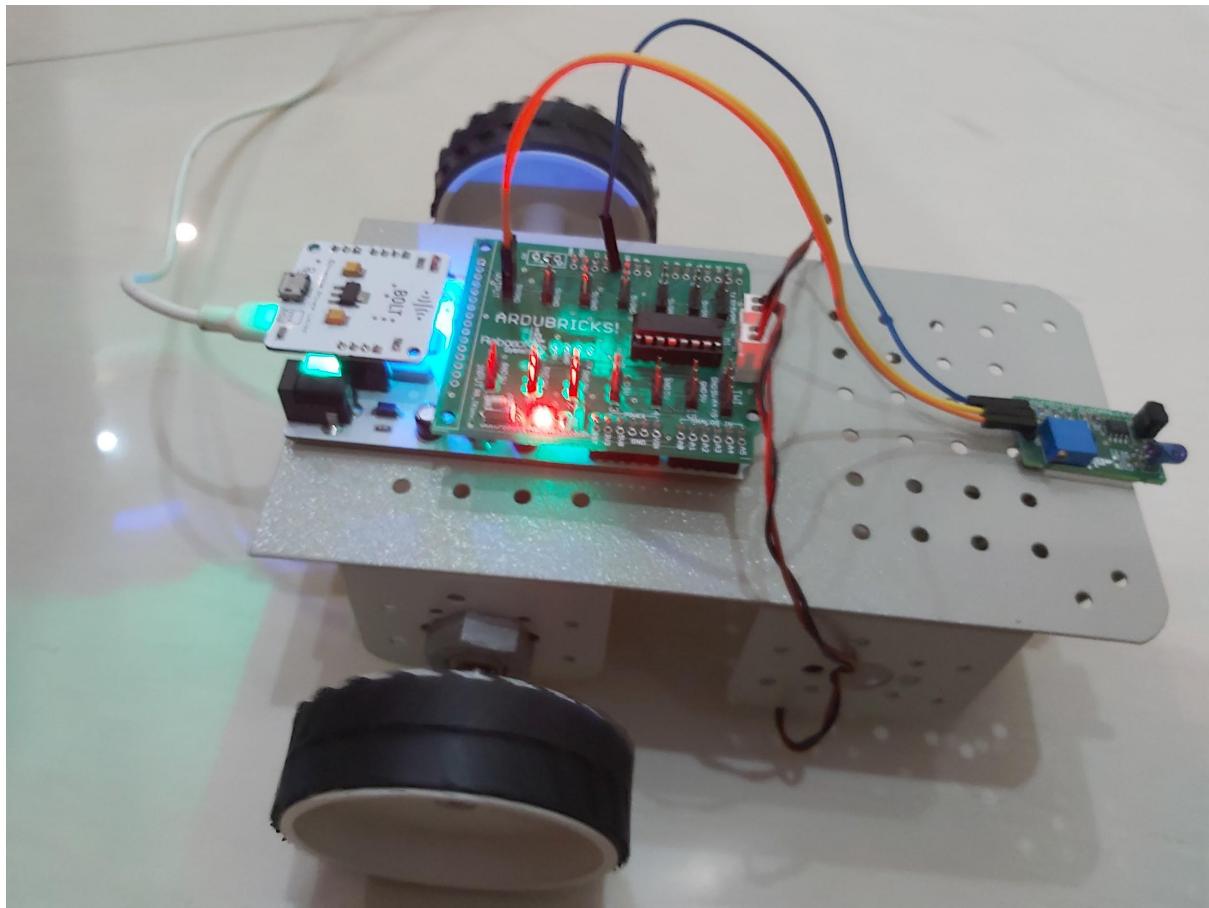


Voice Command Obstacle Avoider Robot



The Voice Command Obstacle Avoider robot, as the name implies, is an autonomous vehicle that avoids the obstacle coming at its surface. This robot ideally works on the Ultrasonic Sensor but in my project I have used IR Proximity Sensor. The objective is simple-if the sensors encounter an obstacle they move back and turn left or right as the case may be. Voice Command is given through google assistant.

Obstacle avoiding robots can be used in almost all mobile robot navigation systems. They can be used for household work like automatic vacuum cleaning. They can also be used in dangerous environments, where human penetration could be fatal.

THINGS USED IN THE PROJECT

HARDWARE

- Boloduino (Arduino)
- ESP8266 Bolt Wifi Module
- IR sensor x1
- Motor driver shield
- Motors x2

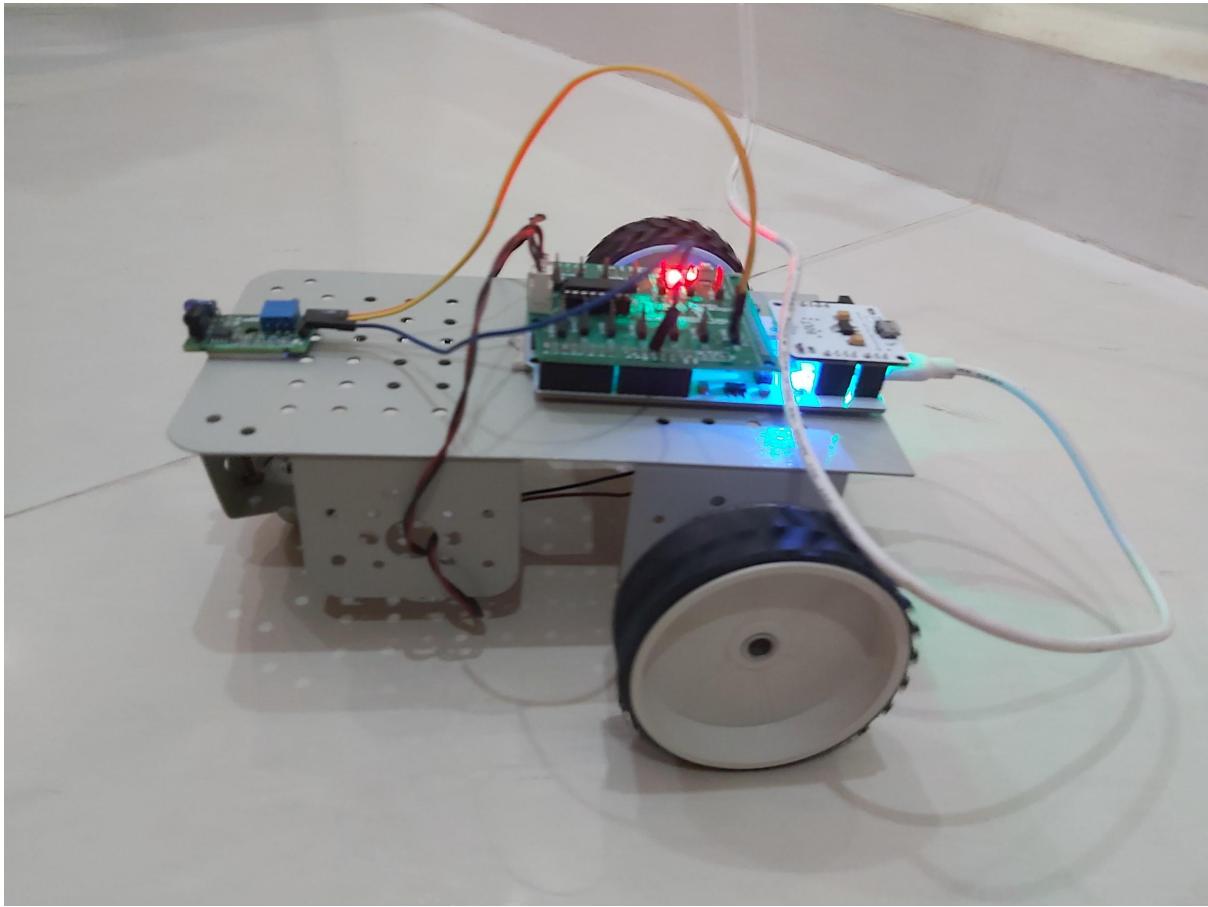
- Chassis
- Standard wheels x2
- Caster wheel
- 12V power adapter
- Few screws & nuts
- USB cable
- A spanner
- A screwdriver

SOFTWARE/ APP / ONLINE SERVICES

- Arduino IDE
- IFTTT
- Google Assistant

HARDWARE SETUP

- 1) Fit caster wheel to chassis with screws and nuts using screwdriver
- 2) Take 2 motors and lose its nut with spanner and fix those motors in a place of wheels from inside of chassis
- 3) Take out the wires of the right motor from the front right side(front wheel side) of the chassis. Similarly, Take out the wires of the left motor from the front left side(front wheel side) of the chassis.
- 4) Lose the screw of both the standard wheels and mount it on the motors.
- 5) Take the motor driver shield and mount it on the Boltduino such that all pins of the motor driver shield are connected to the Boltduino.
- 6) With a double sided tape stick the Boltduino to the top side of the chassis. Such that the USB port is on the edge of the chassis and Boltduino is in the centre of the Chassis.
- 7) Take the wire of the right motor and left motor and connect it to the right and left given pin on the motor driver shield.
- 8) Mount the ESP8266 Bolt Wifi Module on Arduino such that all pins are well connected.
- 9) With a double sided tape stick IR sensor in front of the chassis of the robot such that it can avoid obstacles without robot collision.
- 10) Connect the OUT pin of IR sensors to pin 11 (digital pin) of Arduino, and VCC to 5V and GND to ground pin (GND) of Arduino.
- 11) Our robot is ready to code.



SOFTWARE SETUP

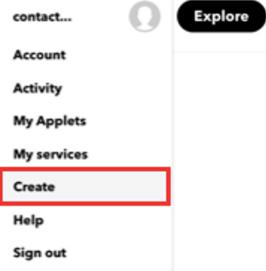
- 1) Open Arduino IDE and select Board as Arduino UNO and Port as per your hardware configuration.
- 2) Open IFTTT account <https://ifttt.com/explore> with Gmail ID.
- 3) We will first need to make the API links, the syntax for the API link is as follows.
- 4) `https://cloud.boltiot.com/remote/<API_key>/<API_call>?<argument_name1>=<argument_value1>&<argument_name2>=<argument_value2>&<argument_name3>=<argument_value3>....`
- 5) So for example if your API key was "0a5b14f4-5654-49b1-b4a7-1885255399ab", the id of your device was "BOLT125216" then the API link to make the robot move forward would be as below.
- 6) **`https://cloud.boltiot.com/remote/0a5b14f4-5654-49b1-b4a7-1885255399ab/serial Write?data=doMotion f &deviceID=BOLT125216`**
- 7) Go to the IFTTT website click on the profile picture icon on the top right corner and click on create.



Start connecting your world.



8)

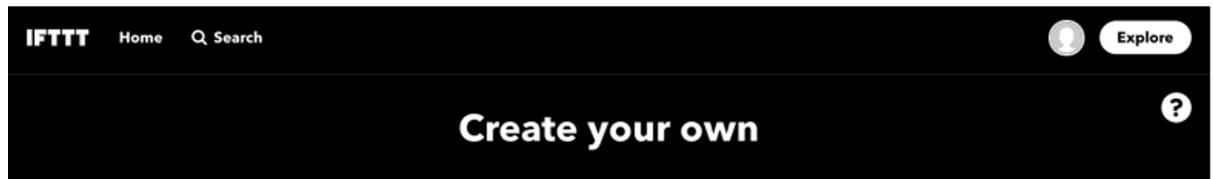


Start connecting your world.



9) <https://ifttt.com/create>

10) Click on the "+" button next to the word IF.



If This Then That

Build your own service on the **IFTTT** Platform

11) <https://ifttt.com/create#>

12) Search for and select "google assistant"

This screenshot shows the 'Choose a service' step in the IFTTT interface. At the top left is a 'Back' button. The title 'Choose a service' is centered above a progress indicator 'Step 1 of 6'. Below this is a search bar containing the query 'google assistant', with a red box highlighting the search term. A list of services is shown below, with the 'Google Assistant' service highlighted by a red box. The service icon features three white circles of increasing size on a dark background, with the text 'Google Assistant' underneath.

13)

14) Connect the google assistant service to IFTTT. You may need to login using a google account for this.

[◀ Back](#)



Connect Google Assistant

Step 1 of 6

Create custom voice commands for your Google Assistant.
Available on Android, iOS and Google Home devices.

Connect

15)

16) Select the trigger "say a simple phrase" from the options available.

[◀ Back](#)



Choose trigger

Step 2 of 6

Say a simple phrase

This trigger fires when you say "Ok Google" to the Google Assistant followed by a phrase you choose. For example, say "Ok Google, I'm running late" to text a family member that you're on your way home.

Say a phrase with a number

This trigger fires when you say "Ok Google" to the Google Assistant followed by a phrase like "Set Nest thermostat to 68." **Use the # symbol to specify where you'll say the number ingredient

Say a phrase with a text ingredient

This trigger fires when you say "Ok Google" to the Google Assistant followed by a phrase like "Post a tweet saying 'New high score.'" **Use the \$ symbol to specify where you'll say the text ingredient

Say a phrase with both a number and a text ingredient

This trigger fires when you say "Ok Google" to the Google Assistant followed by a phrase like "Block time for 'exercise' at 6 PM." **Use the # symbol to specify where you'll say the number ingredient and \$ where you'll say the text ingredient

Don't see what you're looking for?

[Suggest a new trigger](#)

17)

18) Add a phrase that you will say to trigger this recipe. This can be something in the lines of "Stop Robot" or "Stop the Robot" or "Robot Stop". Also add what the google assistant will respond back to you with. This can be something like "Stopping the Robot".

19) Scroll down and click on the "create trigger" button to finish building the trigger. We will now have to work on the action.

20) Click on the "+" button next to the "that" word.

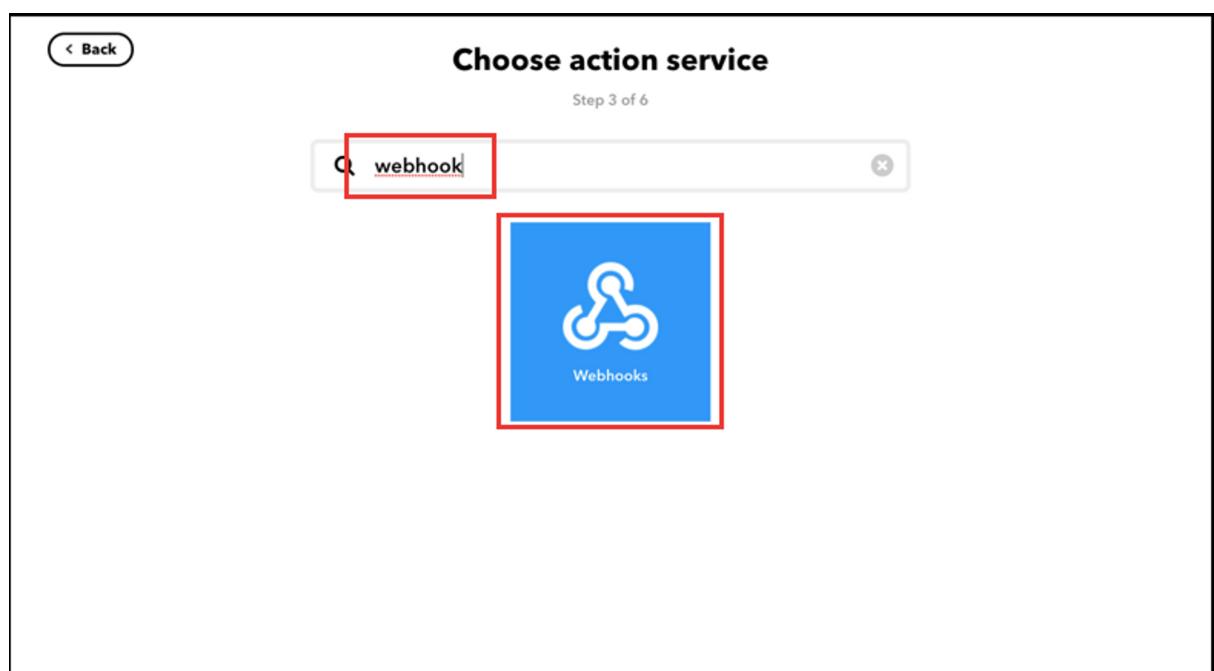
[◀ Back](#)

If Then That

21)

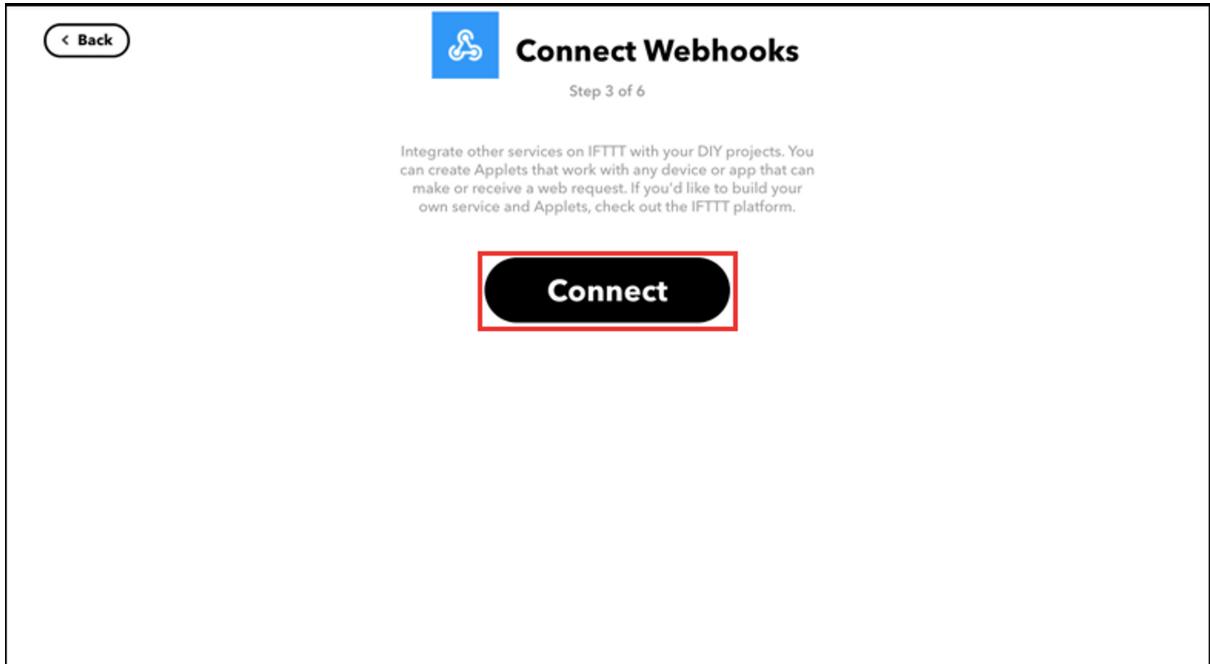
[About](#) [Help](#) [Careers](#) [Terms & Privacy](#)

22) Search and select Webhook.



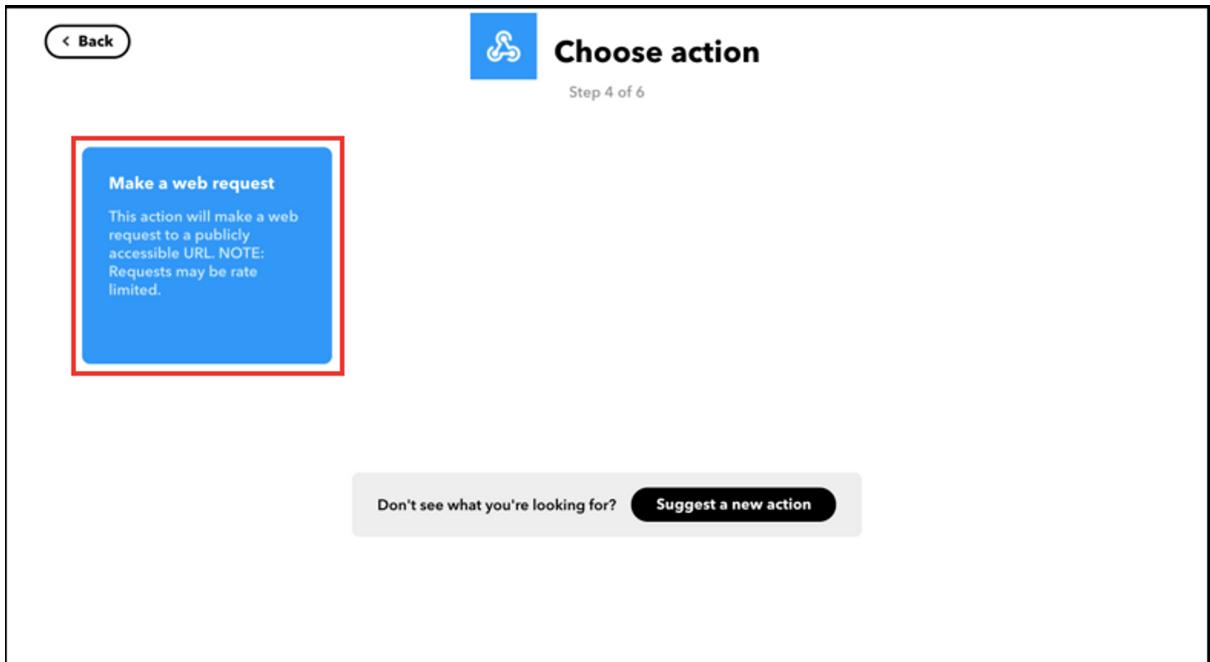
23)

24) Click on the connect webhook button.



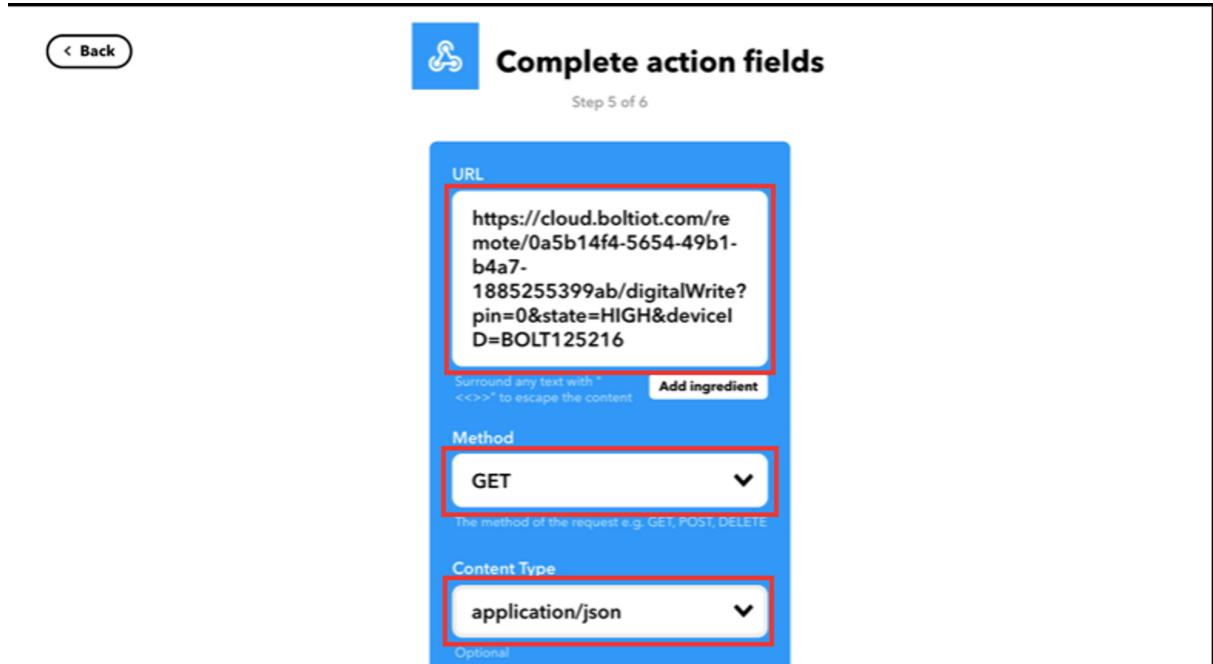
25)

26) Select the "Make a web request" action.



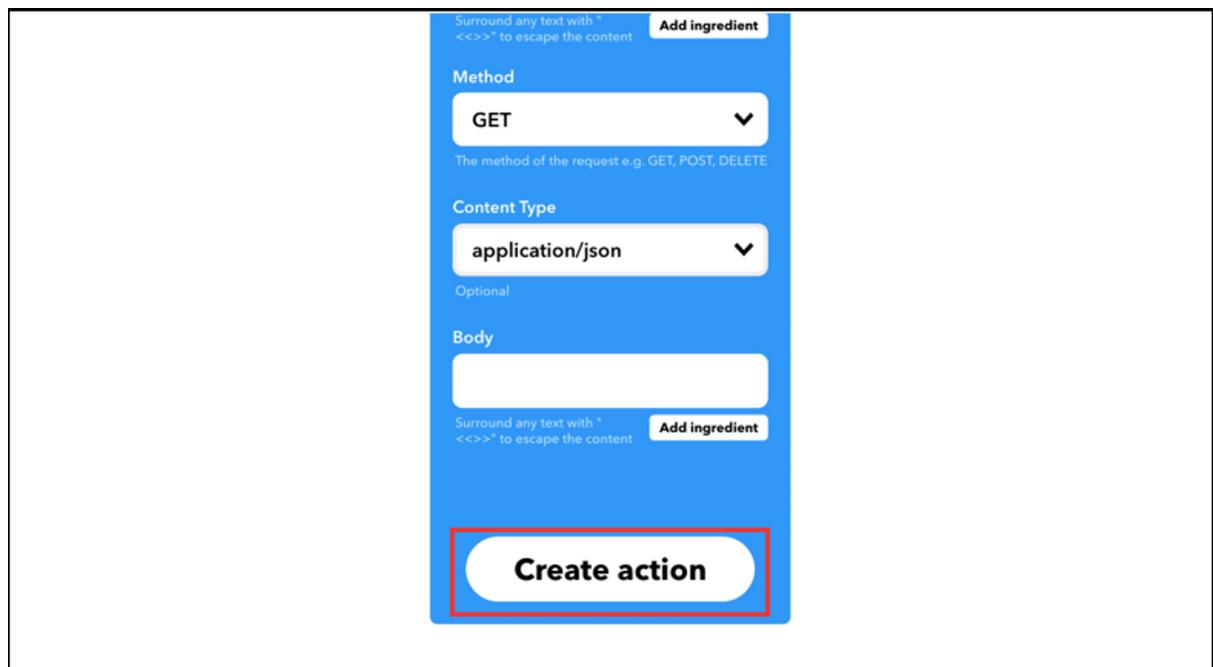
27)

28) Add the API link for moving the robot forward to the URL, set the method type to "get" and the content type to "Application/json".



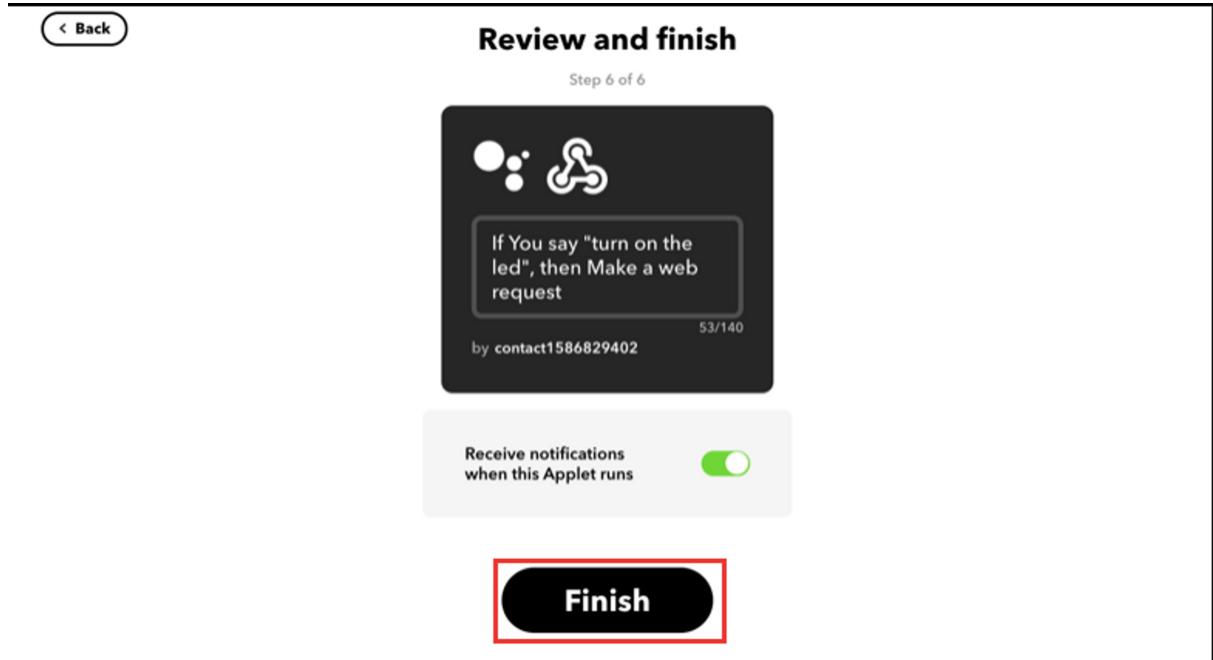
29)

30) Scroll down and click on the "Create action" button.



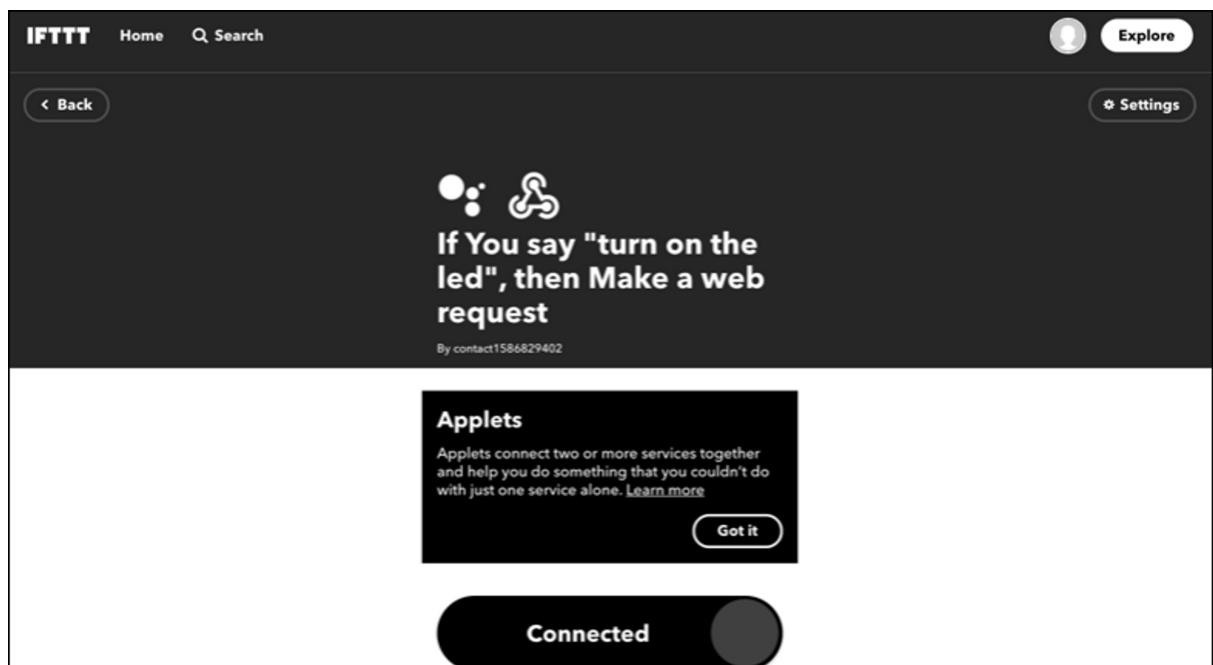
31)

32) Click on the finish button to finish making the recipe



33) _____

34) Once the recipe is complete, you will be shown the following screen



35) _____

36) On your Android mobile phone open the play store app.

37) Click on the install button of Google Assistant and wait for the app to install.

SOFTWARE PROGRAMMING / CODE

- 1) Since we will be using the Bolt WiFi module to control the Robot over the internet so that we can control it using IF, we will first have to include the BoltIoT-Arduino-Helper library into our code.

- 2) Open a new sketch, name it as **Voice_Obstacle_Avoider_Robot** and Code as shown below.

```
#include <BoltIoT-Arduino-Helper.h>

void init_motors(){
    pinMode(5, OUTPUT);
    pinMode(6, OUTPUT);
    pinMode(4, OUTPUT);
    pinMode(7, OUTPUT);
    pinMode(12, OUTPUT);
    pinMode(8, OUTPUT);
    digitalWrite(5, HIGH);
    digitalWrite(6, HIGH);
}

void Forward(){
    digitalWrite(4, HIGH);
    digitalWrite(7, LOW);
    digitalWrite(12, HIGH);
    digitalWrite(8, LOW);
}

void Reverse(){
    digitalWrite(4, LOW);
    digitalWrite(7, HIGH);
    digitalWrite(12, LOW);
    digitalWrite(8, HIGH);
}

void Right(){
    digitalWrite(4, LOW);
    digitalWrite(7, HIGH);
    digitalWrite(12, HIGH);
    digitalWrite(8, LOW);
}

void Left(){
    digitalWrite(4, HIGH);
    digitalWrite(7, LOW);
    digitalWrite(12, LOW);
    digitalWrite(8, HIGH);
}

void Left_Forward(){
    digitalWrite(4, LOW);
    digitalWrite(7, LOW);
    digitalWrite(12, HIGH);
}
```

```
    digitalWrite(8, LOW);
}

void Right_Forward(){
    digitalWrite(4, HIGH);
    digitalWrite(7, LOW);
    digitalWrite(12, LOW);
    digitalWrite(8, LOW);
}

void Right_Reverse(){
    digitalWrite(4, LOW);
    digitalWrite(7, LOW);
    digitalWrite(12, LOW);
    digitalWrite(8, HIGH);
}

void Left_Reverse(){
    digitalWrite(4, LOW);
    digitalWrite(7, HIGH);
    digitalWrite(12, LOW);
    digitalWrite(8, LOW);
}

void Stop(){
    digitalWrite(4, LOW);
    digitalWrite(7, LOW);
    digitalWrite(12, LOW);
    digitalWrite(8, LOW);
}

String doMotion(String *data){
    if(data[0] == "q"){
        Left_Forward();
    }
    if(data[0] == "w"){
        Forward();
    }
    if(data[0] == "e"){
        Right_Forward();
    }
    if(data[0] == "a"){
        Left();
    }
    if(data[0] == "d"){
        Right();
    }
    if(data[0] == "z"){

    }
}
```

```

    Left_Reverse();
}
if(data[0] == "x"){
    Reverse();
}
if(data[0] == "c"){
    Right_Reverse();
}
if(data[0] == "s"){
    Stop();
}
delay(2000);
Stop();
return "Done";
}

void setup(){
    // put your setup code here, to run once:
    init_motors();
    boltiot.begin(Serial);
    boltiot.setCommandString("doMotion", doMotion, 1);
    pinMode(11, INPUT);
}

void loop(){
    // put your main code here, to run repeatedly:
    // boltiot.handleCommand();
    if(digitalRead(11)==HIGH){
        Forward();
        if(boltiot.handleCommand()){
            delay(20000);
        }
    }
    else{
        Reverse();
        delay(1000);
        Left();
        delay(1000);
    }
}

```

- 3) Power up the Bolt WiFi module and once the Bolt WiFi module powers up, Click on the open button and open the google assistant app.
- 4) Once the Google assistant app opens, say the phrase "Stop Robot" to the app.
- 5) Once you do this, the app will trigger the recipe and the robot will stop its motion.
- 6) After this, you can go to IFTTT and set up several recipes for making the robot move in different motions. Remember to use a phrase such as "Move robot left" or "Move robot right" in the trigger, and the API link for turning OFF the led in the actions field.

OUTPUT/ VIDEO

<https://youtu.be/C55i0BiOtzM>