.tsinghua.edu.cn/raspberrypi buster InRelease
Fetched 15.0 kB in 1s (13.3 kB/s)
Reading package lists... Done
pi@raspberrypi:~$ sudo apt-get upgrade
Reading package lists... Done
Building dependency tree
Reading state information... Done
Calculating upgrade... Done
The following package was automatically installed and is no longer required:
  rpi-eeprom-images
Use 'sudo apt autoremove' to remove it.
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
pi@raspberrypi:~$ sudo apt-get install rpi.gpio
```

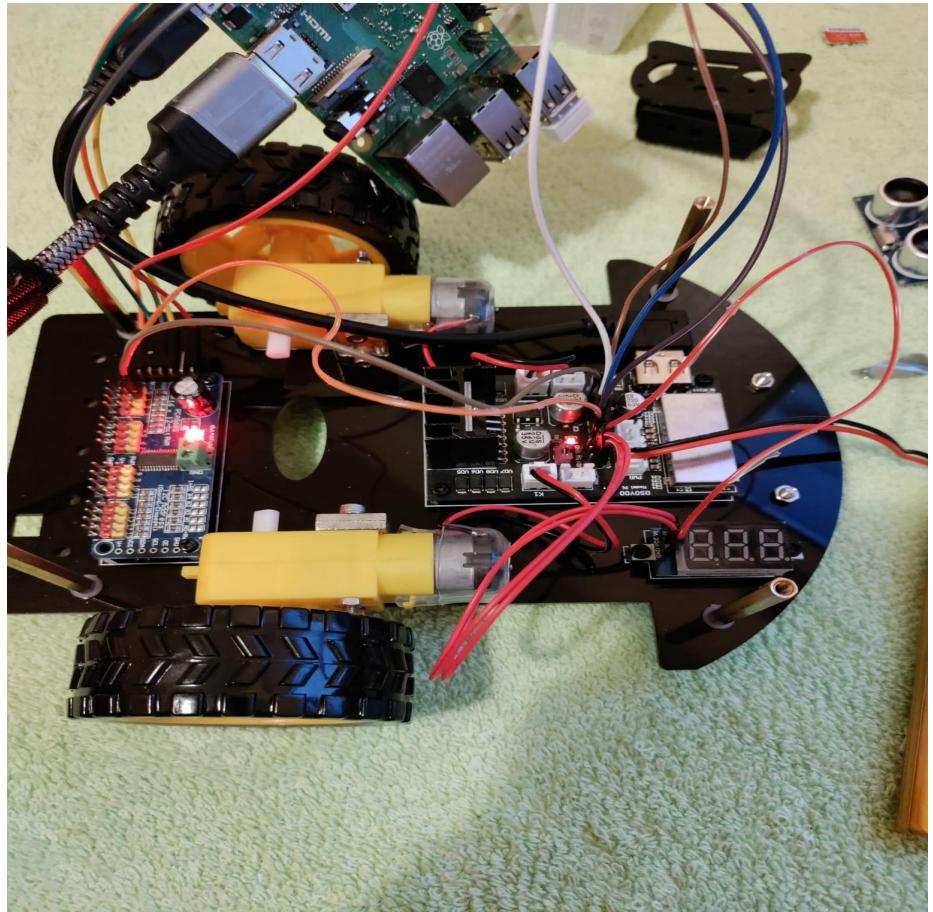
```
pi@raspberrypi: ~
pi@raspberrypi:~$ sudo apt-get install rpi.gpio
Reading package lists... Done
Building dependency tree
Reading state information... Done
Note, selecting 'python-rpi.gpio-dbgsym' for regex 'rpi.gpio'
Note, selecting 'python3-rpi.gpio' for regex 'rpi.gpio'
Note, selecting 'rpi.gpio-common' for regex 'rpi.gpio'
Note, selecting 'python-rpi.gpio' for regex 'rpi.gpio'
Note, selecting 'python3-rpi.gpio-dbgsym' for regex 'rpi.gpio'
python-rpi.gpio is already the newest version (0.7.0-0.1~bp010+1).
python3-rpi.gpio is already the newest version (0.7.0-0.1~bp010+1).
rpi.gpio-common is already the newest version (0.7.0-0.1~bp010+1).
The following package was automatically installed and is no longer required:
  rpi-eeprom-images
Use 'sudo apt autoremove' to remove it.
The following NEW packages will be installed:
  python-rpi.gpio-dbgsym python3-rpi.gpio-dbgsym
0 upgraded, 2 newly installed, 0 to remove and 0 not upgraded.
Need to get 88.2 kB of archives.
After this operation, 126 kB of additional disk space will be used.
Do you want to continue? [Y/n] Y
```

5.5. But it seems we are facing the issue the bot is not moving

5.6. We were searching for the solution to the problem. We found
Some answer to the problem



- 5.7. Then enabled ssh and i2c commands in pie config.
- 5.8. The problem might be loose connections because we tried Multiple trials.
- 5.9. The problem might be we missed some steps. We need to figure it soon to make the demo.



6. Future work

- 6.1. We need to figure the problem why the robot is not moving
- 6.2. We need to make sure that it should be controlled by wifi
- 6.3. We are planning use tracking sensors and a camera to collect data.
- 6.4. Making some website to track camera and further progress.

7. References

- <https://rootsaid.com/robot-control-over-wifi/>
- <https://osoyoo.com/2020/08/01/how-to-use-osoyoo-model-pi-l298n-motor-driver-board-in-raspberry-pi-robot-car/>
- <https://www.youtube.com/watch?v=2AL7HfiRlp4>
- <https://www.youtube.com/watch?v=69w6Q40CBWw>
- <https://www.youtube.com/watch?v=BpJCAafw2qE>
- <https://www.youtube.com/watch?v=-ikmDMW6tEw>
- <https://www.youtube.com/watch?v=OTBIXnzcl34>