1. REQUIREMENTS:

Description

- Describe about the project

Requirements

High Level Requirements

- Features of my project
- Collection of Statement

Low Level Requirements

- How each feature is implemented
- Linkage of High level to Low level

SWOT

4W'S & 1H

❖ ABSTRACT

My project presents a theoretical model and a system concept to provide a smart electronic aid for blind people. The system is intended to provide overall measures- like Artificial vision and object detection. The aim of the overall system is to provide a low cost and efficient navigation aid for blind which gives a sense of artificial vision by providing information about the environmental scenario of objects. An Ultrasonic sensor is used to calculate distance of the objects(Tree or lamp post, pit, obstacles, pavement up, pavement down)around the blind person to guide the user towards the available path.

Output is in the form of displaying the distance in the LCD and the buzzer which the blind person can hear.

Currently, various instruments are invented to help the visually blind people by

many methods. Our project helps to improve the strength of the people by automatic navigation. By wearing this aid, they can face any obstacles without any fear. In the yearly projects, many of them used infrared sensor, but in this project we use ultrasonic sensor to measure the distance. Our aim is to provide an efficient instrument to blind people. It leads to good results in detecting the obstacles, wherever the blind is. Wearing an aid is more convenient than carrying a stick wherever they go.

❖ STATE OF RESEARCH:

Visually impaired people are the people who can't identify smallest detail with healthy eyes. Those who have the visual acuity of 6/60 or the horizontal extent of the visual field with both eyes open less than or equal to 20 degrees, these people are considered blind . Such people are in need of aiding devices for blindness related disabilities. As described in 10% of blind have no usable eyesight at all to help them move around independently and safely. The electronic aiding devices are designed to solve such issue.

To record information about the obstacles presence in a road, active or passive sensors can be used. In case of a passive sensor, the sensor just receives a signal. It detects the reflected, emitted or transmitted electro-magnetic radiation provided by natural energy sources. In case of using an active sensor, the sensor emits a signal and receives a distorted version of the reflected signal. It detects reflected responses from objects irradiated with artificially generated energy sources. These kind of active sensors are capable of sensing and detecting far and near obstacles. In addition, it determines an accurate measurement of the distance between the blind and the obstacle. Overall, in the obstacle detection domain, four different types of active sensors may be used: infrared, laser, ultrasonic, in addition to radar sensors.

2.ARCHITECTURE:

Architecture

Design

Structural

Behavioral

Model Of Project

Block Diagram

Conceptional Diagram

BEHAVIORAL DAIGRAM

MODELLING ATTRIBUTES

MODEL OF THE PROJECT:

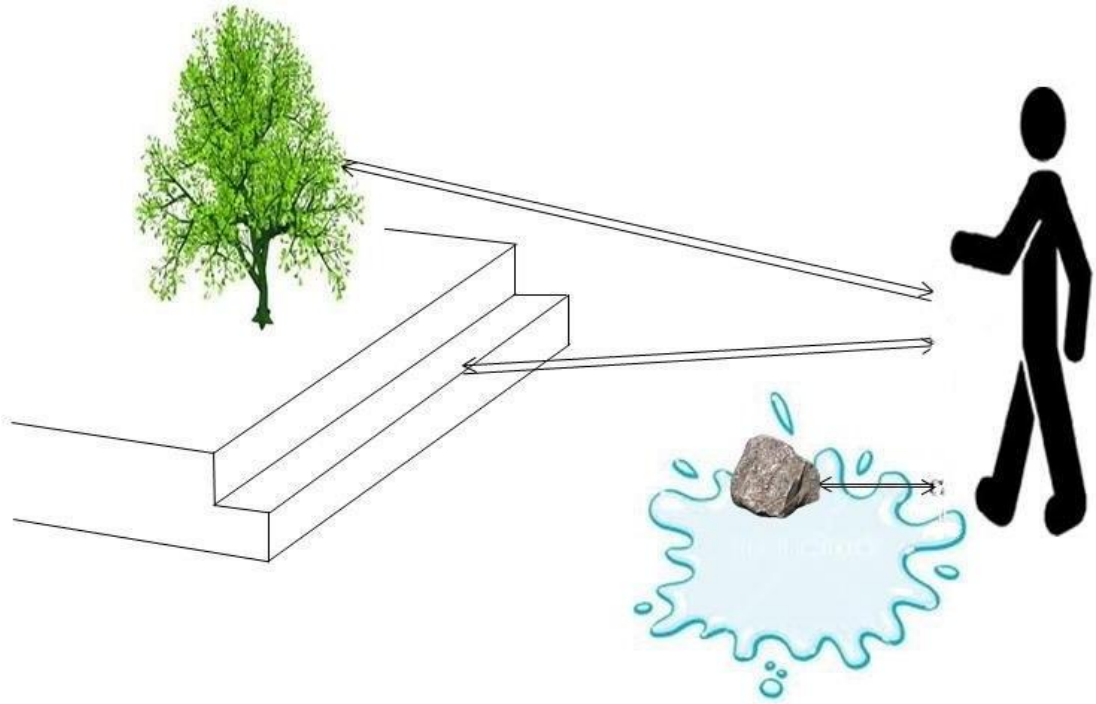
In My work I tried to overcome some of disadvantage:

The training of my product isn't as expensive as Training in other product. Our training is just description of electronic aid component and usage position

I use buzzer to transmit information to the Blind. We integrated LCDin the hand, if they are deaf. It's natural dimension to keep it user friendly.

It is very fast response time calculated as 39 ms in average of 400 cm before hitting the obstacles.

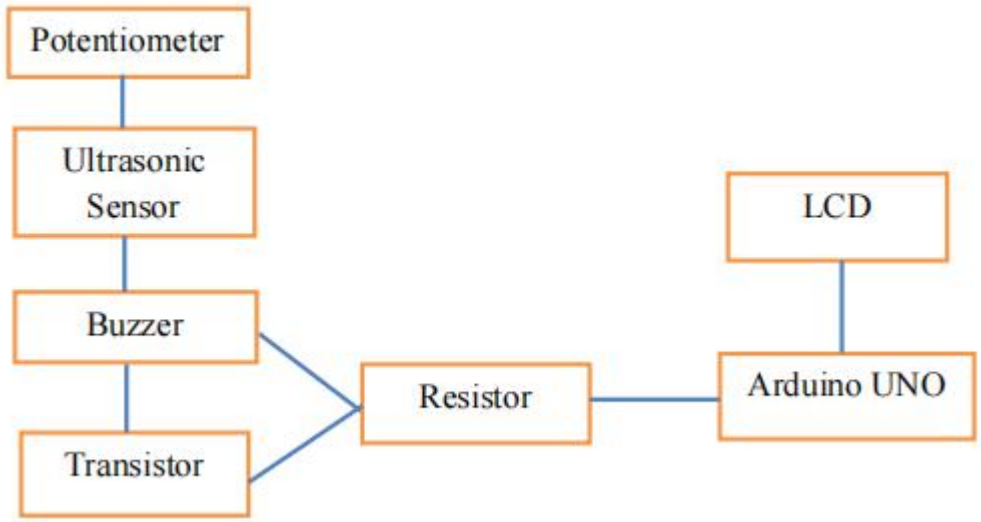
I Designed stick to detect obstacles and it's able to recognize and speak aloud the upward and downward stairs or puddles as shown in fig.



CONCEPTIONAL DESIGN:

The system will be designed to detect manhole and obstacle. It should be able to automatically calculate an approximate height of the user and average distance between the system in hand and surface. If at any time the distance between the device and the surface is much higher than the average calculated distance then it will generate buzzer for manhole. The system will generate buzzer for obstacle if there is any obstacle within a certain range. If they are deaf, they must watch the distance displaying in the LCD. Then, they must add the resistor, potentiometer and the transistor.with help of this , they will display the distance in the LCD and if the obstacles is there, buzzer is generated.

BLOCK DIAGRAM:



3.IMPLEMENTATION:

Sample Code:

```
#include <"Android">
#include "Buzzer.h"
#include "NewPing.h"
#include "LiquidCrystal_PCF8574.h"
#include "Servo.h"
#define BUZZER_PIN_SIG 2
#define HCSR04_PIN_TRIG 4
#define HCSR04_PIN_ECHO 3
#define SERVO9G_PIN_SIG 5
#define LCD_ADDRESS 0x3F
#define LCD_ROWS 2
#define LCD_COLUMNS 16
#define SCROLL_DELAY 150
#define BACKLIGHT 255
```

```
const int servo9gRestPosition = 20;
const int servo9gTargetPosition = 150;
Buzzer buzzer(BUZZER_PIN_SIG);
NewPing hcsr04(HCSR04_PIN_TRIG,HCSR04_PIN_ECHO);
LiquidCrystal_PCF8574 lcdI2C;
Servo servo9g;
const int timeout = 10000;
char menuOption = 0;
long time;
void setup()
{
 Serial.begin(9600);
 while (!Serial) ;
 Serial.println("start");
 lcdI2C.begin(LCD_COLUMNS, LCD_ROWS, LCD_ADDRESS,
BACKLIGHT);
 servo9g.attach(SERVO9G_PIN_SIG);
 servo9g.write(servo9gRestPosition);
 delay(100);
 servo9g.detach();
 menuOption = menu();
}
void loop()
{ if(menuOption == '1') {
 buzzer.on();
 delay(500);
 buzzer.off();
 delay(500);
 }
 else if(menuOption == '2') {
 int hcsr04Dist = hcsr04.ping_cm();
 delay(10);
```

```
 Serial.print(F("Distance: ")); Serial.print(hcsr04Dist); Serial.println(F("[cm]"));
 }
 else if(menuOption == '3')
 {
 lcdI2C.clear();
 lcdI2C.print(" Circuito.io ");
 lcdI2C.selectLine(2);
 lcdI2C.print(" Rocks! ");
 delay(1000);
 }
 else if(menuOption == '4') {
 servo9g.attach(SERVO9G_PIN_SIG);
 servo9g.write(servo9gTargetPosition);
 delay(500);
 servo9g.write(servo9gRestPosition);
 delay(500);
 servo9g.detach();
 }
 if (millis() - time0 > timeout)
 {
 menuOption = menu();
 } }
char menu()
{
 Serial.println(F("\nWhich component would you like to test?"));
 Serial.println(F("(1) Buzzer"));
 Serial.println(F("(2) Ultrasonic Sensor - HC-SR04"));
 Serial.println(F("(3) LCD 16x2 I2C"));
 Serial.println(F("(4) 9G Micro Servo"));
 Serial.println(F("(menu) send anything else or press on board reset button\n"));
 while (!Serial.available());
 while (Serial.available())
```

```
{
char c = Serial.read();
if (isAlphaNumeric(c))
{
if(c == '1')
Serial.println(F("Now Testing Buzzer"));
else if(c == '2')
Serial.println(F("Now Testing Ultrasonic Sensor - HC-SR04"));
else if(c == '3')
Serial.println(F("Now Testing LCD 16x2 I2C"));
else if(c == '4')
Serial.println(F("Now Testing 9G Micro Servo"));
else
{
Serial.println(F("illegal input!"));
return 0;
}
time0 = millis();
return c;
}
}
}
```

4.TEST PLAN:

Every plan , define a test case

Run a Feature

Modified a Project

Obstacles Detection

Table

ID, Description of Test case, Input values, Expected Output, Actual Output

MAJORE HARDWARE:

1. Buzzer
2. Potentiometer
3. Ultrasonic Sensor
4. Bread Board
5. Wire – Normal Wire
6. Transistor
7. Resistor
8. LCD

ULTRASONIC SENSOR:

Ultrasonic sensor work well for close obstacles unlike laser one, when an object is so close the laser sensor (less than 15 cm) can’t get an accurate reading. Moreover, it should be noted that radar sensors can easily detect near and far obstacles with equal perform once, but their medium accuracy doesn't allow them detecting small obstacles. Ultrasonic sensor used 40 kHz transmission signal. This is a reasonable size to be installed in the Aid. It is used to detect upward and

downward stairs because the sensor spot is roughly 6 cm. This feature enables the user to identify precisely, any kind of stairs in front of him.

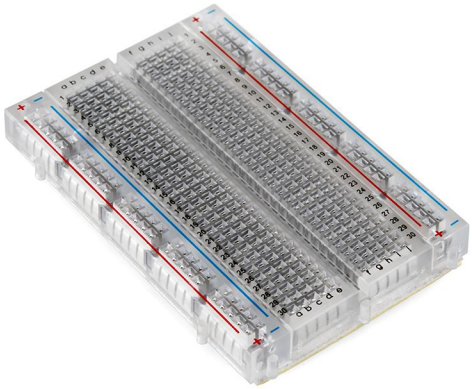
An upper one at a height 90 cm to detect upper obstacles and another sensor at a height 30 cm to detect low obstacles. Detection using ultrasonic sensor is based on two factors: Time of flight (TOF) and Beam Size. Obstacles whose dimensions are larger than the beam size, all of the sound waves will be reflected to receiver.

BUZZER:

It is used to alert the blind people by giving the sound. Alarming Circuits, where the user has to be alarmed about something. Communicationequipments. Automobile electronics. Portable equipments, due to its compact size

BREAD BOARD:

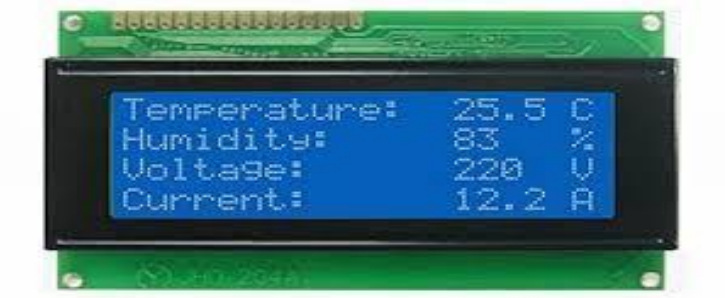
A breadboard is used to build and test circuits quickly before finalizing any circuit design. The breadboard has many holes into which circuit components like ICs and resistors can be inserted. A typical breadboard is shown below:



It is important to breadboard a circuit neatly and systematically, so that one can debug it and get it running easily and quickly. It also helps when someone else needs to understand and inspect the circuit.

LCD:

It is used to display the distance measured by ultrasonic sensor.



MAJOR SOFTWARE:

SOFTWARE [ARDUNIO]

The Arduino UNO is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), analog inputs, a 16MHZ ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an adapter or battery to get started.

POWER:

- The Arduino UNO can be powered via the USB connection or with an external power supply. The power source is selected automatically.
- External power can come either from AC to DC adapter or battery.
- Leads from a battery can be inserted in the GND and Vin pin headers of the power connector.
- The board can operate on an external supply of 6 to 20 volts. If supplied with less than 7V, however, the 5V pin may supply less than 5V and the board may be unstable. If using more than 12V, the voltage regulator may overheat and damage the board. The recommended range is 7 to 12 volts.
- The power pins are as follows:

VIN:

The input voltage to the Arduino board .It can supply voltage either using an external power source or via the power jack.

5V:

This pin outputs a regulated 5V from the regulator on the board. The board can be supplied with power either from the DC power jack (7-12V), the USB connector (5V).

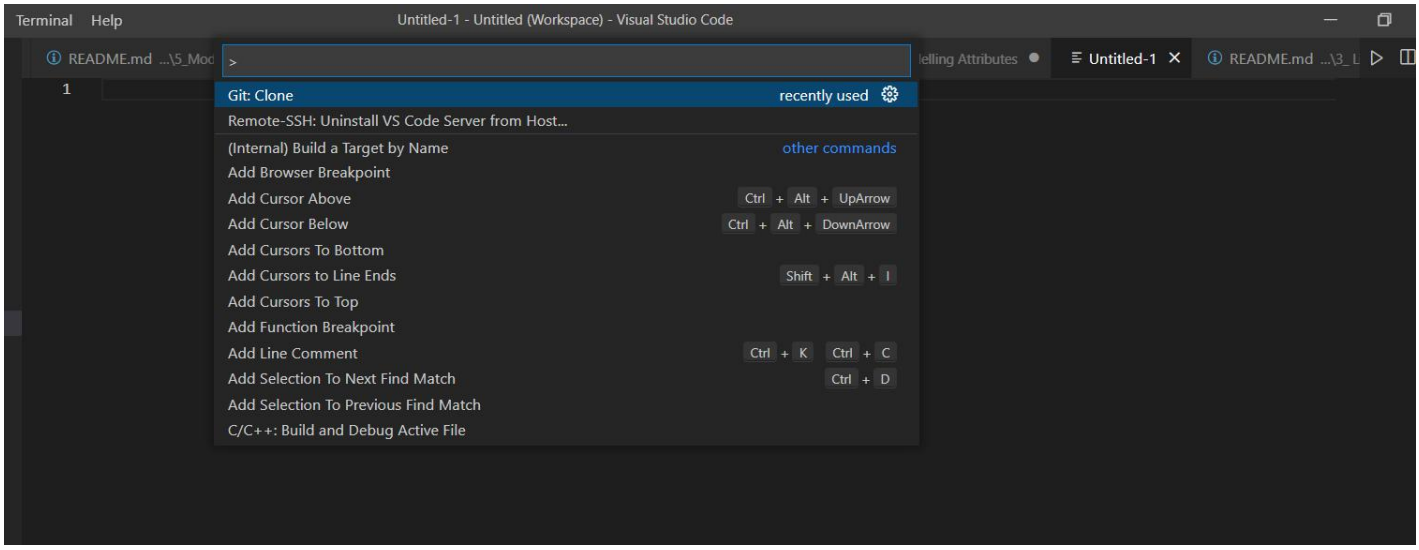
3.3V:

A 3.3 volts supply generated by the regulator. Maximum current draw is 50mA. And Ground pins.

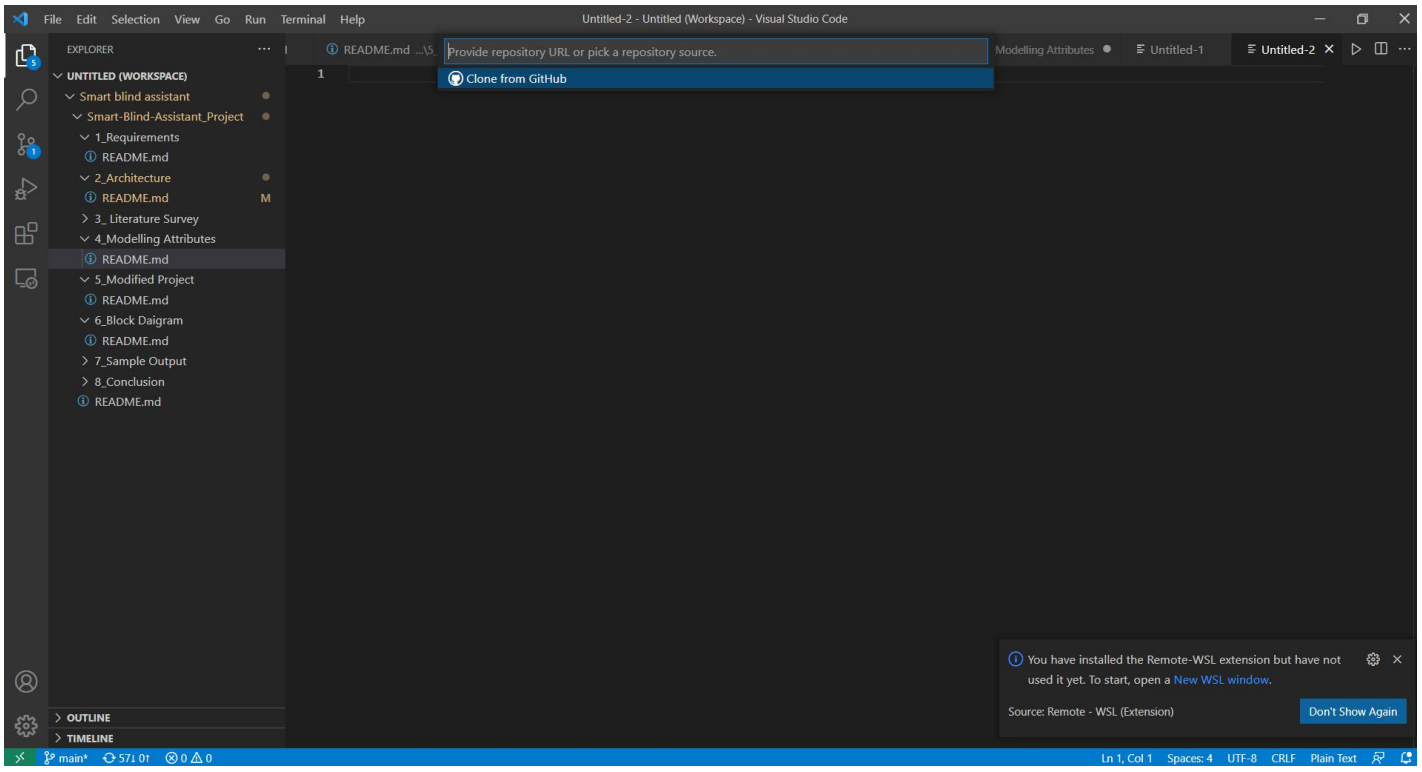
Each of the 14 digital pins (pin 0 to 13) can provide the UNO can be used as an input or output, using pinMode(), digitalWrite(), and digitalRead() functions. They operate at 5 volts. Each pin can provide or receive maximum of 40mA and has an internal pull-up resistor of 20-50 kOhms.

5.IMAGES:

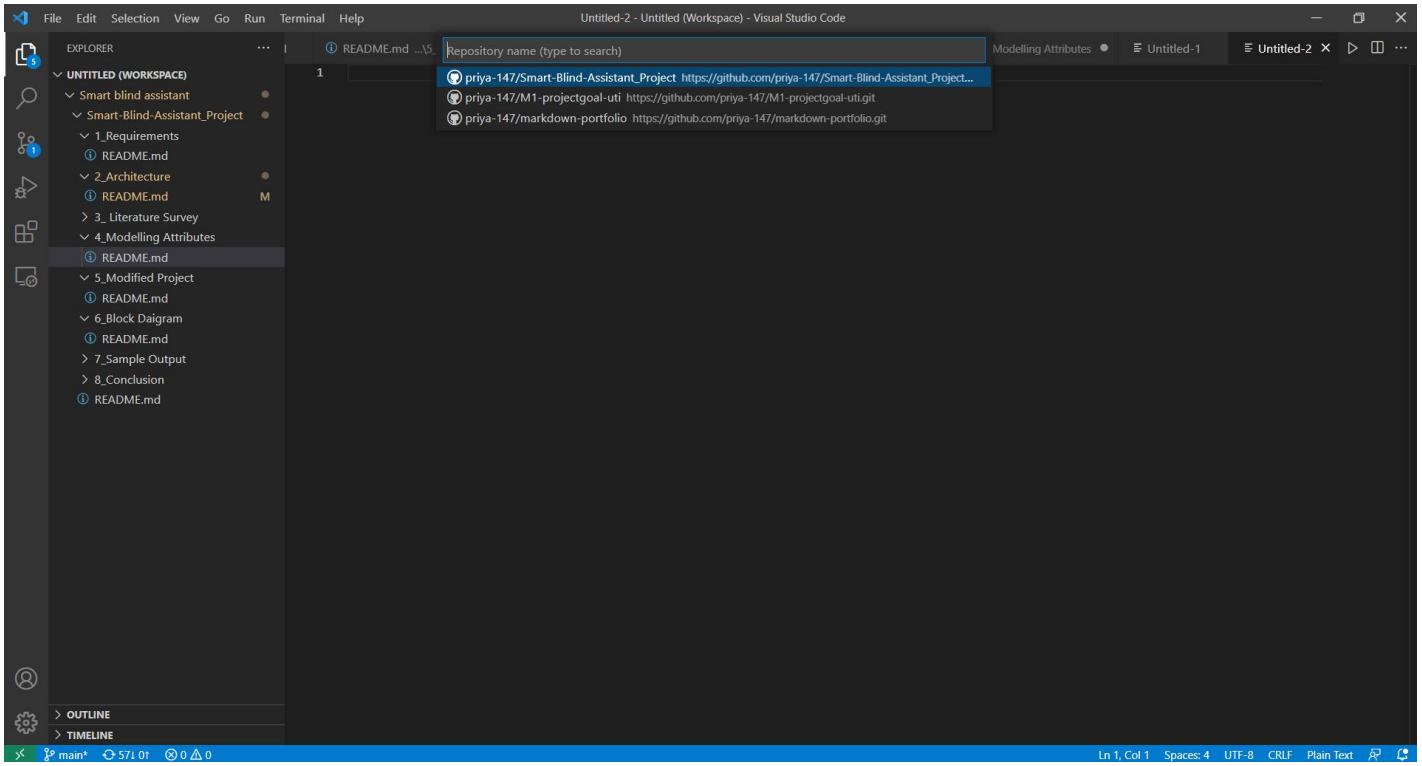
CLONE-1:



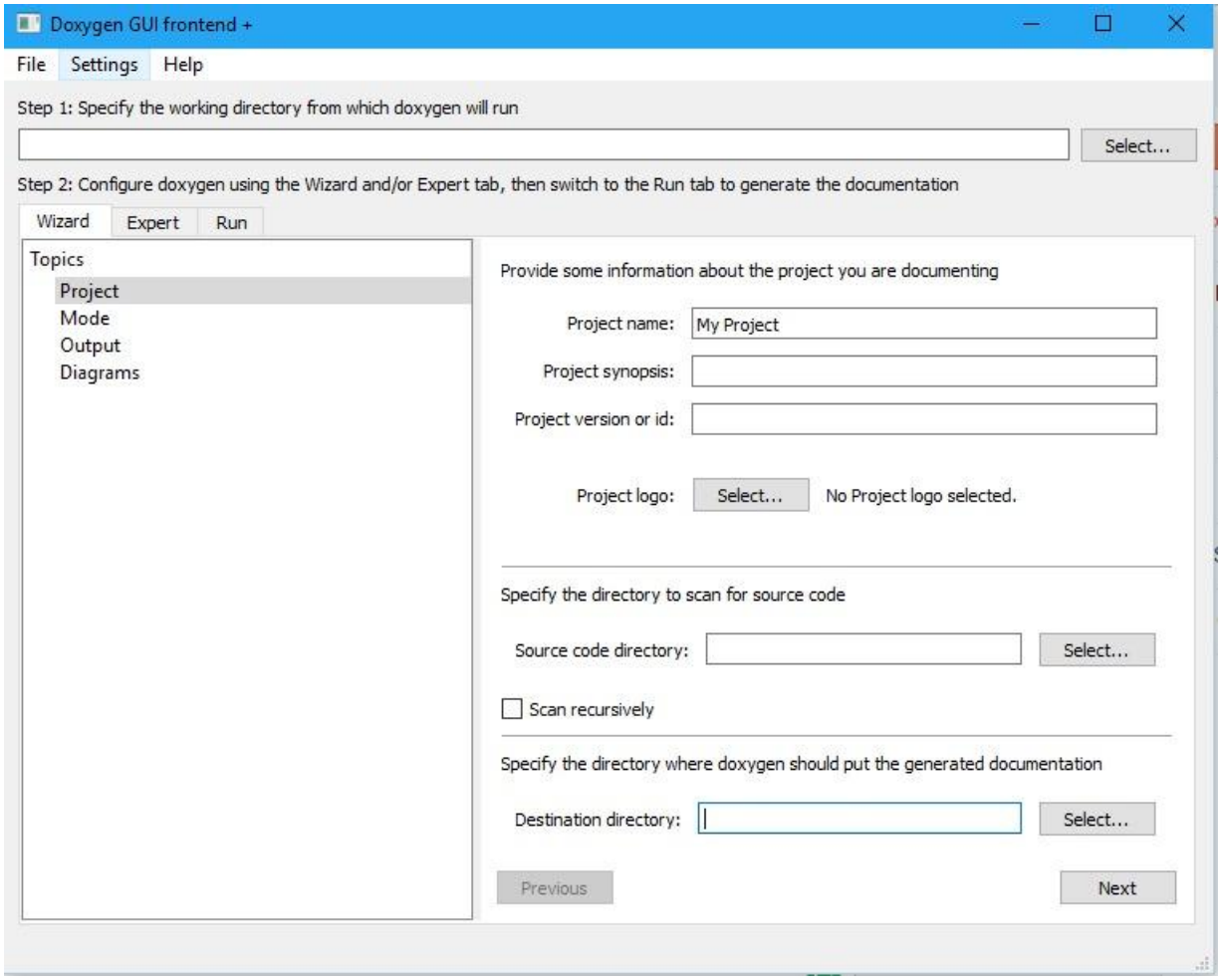
CLONE-2:



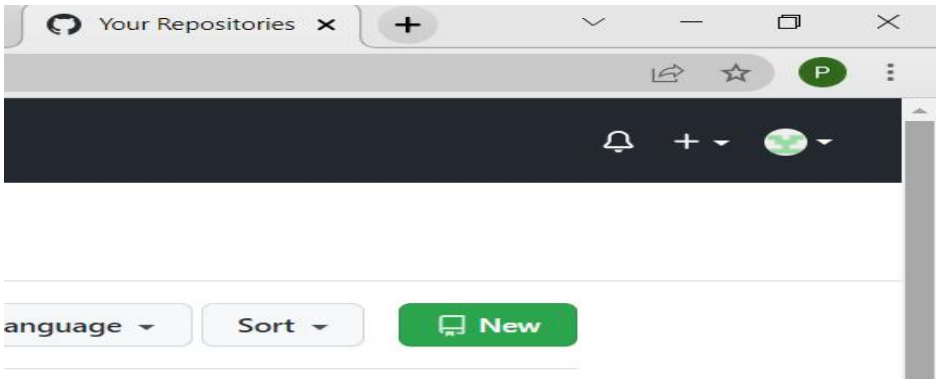
CLONE-3:



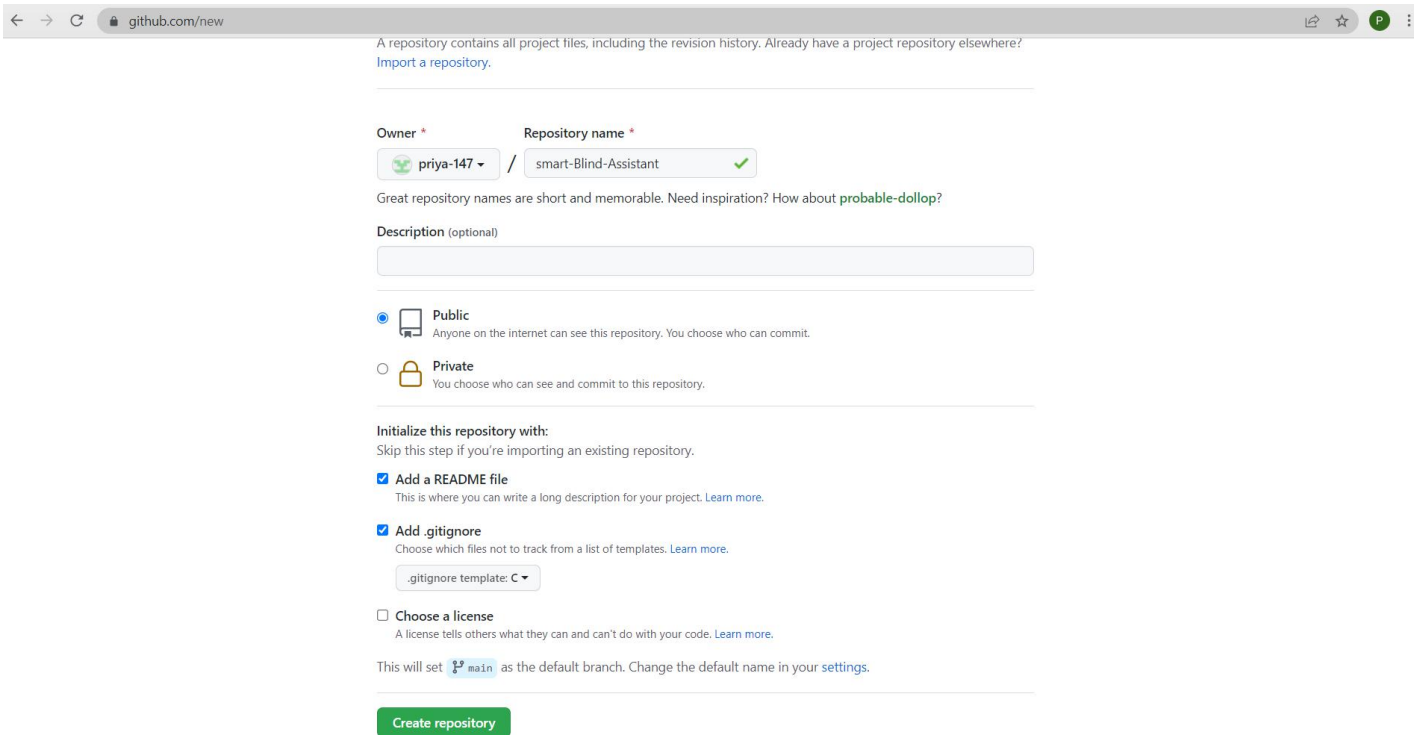
DOXYGEN:



REPO-1:



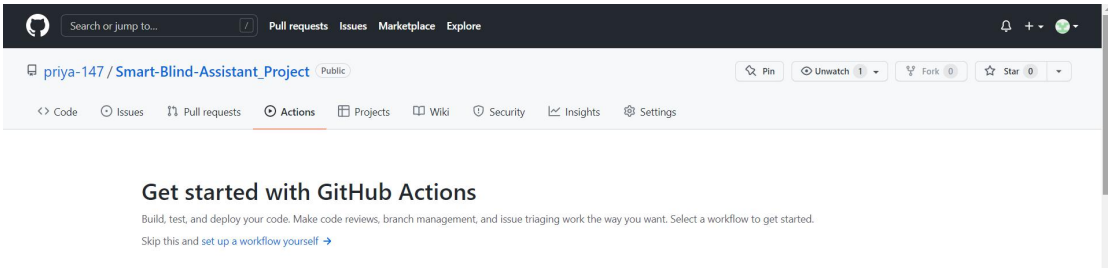
REPO-2:


github.com/new
A repository contains all project files, including the revision history. Already have a project repository elsewhere?
Import a repository.
Owner *
Repository name *
priya-147
smart-Blind-Assistant
Great repository names are short and memorable. Need inspiration? How about probable-dollop?
Description (optional)
Public
Anyone on the internet can see this repository. You choose who can commit.
Private
You choose who can see and commit to this repository.
Initialize this repository with:
Skip this step if you're importing an existing repository.
Add a README file
This is where you can write a long description for your project. Learn more.
Add .gitignore
Choose which files not to track from a list of templates. Learn more.
.gitignore template: C
Choose a license
A license tells others what they can and can't do with your code. Learn more.
This will set main as the default branch. Change the default name in your settings.
Create repository

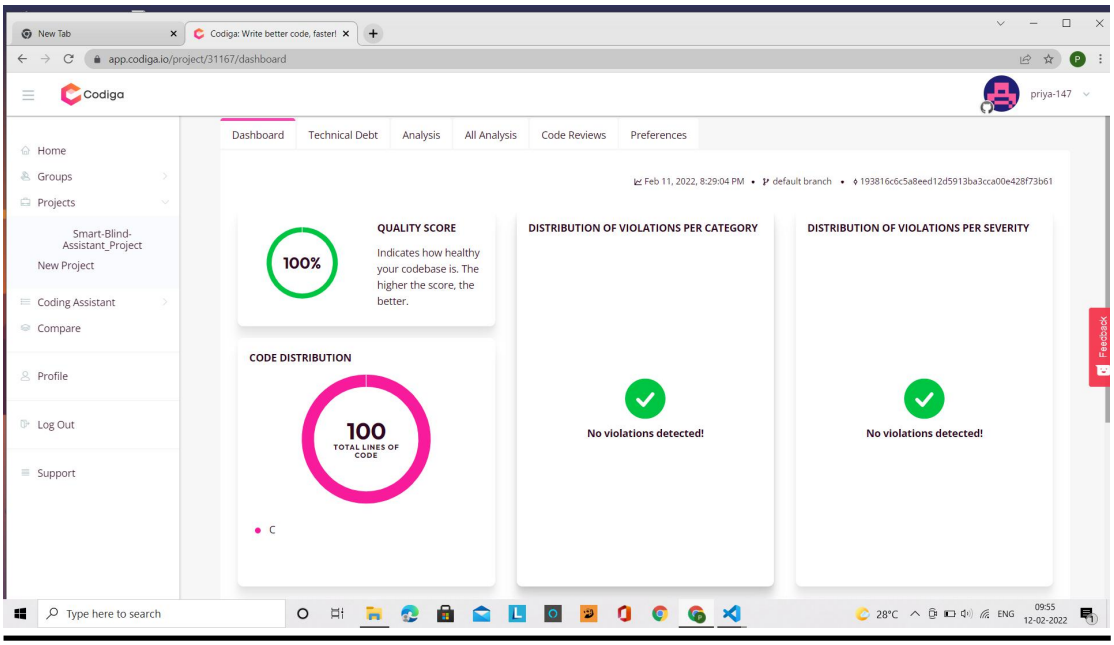
REPO-3:


M1_Smart BlindAssistant_Util
Repository to Teach C Programming as per Industry Standards
Milestone-1
Folder Structure
Idea
Requirements
Design
Test Plan

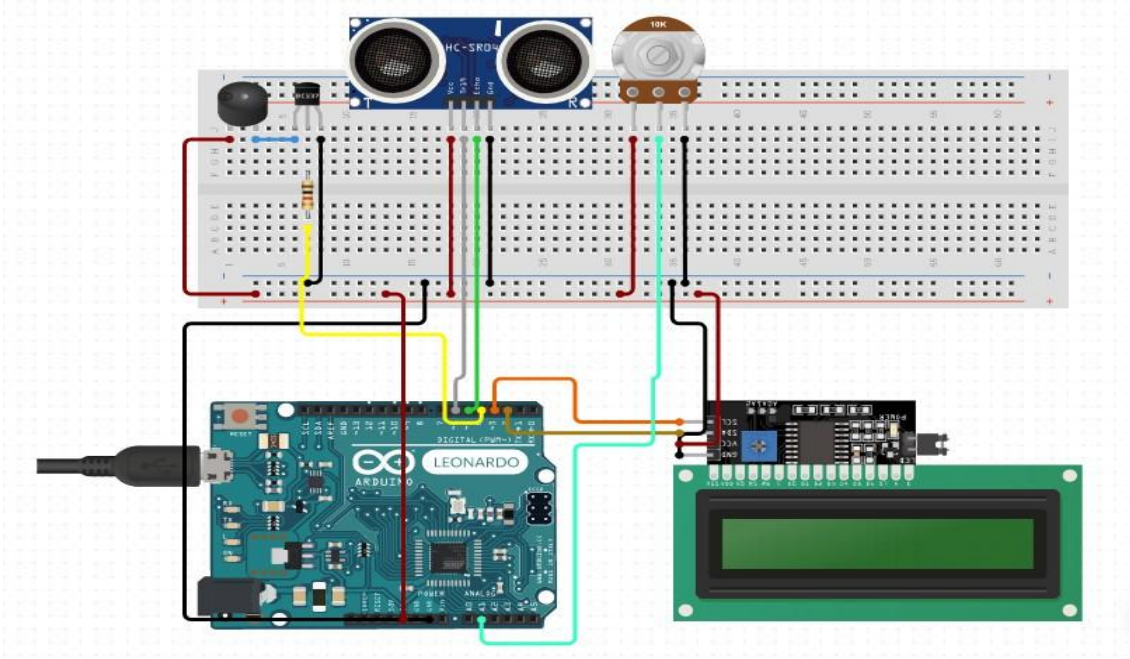
WORKFOLW_CREATE:



6.BADGES:



SAMPLE OUTPUT:



9.CONCLUSION:

My Project provides a new concept of smart electronic aid for blind people. The advantage of this project lies in the fact that it can prove to be very low cost solution to millions of blind people worldwide. The proposed combination of various working units makes a real-time system that monitors position of the user and provides feedback making navigation more safe and secure.

The Smart Aid acts as a basic platform for the coming generation of more aiding devices to help the visually impaired to be more safe. It is effective and afford. It leads to good results in detecting the obstacles lying ahead of the user in a range of four meters, detecting stairs and water pits. This system offers a low-cost, reliable, portable, low-power consumption and robust solution for navigation with obvious short response time. Though the system is hard-wired with sensors and other components, it's light in weight. Further aspects of this system can be improved via wireless connectivity between the system components, thus, increasing the range of the ultrasonic sensor and implementing a technology

for determining the speed of approaching obstacles. While developing such an empowering solution, visually impaired and blind people in all developing countries were on top of our priorities.

FUTURE SCOPE:

In Future, it must provide an efficient navigation aid for visually impaired people with the help of Arduino UNO board, ultrasonic sensor, a buzzer. This developed system can able to detect especially five obstacles such as pavement up, pavement down, pit, lamp post and trees. It uses buzzer system to aware the subject about the detected objects.

The Blind System hopes to allow visually impaired users to be aware about the objects in the front. The system hopes to provide a portable unit that can easily be carried and operated by a visually impaired user.