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MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY



Project Title

THE EYE-MATE

A Smart shoe for the visually impaired person



HOOCHLY ENGINEERING & TECHNOLOGY COLLEGE
Electronics and Communication Engineering
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INTRODUCTION



Many people suffer from serious visual impairments preventing them from travelling independently. Accordingly, they need to use a wide range of tools and techniques to help them in their mobility. The increasing number of blind persons attracts the development of many assistive devices around the world.

The current estimates predict that there are **40 million** blind people in the world majority of whom use a simple stick for navigation in their everyday life. We, in an effort to help this people have come up with an idea of replacing with advanced IOT enabled shoes to make the life of blind people much easier.

In this paper, we aim to develop a low-cost, reliable system for visually disabled people and those who care for them, provide legitimate, useful mapping information that enables a blind person to make reasonable and appropriate route choices in both indoor and outdoor environments.

OBJECTIVE

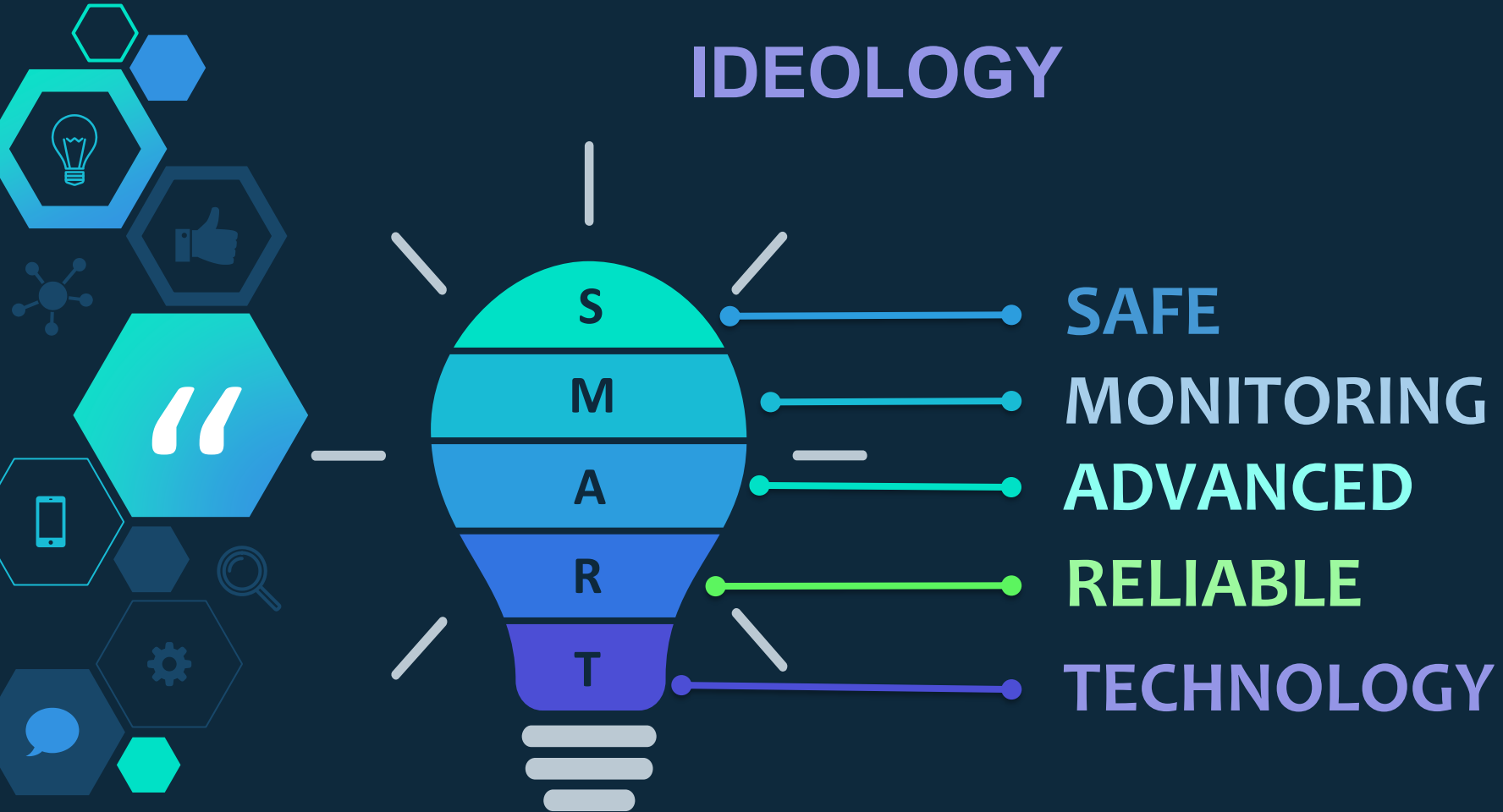
Our aim of our this project is to provide a hustle free life style to every visually impaired citizen of our country.

By throwing some lights to our thinking, we are under going to a process of making a smart shoe to assist all the visually impaired persons by detecting the obstacles on the path and navigate the person to the proper destination.

Our prototype will act as a “Third Eye” for them.



IDEOLOGY



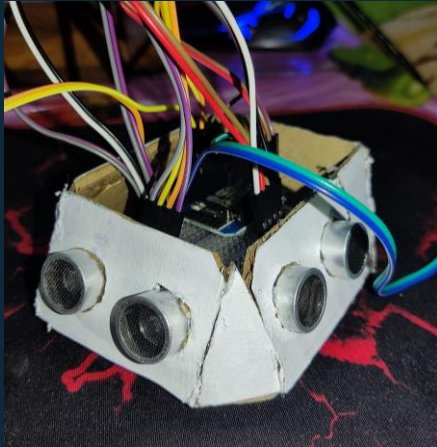
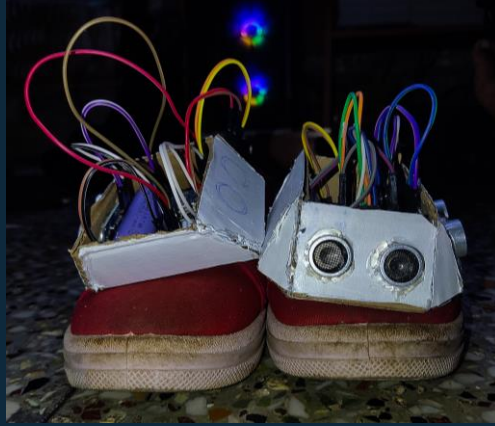
KEY FEATURES

- ◇ OBJECT DETECTION
- ◇ GUIDE THE CORRECT PATH
- ◇ LOCATION TRACKER DURING EMERGENCY
- ◇ SHOE TRACKER
- ◇ LOW POWER CONSUMPTION
- ◇ REMOTABLE

HARDWARE COMPONENTS

- NODE MCU (ESP8266 D1 MINI)
- ULTRASONIC SENSOR
- GPS NEO-6M
- VIBRATION MOTOR
- ARDUINO NANO
- RESSTOR
- CAPACITOR
- OpAmp
- PRESET
- BMS
- BATTERY
- JUMPER WIRES

PROJECT MODEL





WORKING PRINCIPLE

The Eye Mate: Smart shoe project consists of many functionalities to perform any real-time operation for the betterment of blind persons.

Firstly the ultrasonic sensors placed in the model in all four-direction, detect the obstacle at real time and transfer the pulse duration data to D1 Mini.-Esp8266.

Some mathematical calculation has been performed in D1 mini.-esp8266 to detect the actual distance of the obstacle from the user.

The model was gradually optimized to perform accurately.

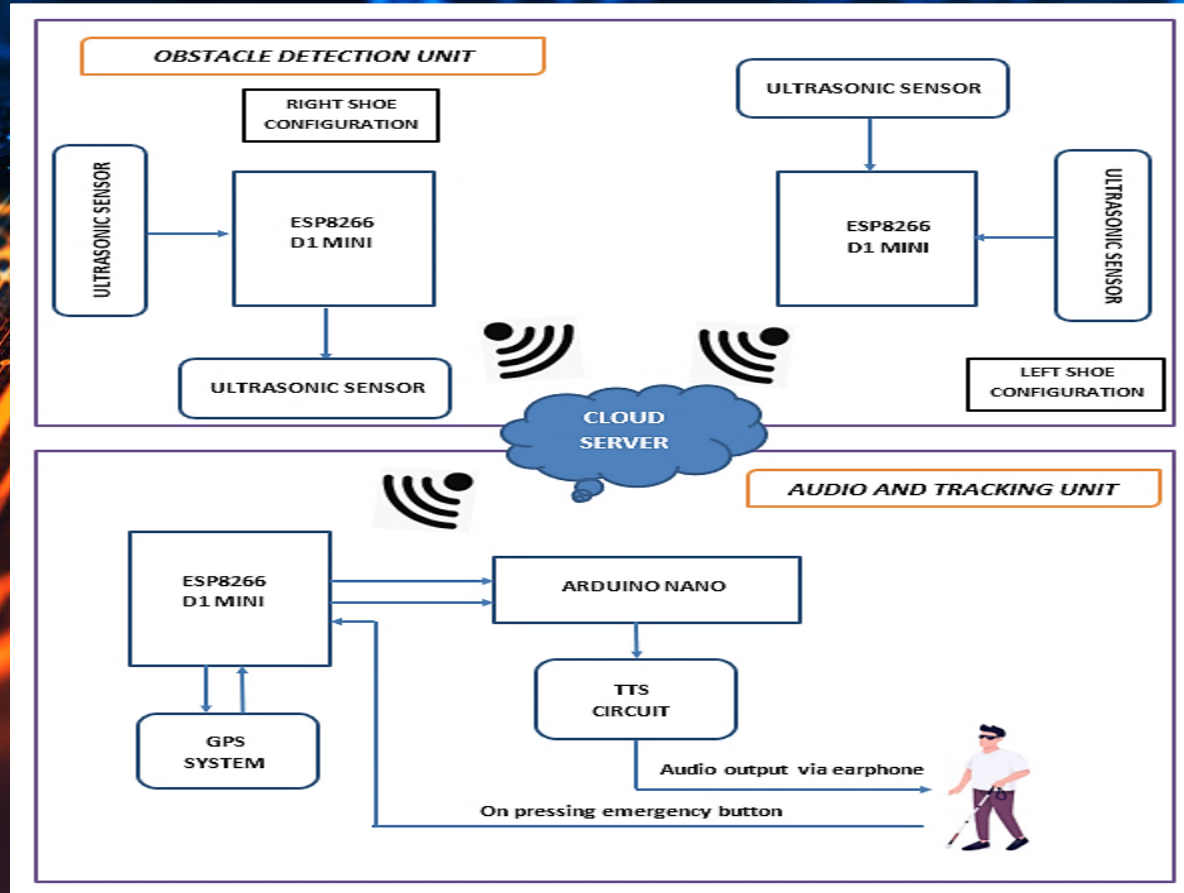
Further the Di mini publish the distance data to the cloud server for monitoring purpose.

The model generates some vibration feedback as well as send an alert to the server when the it encountered a obstacle to respective directions.

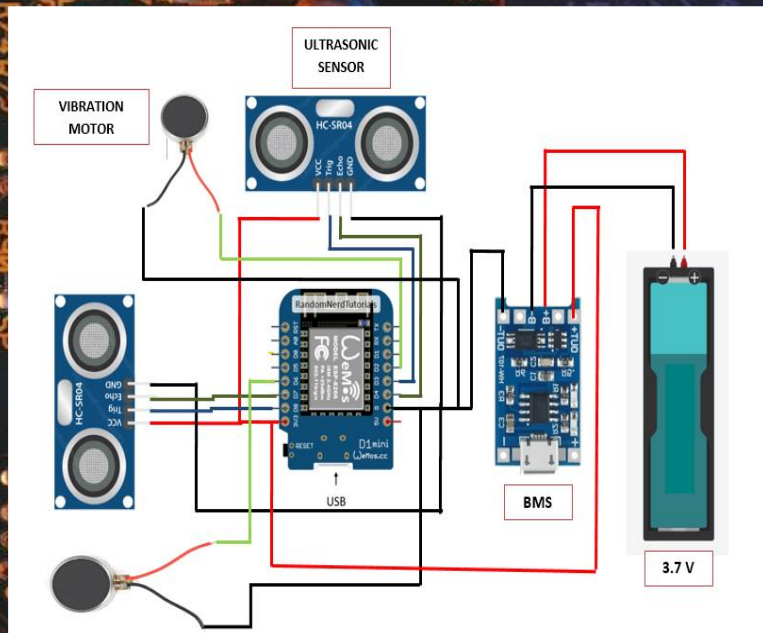
The instant navigating system activates when another D1 Mini gets alert from the server when any obstacle occurred in front of the user and it would navigate the user to take proper turns safely.



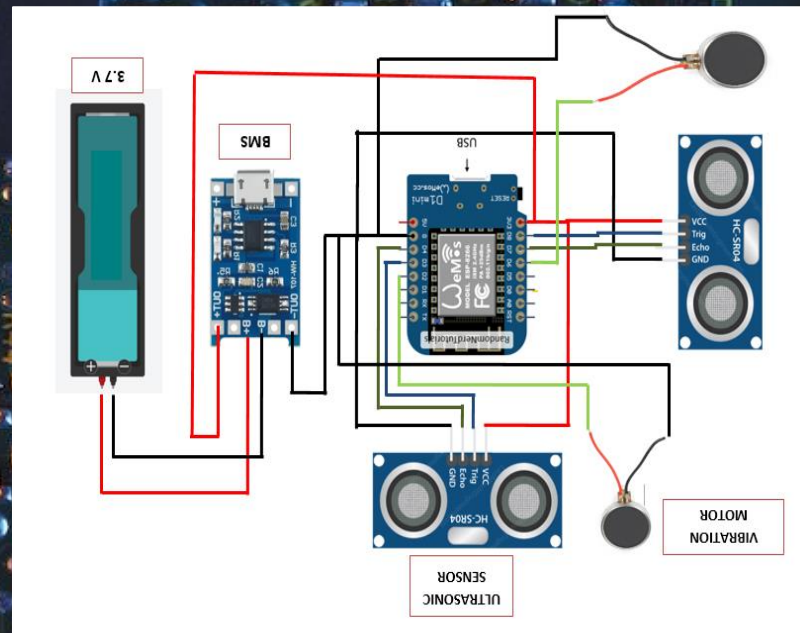
BLOCK DIAGRAM



CIRCUIT DIAGRAM



LEFT SHOE



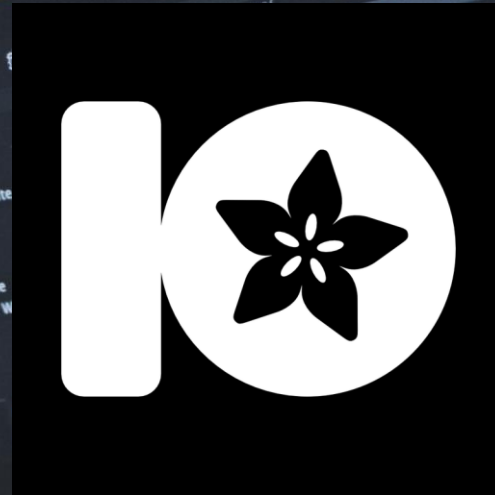
RIGHT SHOE



SOFTWARE USED:

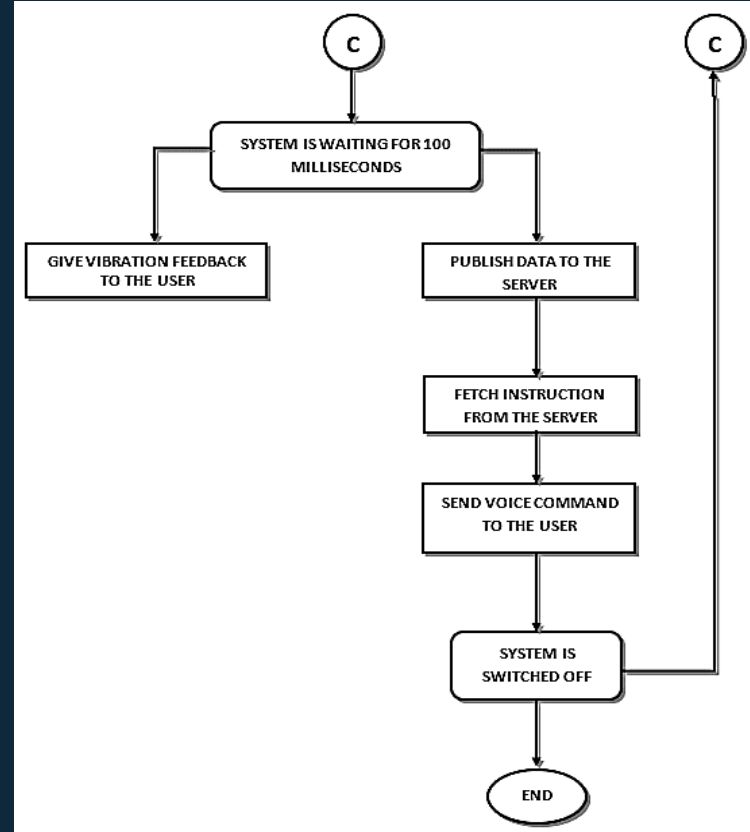
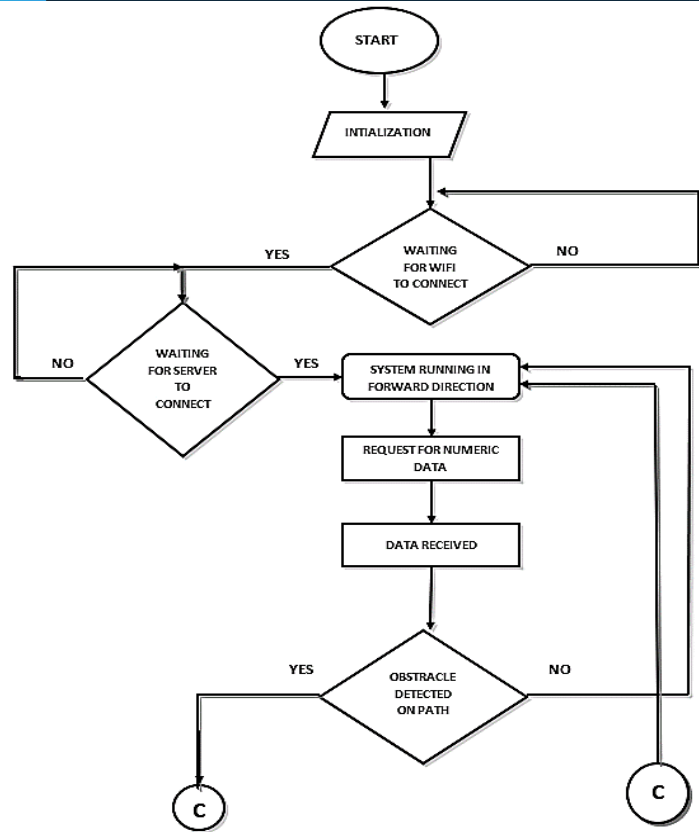


ARDUINO IDE



ADAFRUIT.IO

FLOWCHART



MERITS AND DEMERITS




- ☐ Reduces Dependencies
- ☐ Prevents accidents
- ☐ Easy to Use
- ☐ Easy to find Path
- ☐ Security

- ☐ Fast moving object
- ☐ Transparent object
- ☐ Down ward stairs
- ☐ Slippery surface
- ☐ Durability
- ☐ Small range





CHALLENGES & ISSUES

- 
- ◇ Ultrasonic Sensor has an error of 5% to 15%.
 - ◇ Neo-6M GPS module has accuracy rate of a second with 2.5m horizontal position accuracy.
 - ◇ Bluetooth module in low frequency range communication may hamper.
 - ◇ Air fluctuation may lead to mal functions to Ultrasonic Sensors
 - ◇ High current supply from the power source, Piezo Sensors, may be cause damage to microcontroller





COST ESTIMATION

SL NO	COMPONENTS	QUANTITY	PRICE
001	NODE-MCU (ESP8266 D1 MINI)	3	1200/-
002	ULTRASONIC SENSOR	4	250/-
003	VIBRATION MOTOR	4	200/-
004	GPS MODULE	1	350/-
005	ARDUINO NANO	1	400/-
006	TP4056 BATTERY CHARGING MODULE	3	150/-
007	RECHARGEABLE Li-ion BATTERY	3	450/-
008	OpAmp (LM386 IC)	1	60/-
009	PRESET(10k)	1	10/-
010	RESISTORS + CAPACITORS	3+5	60/-
011	PUSH BUTTON	1	15/-
012	AUDIO JACK (FEMALE PORT)	1	20/-
013	JUMPER WIRE	4 SET	100/-
014	VEROBOARD	1	50/-
015	PCB DESIGN	1	200/-
TOTAL COST			3515/-



FUTURE PROSPECTS

- 
- ◇ Enhance the Responsiveness of the system.
 - ◇ Water resistive
 - ◇ Adding Health Monitoring features
 - ◇ More Handy Android Application.
 - ◇ A Better Shoe Design.
 - ◇ Web Camera and NI-smart Cameras.
 - ◇ Send immediate alert to nearby hospital during emergency
- 

CONCLUSION

- ❖ We have successfully constructed the prototype of the smart shoe.
- ❖ We have done with the connection of two Ultrasonic Sensors (HC-SR 04) with each Arduino Nanos.
- ❖ Also, we have successfully connected GPS Module (Neo-6M) with Arduino Nano. And it is successfully giving locations of latitude and longitude in serial monitor.
- ❖ All the devices are connected properly.



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REFERENCES



- <https://www.arduino.cc/en/software>

- <https://www.levelaccess.com/understanding-assistive-technology-how-does-a-blind-person-use-theinternet/>

- <https://ieeexplore.ieee.org/abstract/document/9417928>

- <https://1000projects.org/detection-of-currency-notes-and-medicine-names-for-the-blind-peopleproject.html>

- [\(PDF\) Smart Shoes for Visually Impaired/Blind People \(researchgate.net\)](#)



ResearchGate

LEVEL
access



Thanks!

Any questions?

