

BOLT IOT BASED DEVICE

SMART ASSISTIVE STICK



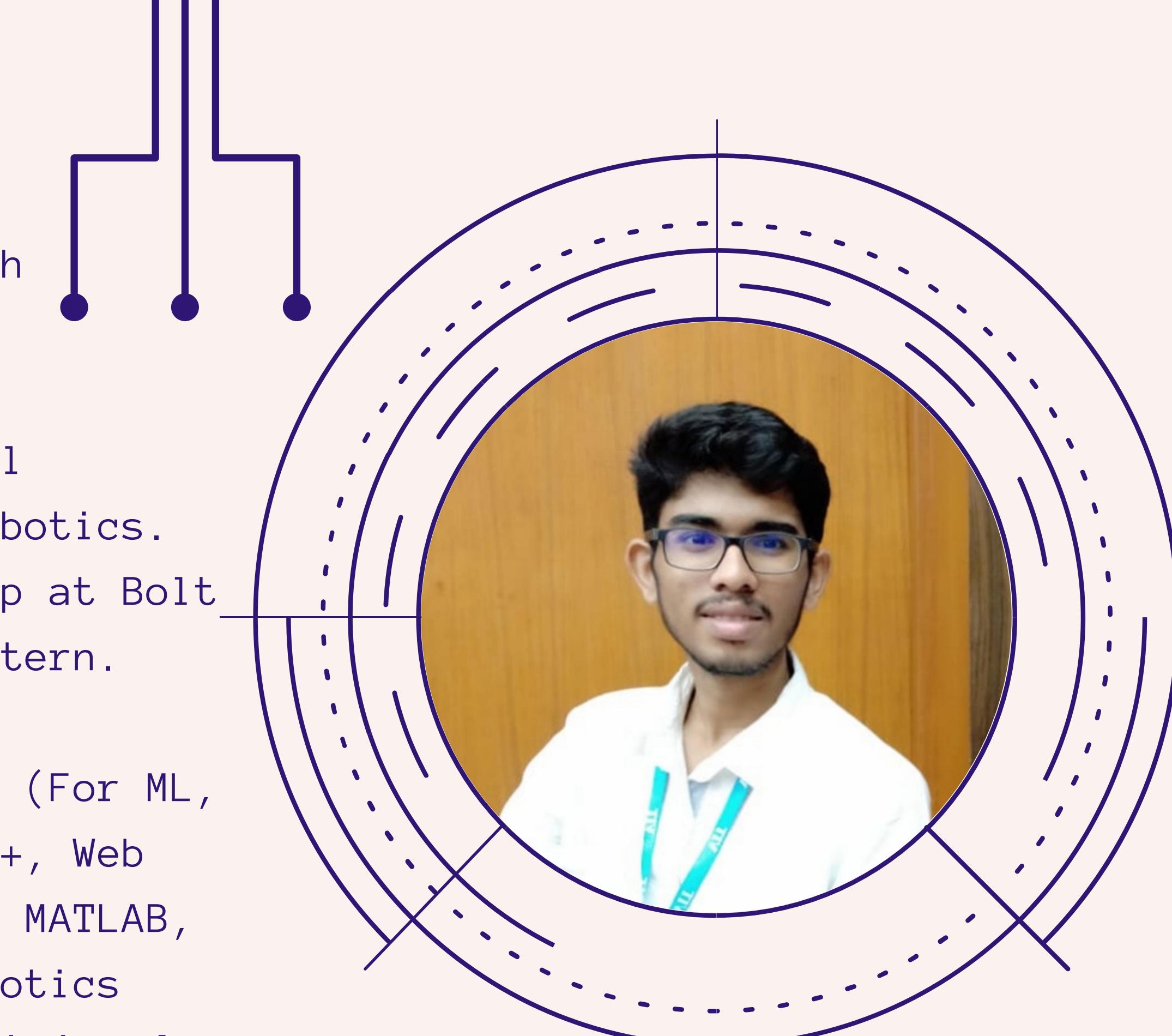
Presented by Samarth Patil

ABOUT ME

Education: B.Tech in CSE with specialization in AI & ML.

Interests: in AIoT(Artificial Intelligence of Things) & Robotics.
Recently completed internship at Bolt IoT as Robotics Developer Intern.

Languages and Skills: Python (For ML, NLP), R (Data Science), C/C++, Web Dev(HTML, CSS, Javascript), MATLAB, ROS (Framework), IoT and Robotics (ESP8266, ESP32, Raspberry pi 4 and Arduino UNO)



Samarth Patil

- 1 Understanding the Problem
- 2 Project Objective
- 3 Project Requirements
- 4 Block & Circuit Diagrams
- 5 Hardware & Software Setup
- 6 Code Block & Working
- 7 Pros & Cons
- 8 Future Scope
- 9 Conclusion
- 10 Let's Connect

AGENDA

UNDERSTANDING THE PROBLEM

WHO estimates that the number of people with visual impairment (presenting vision) is 285 million (65% of whom are aged over 50 years). Of these, 246 million have low vision (63% over 50) and 39 million are estimated to be blind (82% over 50).

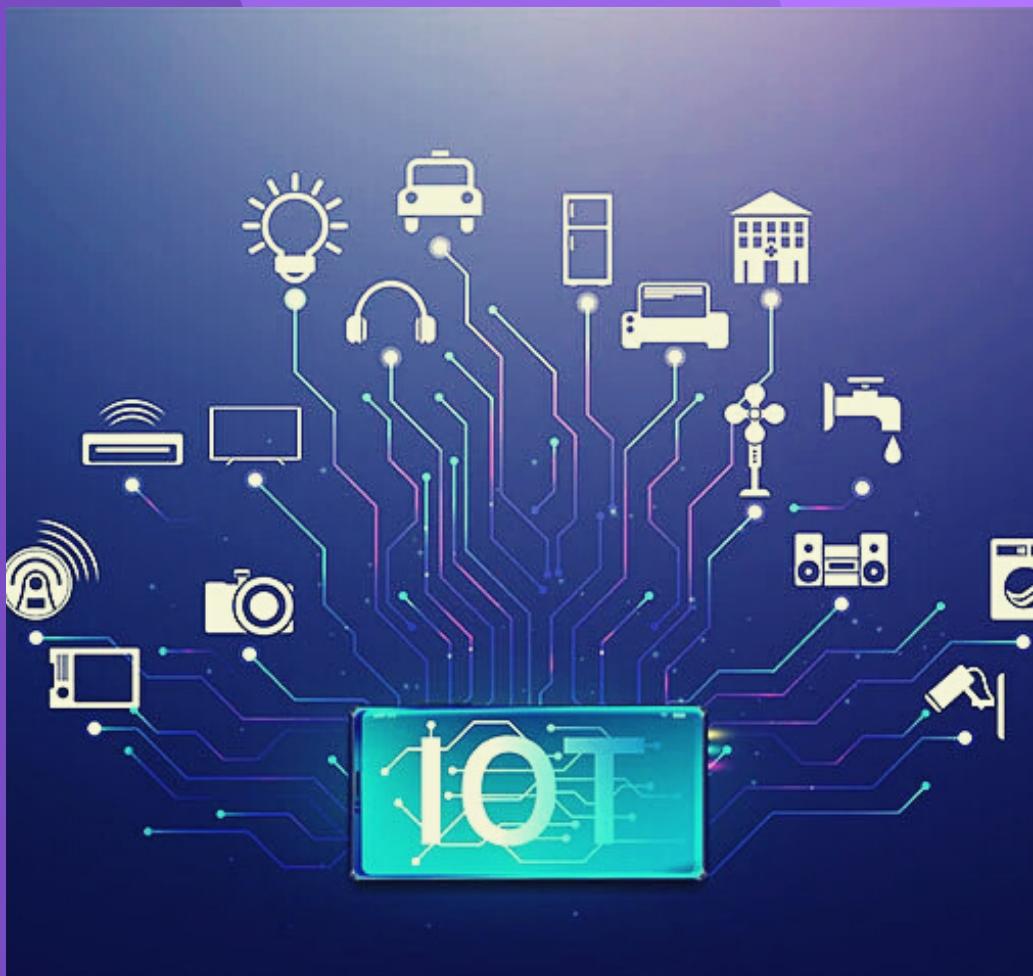
Biggest Challenge: Navigating Around Places



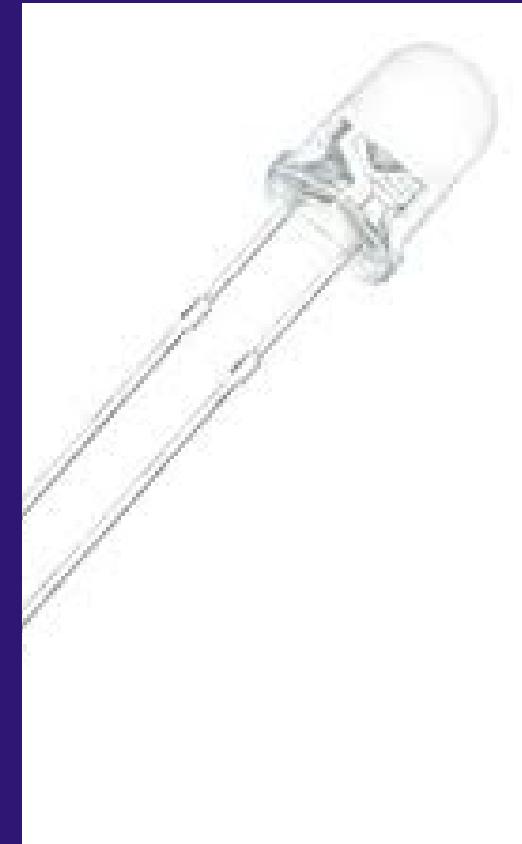
PROJECT OBJECTIVE

To make new technology easier to use for visually disabled people.

This project work proposes a smart stick for blind people to aid them in achieving personal independence. It is simple to use due to its low cost and lack of bulk. The ultrasonic sensor senses the presence of an obstruction and calculates the distance between the source and the target.



Project Requirements



Bolt WiFi
Module

Boltduino
(Arduino)

HC-SR04
Ultrasonic
Sensor

BreadBoard

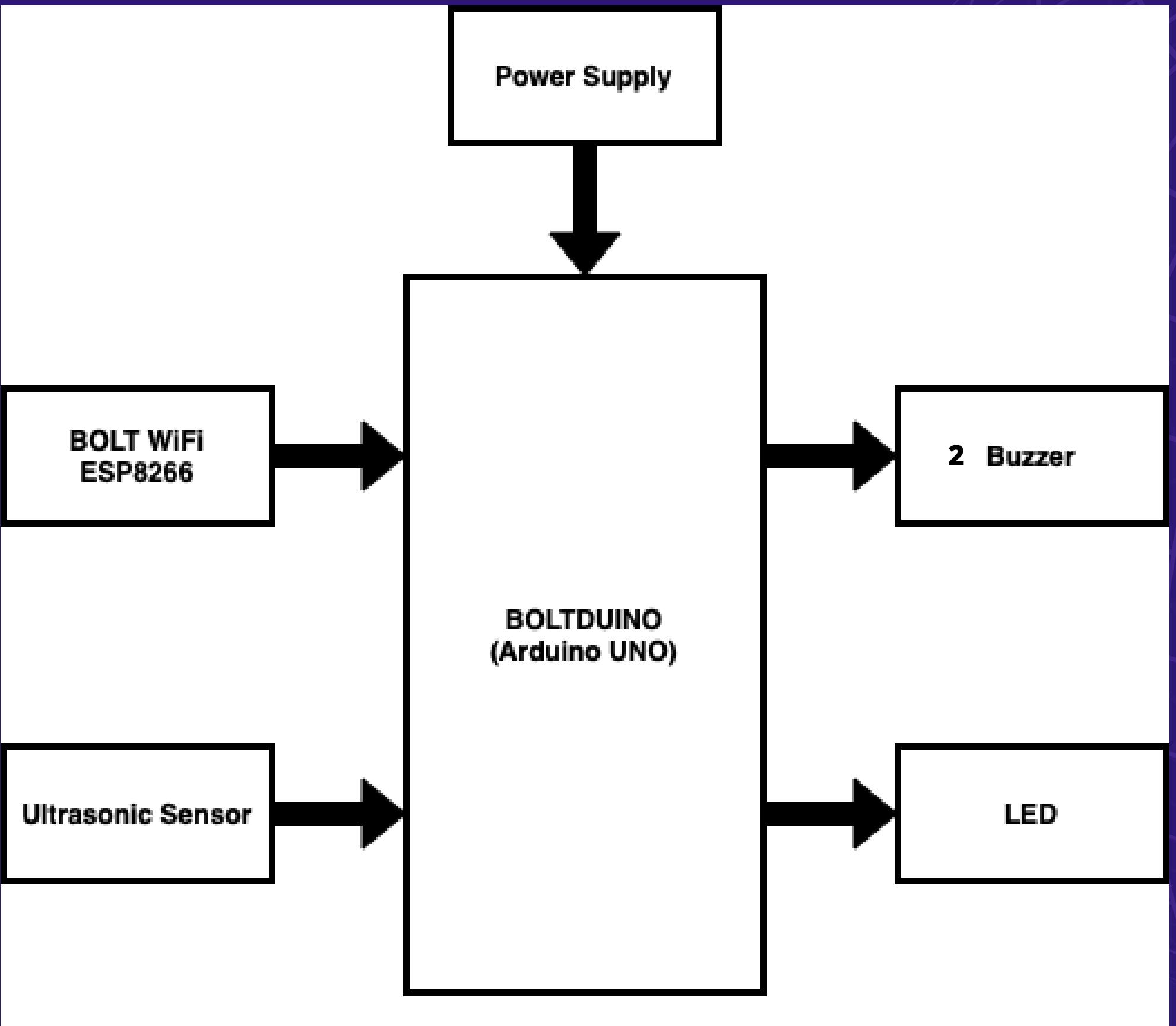
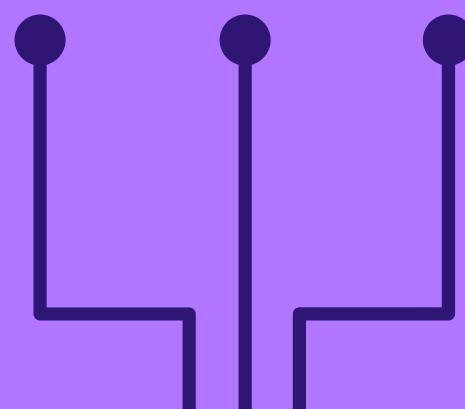
2 Buzzers

LED

Other Requirements: long walking stick, M2M M2F wires, USB cable, double sided tape.

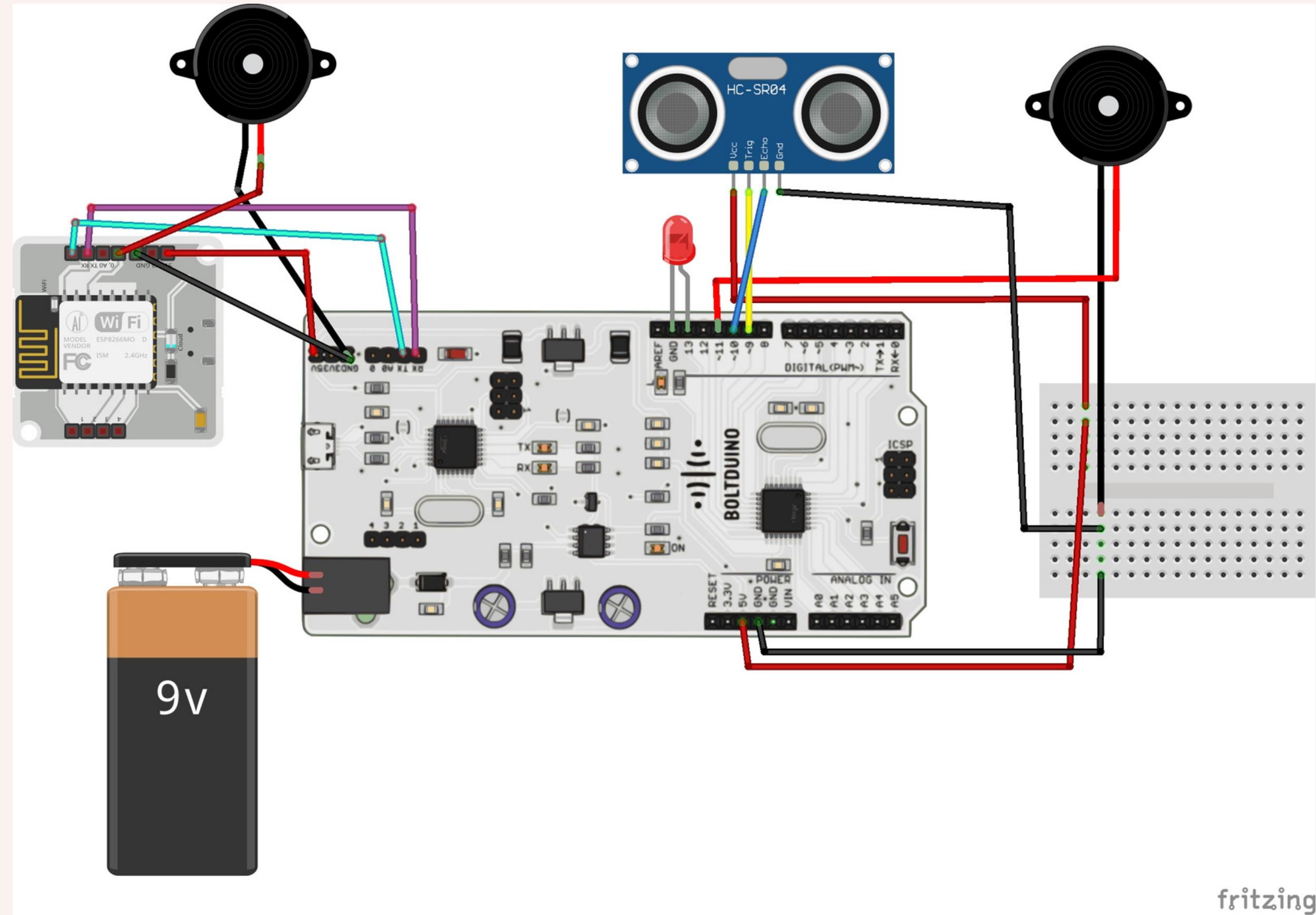
*1st buzzer used for obstacle detection and 2nd buzzer is used for giving frequency modulated message to the smart stick user via bolt wifi module & bolt cloud.

BLOCK DIAGRAM



SMART ASSISTIVE STICK

CIRCUIT DIAGRAM



HARDWARE SETUP

1

CONNECT THE HC-SR04 ULTRASONIC SENSOR TO THE BOLTDUINO(ARDUINO) VIA BREADBOARD, VCC PIN TO 5V, TRIG TO DIGITAL PIN 9, ECHO TO DIGITAL PIN 10, GND TO GROUND PIN OF BOLTDUINO.

2

CONNECT THE LED MODULE TO BOLTDUINO, LED PIN TO PIN NO. 13, AND GND TO GROUND PIN OF BOLTDUINO

3

CONNECT THE 1ST BUZZER, LONG PIN(+VE) TO PIN NO. 11. AND OTHER SHORT PIN(-VE) TO GND PIN OF BOLTDUINO.

4

CONNECT THE BOLT WIFI MODULE (ESP8266) TO BOLTDUINO AS SHOWN IN THE CIRCUIT.
CONNECT THE 2ND BUZZER LONG PIN TO GPIO PIN 0 AND SHORT PIN TO THE GROUND PIN GND OF THE BOLT WIFI MODULE.

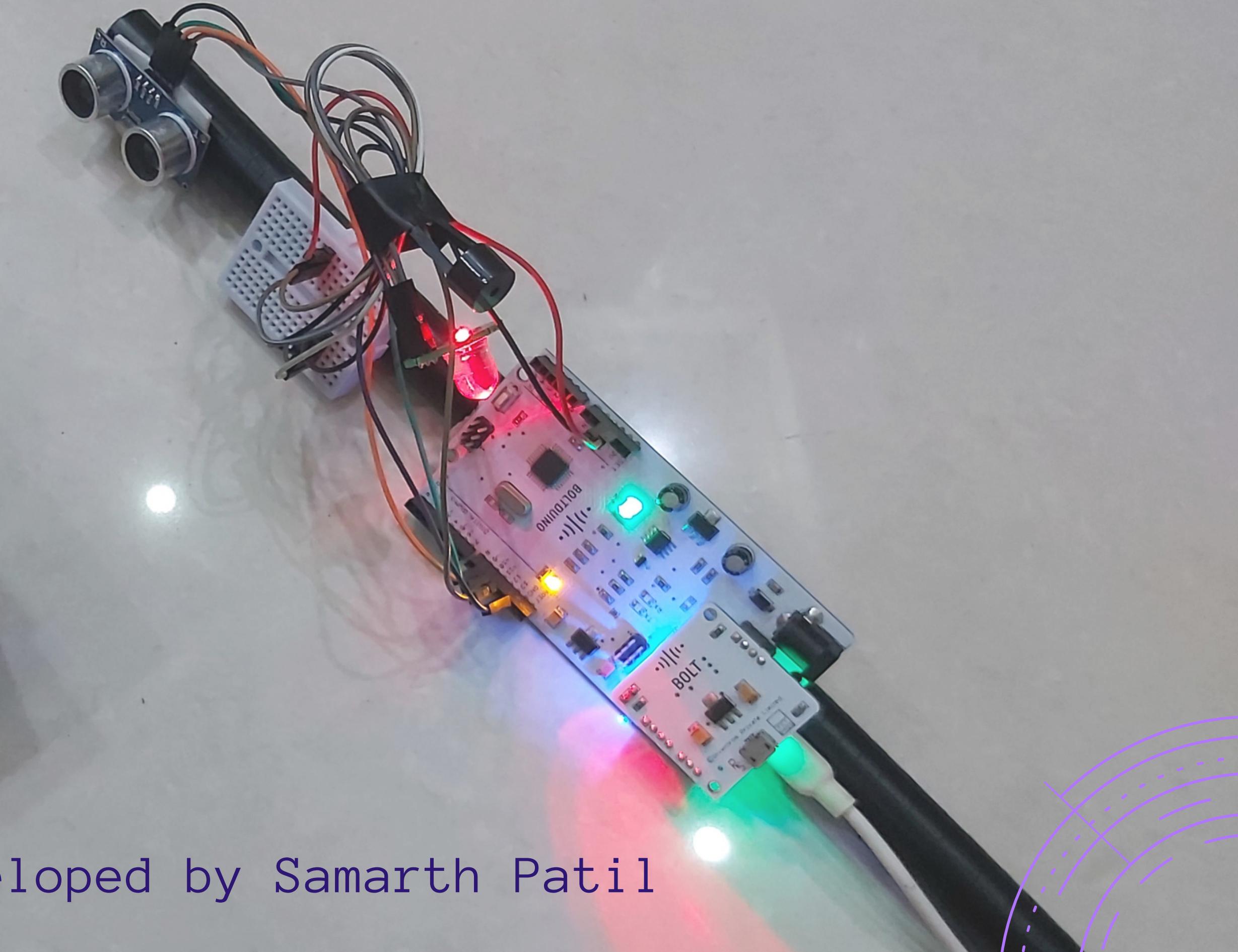
5

STICK THE SENSOR, BREADBOARD, BOLTDUINO TO A LONG WALKING STICK. OUR SMART ASSISTIVE STICK IS READY TO CODE.

SMART ASSISTIVE STICK

Developed by Samarth Patil

SMART ASSISTIVE STICK



Developed by Samarth Patil

SOFTWARE SETUP

For Bolt WiFi Module & Bolt Cloud

1

GO TO CLOUD.BOLTIOT.COM AND CREATE A NEW PRODUCT. WHILE CREATING THE PRODUCT, CHOOSE PRODUCT TYPE AS OUTPUT DEVICE AND INTERFACE TYPE AS GPIO. AFTER CREATING THE PRODUCT, SELECT THE RECENTLY CREATED PRODUCT AND THEN CLICK ON CONFIGURE ICON.

2

MOVE TO THE CODE TAB AND WRITE THE GIVEN CODE TO CONTROL THE 2ND BUZZER.

3

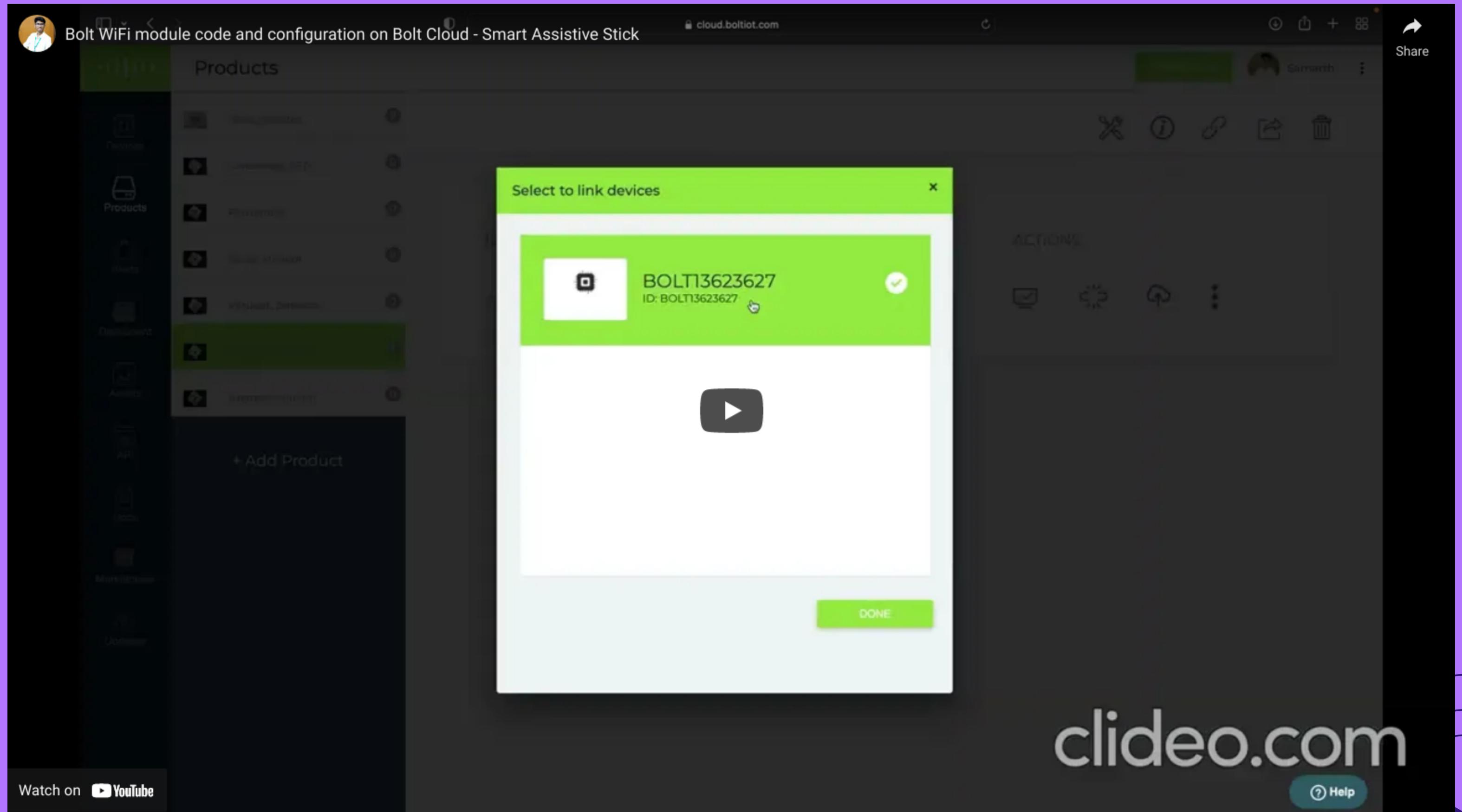
ONCE YOU HAVE WRITTEN THE COMPLETE CODE IN THE EDITOR, GIVE THE FILENAME AS BUZZERCONTROL AND IN THE DROP-DOWN SELECT THE FILE EXTENSION AS HTML.

4

NOW CLICK ON SAVE ICON TO SAVE THE CODE. NOW GO BACK TO THE DASHBOARD BY CLICKING ON 'X' ICON. IN THE PRODUCTS TAB, SELECT THE PRODUCT CREATED AND THEN CLICK ON THE LINK ICON. SELECT YOUR BOLT DEVICE IN THE POPUP AND THEN CLICK THE 'DONE' BUTTON.

5

NOW CLICK ON VIEW THIS DEVICE ICON TO VIEW THE PAGE THAT YOU HAVE DESIGNED AND THAT IS THE FINAL OUTPUT.



Working

Working prototype video of smart assistive stick BOLT WiFi Module. Alert sending via Different Buzzer Frequencies.

CODE BLOCK

For Bolt WiFi Module in Bolt Cloud

Filename

Extension

buzzercontrol

html

```
1 <!DOCTYPE html>
2 <html>
3   <head>
4     <title>Bolt IoT Smart Assistive Stick Platform</title>
5     <script type="text/javascript" src="https://cloud.boltiot.com/static/js/boltCommands.js"></script>
6     <script>
7       setKey('{{ApiKey}}','{{Name}}');
8     </script>
9   </head>
10  <body>
11    <center>
12      <input type="range" min="0" max="255" value="100" onchange="analogWrite(0,this.value); console.log('this.value');">
13      <button onclick="digitalWrite(0, 'LOW');">Buzzer OFF</button>
14    </center>
15  </body>
16 </html>
```

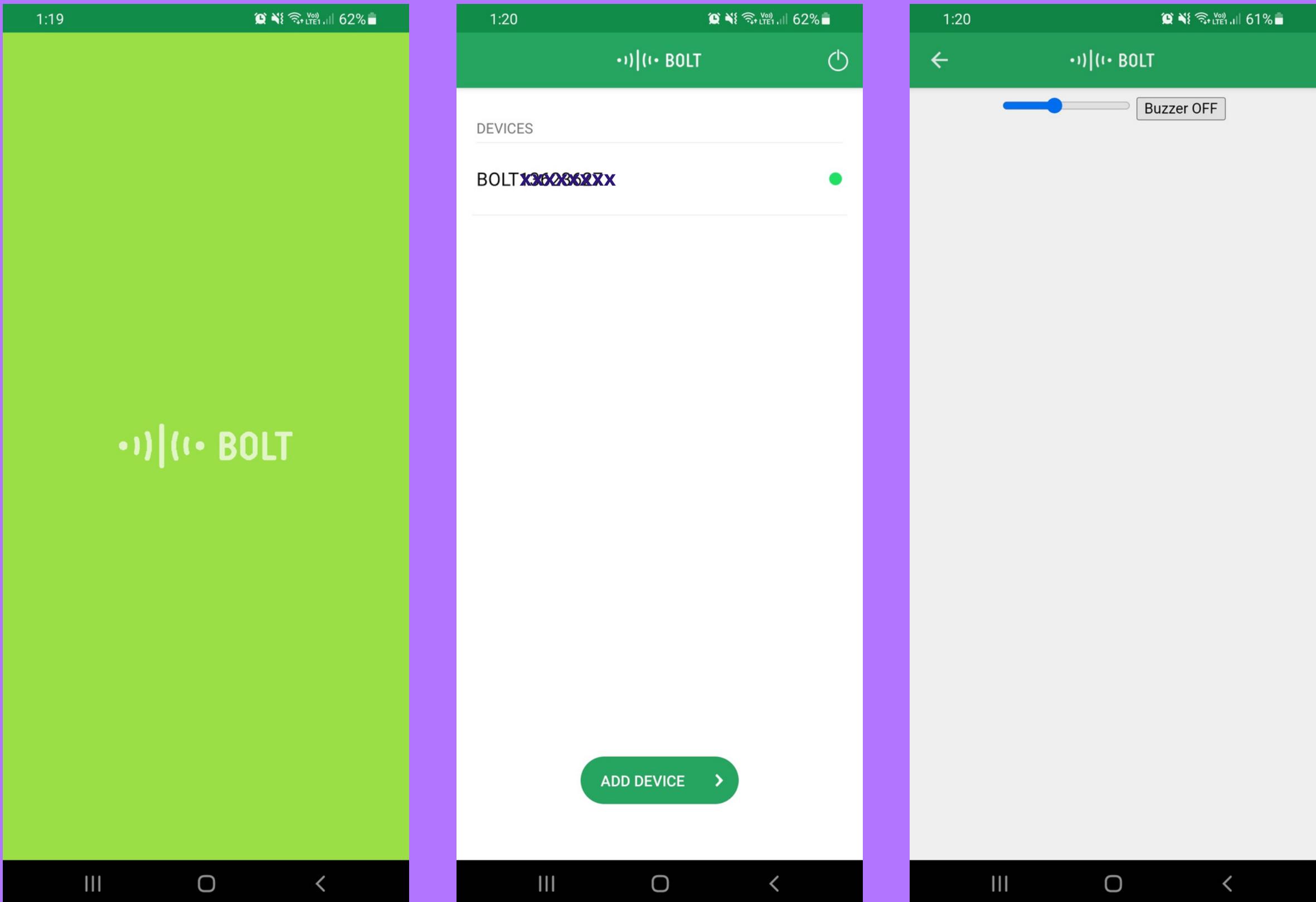
Output:

The screenshot shows a web browser window with the following details:

- Title Bar:** cloud.boltiot.com
- Content Area:**
 - A slider control with a value of 100.
 - A button labeled "Buzzer OFF".

Similarly via Bolt App

We can control the buzzer
frequency .

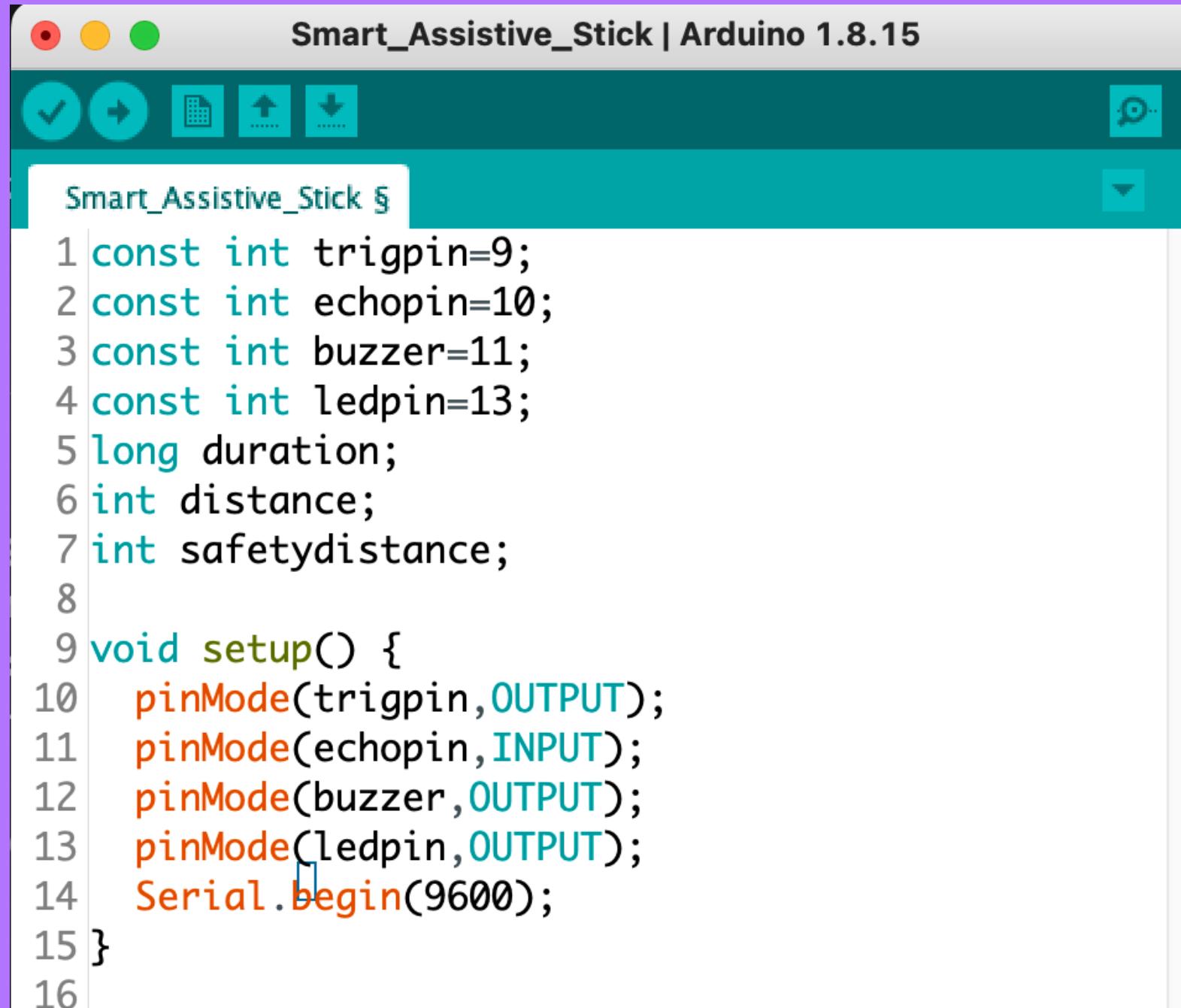


SOFTWARE SETUP & CODE BLOCK

For Boltduino (Arduino)

Open Arduino IDE and select Board as Arduino UNO and Port as per your hardware configuration.

Open a new sketch, name it as Smart_Assistive_Stick and write code block.



The screenshot shows the Arduino IDE interface with the title bar "Smart_Assistive_Stick | Arduino 1.8.15". Below the title bar are standard file icons: a checkmark, a circular arrow, a document, an upward arrow, and a downward arrow. The main area displays the following C++ code:

```
Smart_Assistive_Stick §
1 const int trigpin=9;
2 const int echopin=10;
3 const int buzzer=11;
4 const int ledpin=13;
5 long duration;
6 int distance;
7 int safetydistance;
8
9 void setup() {
10   pinMode(trigpin,OUTPUT);
11   pinMode(echopin,INPUT);
12   pinMode(buzzer,OUTPUT);
13   pinMode(ledpin,OUTPUT);
14   Serial.begin(9600);
15 }
16
```

```
17 void loop() {
18   digitalWrite(trigpin,LOW);
19   delayMicroseconds(2);
20   digitalWrite(trigpin,HIGH);
21   delayMicroseconds(10);
22   digitalWrite(trigpin,LOW);
23   duration=pulseIn(echopin,HIGH);
24   distance=duration*0.034/2;
25   safetydistance=distance;
26   if(safetydistance<=15){
27     digitalWrite(buzzer,HIGH);
28     digitalWrite(ledpin,HIGH);
29   }
30   else{
31     digitalWrite(buzzer,LOW);
32     digitalWrite(ledpin,LOW);
33   }
34   Serial.print("Distance:");
35   Serial.println(distance);
36 }
```

Verify and Upload this code via connecting USB cable to the Boltduino



Smart Assistive Stick - For Visually Impaired People



Share



Watch on YouTube

clideo.com

Working

Working prototype video of smart assistive stick.

Pros

1. IT'S EASY TO USE AND INEXPENSIVE.
2. THE SMART BLIND STICK IS DURABLE, AS WELL AS LIGHT, PORTABLE, AND DEPENDABLE.
3. IT HAS A MINIMAL POWER CONSUMPTION, MAKING IT PRACTICAL TO USE.
4. ALERT THE BLIND USER VIA DIFFERENT LEVEL OF FREQUENCY OF THE BUZZER.

Cons

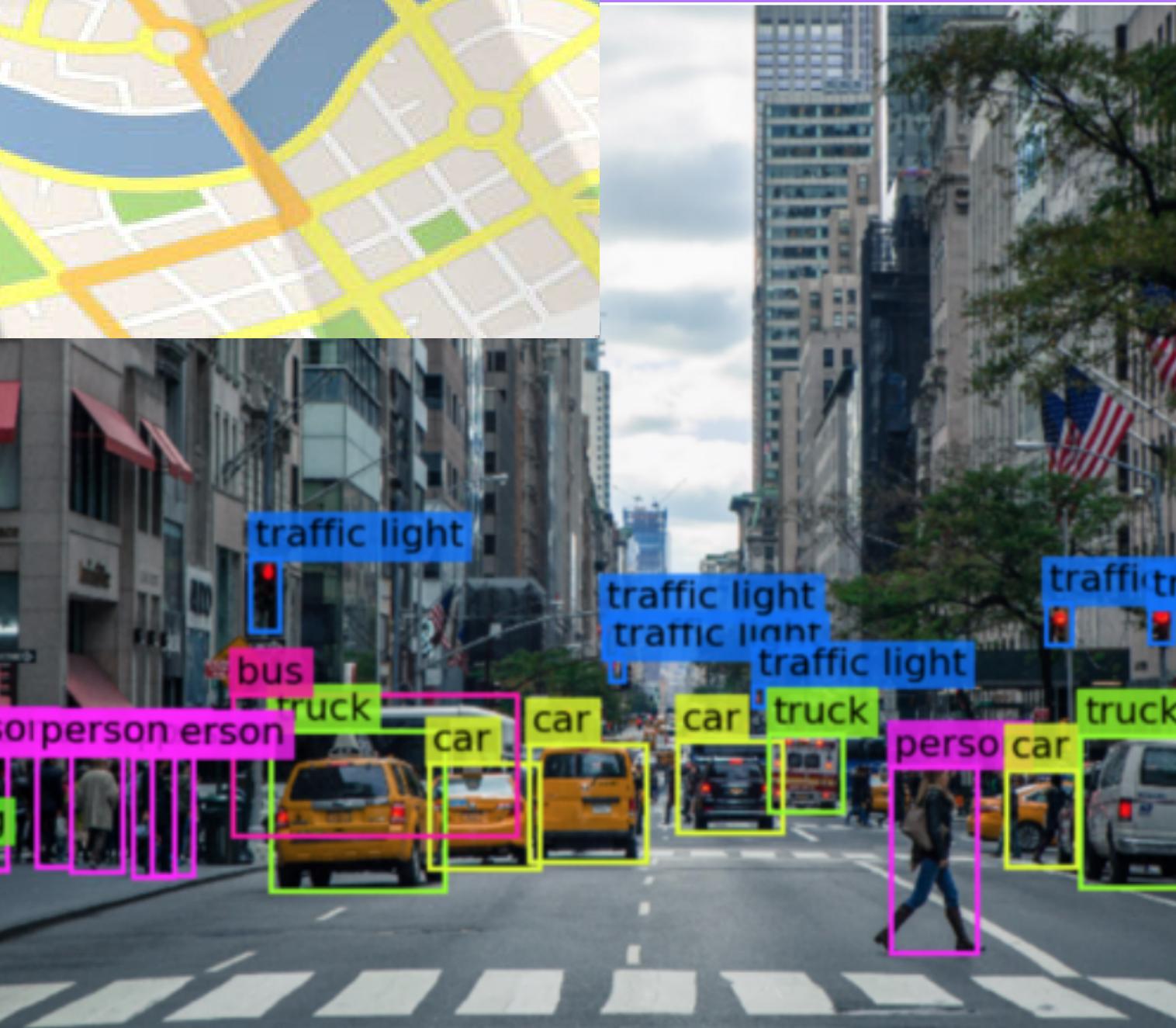
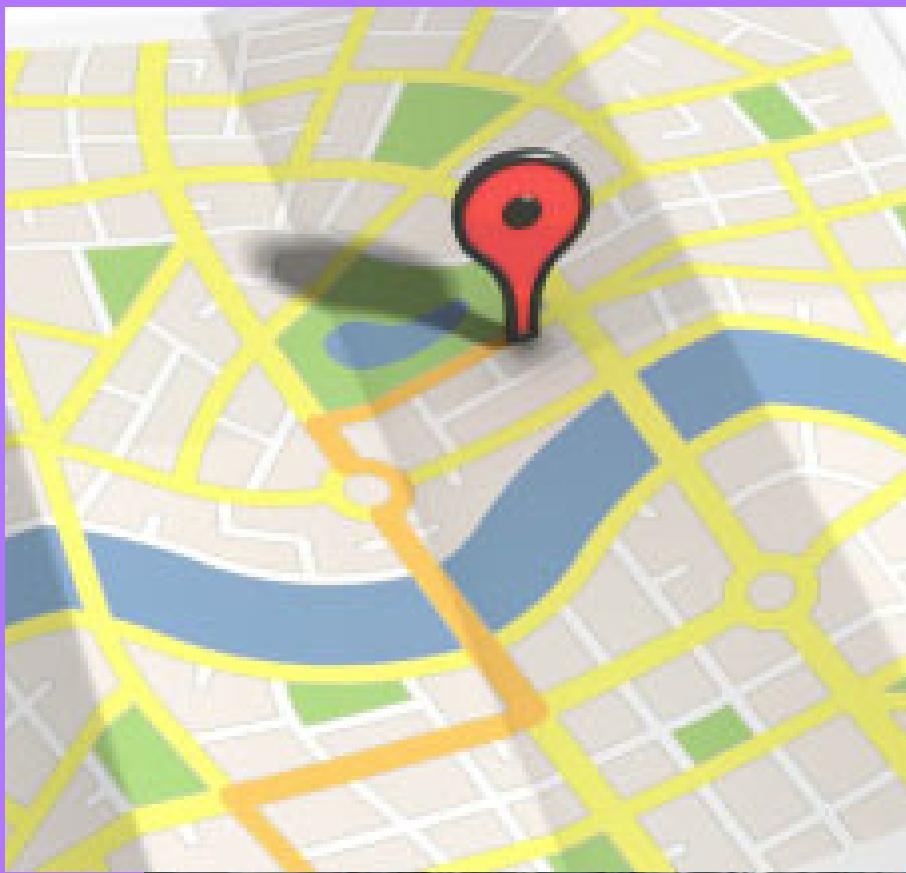
1. THE SENSOR IS SENSITIVE, IT SHOULD BE HANDLED WITH CARE AND KEPT AWAY FROM WATER.

Future Scope

MORE SENSORS CAN BE INTEGRATED TO DETECT OBSTACLES AND OTHER OBJECTS ACCURATELY. SMART STICK WILL HAVE MORE FUNCTIONALITY.

SUCH AS

- CAMERA
- GPS & GSM MODULES
- RAIN SENSOR
- MICRO VIBRATION MOTOR



Conclusion

The smart stick will serve as a foundation for the next generation of devices that will assist the visually impaired in safely moving both indoors and outdoors. It is both efficient and cost-effective. It achieves an excellent performance in identifying obstacles in the user's route in a range. This project provides low-cost, reliable, portable and energy-efficient smart device.

LET'S CONNECT



imsamarthpatil@gmail.com



linkedin.com/in/imsamarthpatil/



@imsamarthpatil



@imsamarthpatil