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VIRTUAL EYE FOR VISUALLY BLIND PEOPLE

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Abstract: visually impaired and Blind people find difficulties in detecting obstacles during walking in the street. This system is intended to provide artificial vision and object detection, real time assistance via GPS by making use of Raspberry Pi. This system consists of ultrasonic sensors module, module of gps, and the feedback is receive through audio, voice output works through TTS (text to speech). This system detects an object around them and sends feedback in the form of speech, alert messages via earphone and also provides navigation to specific location through gps. The purpose of the system is to provide a low cost and efficient navigation and obstacle detection for blind so that they can walk independently.

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I INTRODUCTION

The number of visually impaired people are expected to grow in the future due various reasons. As a result there is a need for a cost effective system that can be used blind people in order to walk easily and comfortably. This project proposes to design and develop a portable stick for blind people for usage and navigation in public places. In this smart system we use raspberry pi to control the sensors and camera. The purpose of this system would be to make blind people more independent.

Objective –

This purposed project is used to provide a tool which will help blind people to navigate as well as sense the obstacle. This project is used to identify the ways and means to make the lives of blind people much easier. Camera module is used to capture the images of specific objects. Ultrasonic sensor deals with the distance measurement between the obstacle and the blind person. Water sensor is used to detect the presence of water and provide an alert in time for path change so as to avoid Slipping. Also we use a RF module to get the location of stick. Light sensor is used for night. It alerts the people in the surrounding area that a blind person is walking and allow space so that, blind person can walk easily. Vibration motor is use for vibration purpose when object is detected its get on and blind people sense that vibration through his hand. Fire sensor used for fire detection.

II LITERATURE SURVEY

The microcontroller based smart stick is used for the blind people. But microcontroller run a single program at a time. Therefore instead of microcontroller we are using the Raspberry pi processor, which has the ability to run multiple program at a same instant. Our project is mainly focuses on the visually impaired people who cannot walk independently in unfamiliar environment. The main aim of our project is to make a system that helps the blind people to move independently.

III PAPER DETAILS

A Survey of Voice Aided Electronic Stick for Visually Impaired People. Author Name- Young Ho, Sung Jae Kang. - From this paper we got idea about latest technology like GPS & GSM. Which will help for tracking the location & used for making module of smart stick for visually blind people and it gives us idea about Voice messages get from Android Phone to that visually impared person.

Electronic Path Guidance for Visually Impaired People. Author Name-Iwan Ulrich and Johann Borenstein - From this paper we got idea about the how range which is required for detecting obstacle or object from location of smart stick specific range is there we need to set some value if obstacle comes into that particular range then it can detect successfully otherwise can't.

Smart Cane: Assistive Cane for Visually-impaired People. Author Name-AmirulATalib, MohdHelmy Wahab - We got idea from this paper for Voice message & Vibration when person detect obstacle with help of this smart system the blind person get aware to it by understanding Vibration alert & Voice message which comes from smart phone.

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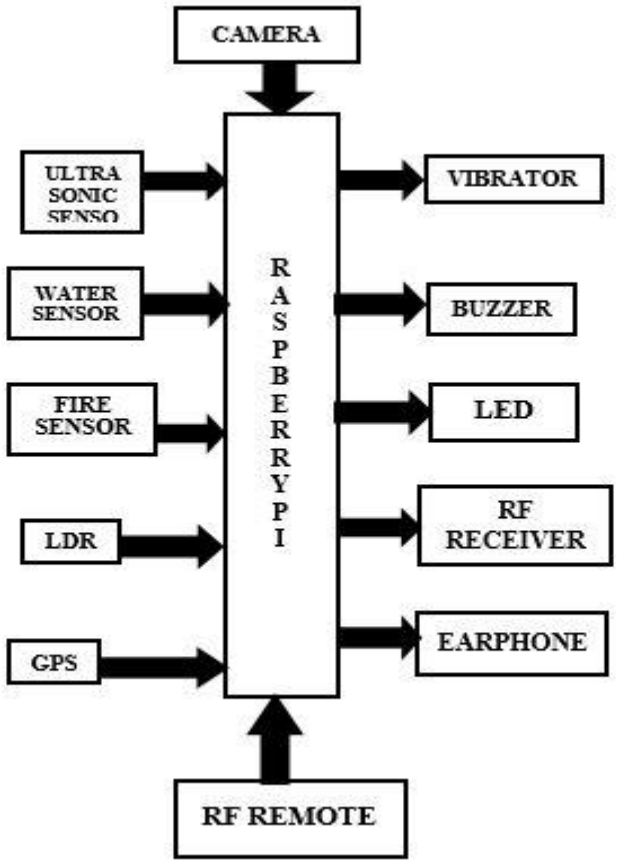
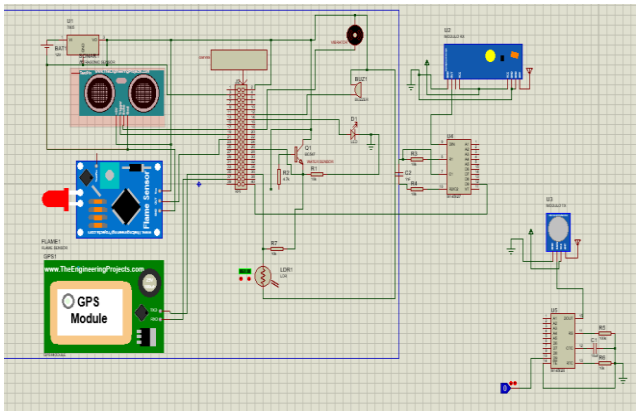
IV BLOCK DIAGRAM



V CIRCUIT DIAGRAM



Hardware Components:

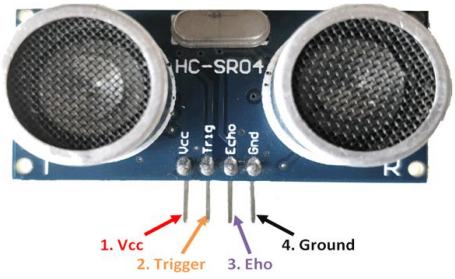
Hardware Requirements:

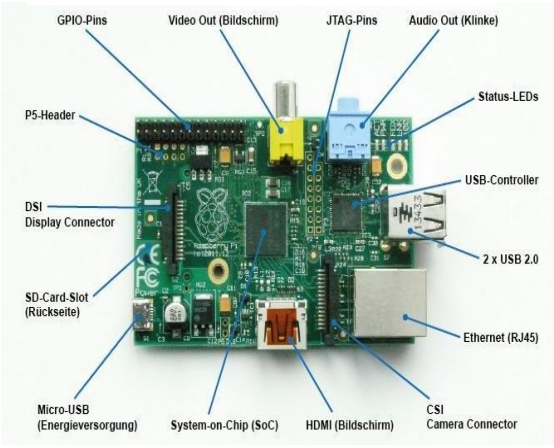
- Raspberry Pi
- Ultrasonic Sensor
- Raspberry pi camera
- Vibration Motor
- Fire Sensor
- LDR
- GPS
- RF Remote
- Buzzer
- LED
- Earphone

Raspberry Pi :

- It has 1GB RAM
- BCM43438 wireless LAN
- 40-pin extended GPIO pins
- 4 USB 2 ports
- Full size HDMI support

Ultrasonic Sensor :





- Operating voltage: +5V
- Theoretical Measuring Distance: 2cm to 450cm
- Practical Measuring Distance: 2cm to 80cm
- Accuracy: 3mm

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Water Sensor:

- 0utputs: 4-20 mA or 0.5 to 2.5 VDC
- Supply Voltage: 3.3 to 5 VDC
- Dimensions: 60 x 20mm, contacts 45mm
- when the **water** level is low then the digital output goes high and Adjustable sensitivity

Fire Sensor :

- Operating temperature : - 10°C to 60°C
- Humidity : 10% to 93%
- non-condensing Dimensions (HxWxD) : Surface: 87 x 87 x 52 mm
- Weight : 125 gram

Light Sensor :

1.Max power dissipation : 200mW
2.Max voltage @ 0 lux : 200V
3.Dark resistance after 1 sec : 0.03MΩ
4.Dark resistance after 5 sec : 0.25MΩ

Raspberry pi camera module:

- High-Definition video camera for Raspberry Pi Model A/B/B+ and Raspberry Pi
- Lens holder: M12x0.5 , CS mount or C mount
- 5MPixel sensor
- Integral IR filter
- Still picture resolution: 2592 x 1944
- Max video resolution: 1080p
- Maximum frame rate: 30fps
- It support FREX or STROBE feature
- Size: 36 x 36 mm

VI.WORKING

Camera module is used to capture the images of specific objects and compare that images with the stored images, and its feedback is received through earphone.

High frequency sound waves is generated by ultrasonic sensor. It evaluates the echo which is received back by the sensors. The time interval between sending the signal and receiving the echo is calculated by sensor to determine the distance to an object.

Ultrasonic is like an infrared where it will reflect on a surface in any shape, but ultrasonic has a better range detection compared to infrared. In robotic and automation industry, ultrasonic has been highly accepted because of its usage. In our Project the Ultrasonic sensor distance measurement. Module deals with the distance measurement between the obstacle and the blind person. This module starts the process when the user turns on the device using power supply. Firstly when the device turns on, the ultrasonic sensor will automatically gives the distance measurement of the obstacle infront of the blind, and then the distance measured is stored in the SD card. Obstacle Detection.

First the ultrasonic sensor gives voice command about the distance measurement between the obstacle and the blind person, based on that the navigation route instruction will be provided to blind by GPS Module via voice command. The navigation route is provided based on the latitude and longitude values. The latitude and longitude values will be stored so that when that value is matched the blind person gets the voice command to move left or right.

Voice Command Module deals with giving the instructions to the blind user about the obstacles via Earphone. After detecting the Obstacles it gives the instructions about the obstacle and based on that GPS Module Provides route to the blind. Water sensor is

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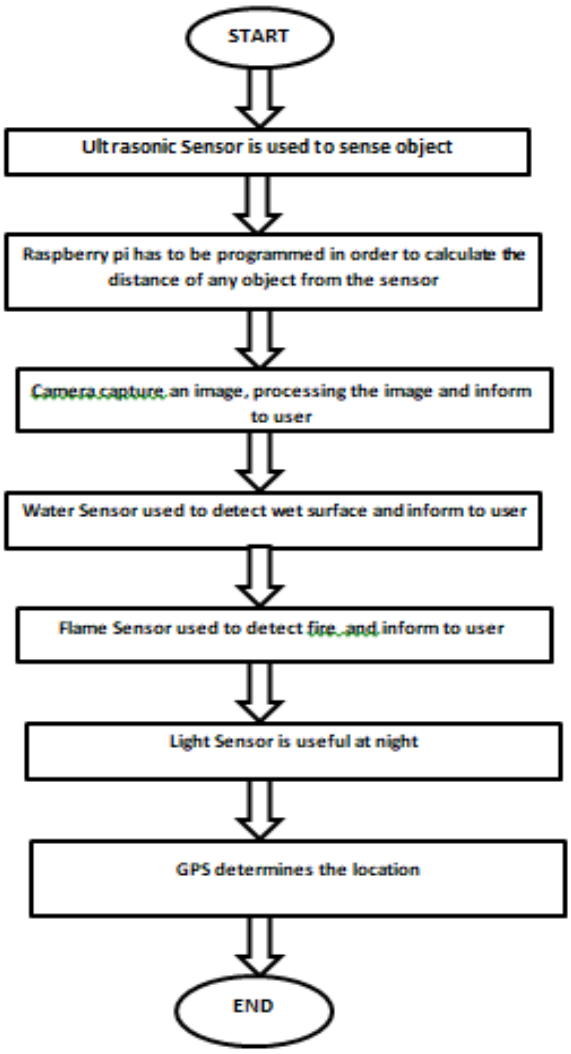
used to detect the presence of water and provide and alert in time for path change so as to avoid Slipping.

Also we use a RF module to get the loction of stick . This feature is done using radio frequency waves wherever there's a radio frequency receiver circuit on the stick and a separate radio frequency transmitter circuit that triggers an alarm on pressing a pushbutton. Light sensor is useful at night. It alerts the people in the surrounding area that a blind person is walking and allow space so that, blind person can walk easily. Fire sensor is used to detect fire.

Vibration motor is use for vibration purpose when object is detected its get on and blind people sense that vibration through his hand .

VII. Flowchart :



VIII.RESULT

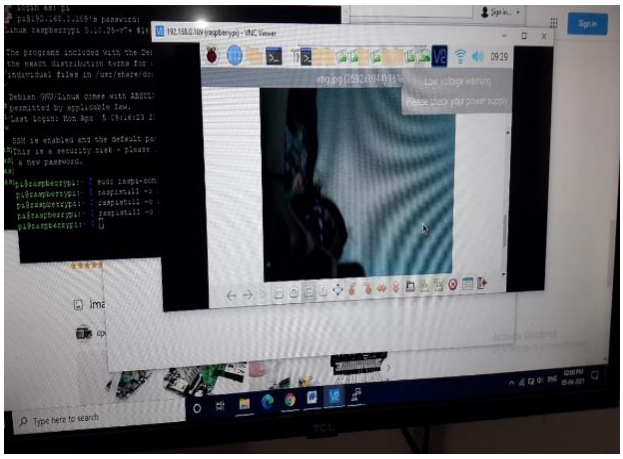


Fig : Camera capture an image

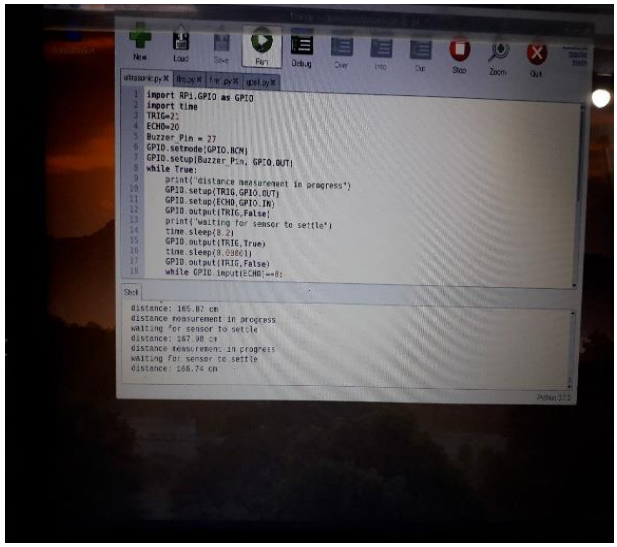


Fig : Output of Ultrasonic Sensor

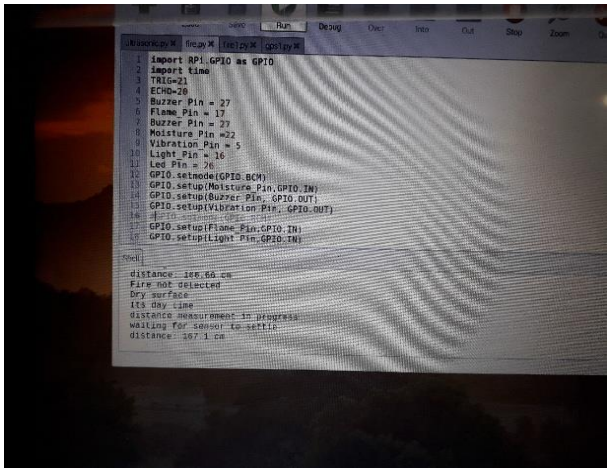


Fig : Output of Water Sensor, Flame Sensor and Light Sensor

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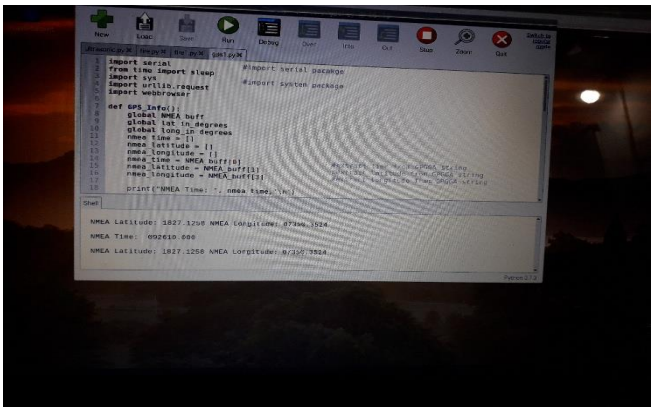

Fig : Output of GPS Module

IX.ADVANTAGES

1.Detect the obstacle based on ultrasonic sensor.

2.Easy to handle to virtually impaired or blind people.

3.This project is used to help visually impaird people to navigate with ease using advance technology.

4.People strive to live independently for blind people to help them gain personal independence.

5.This system is not bulky, one can make use of it easily.

6.It provides Anti-theft protection.

Warnings through voice and vibration .

X.APPLICATIONS

1.Useful for Visually Impaired People.

2.Help blind people to easy walking to destination, also obstacle detection and wet surface detection.

XI. CONCLUSION

This project will be cost effective which include many functions which are using camera, different sensors. Using this components we provide support for the blind society in guiding. like ultrasonic sensor helps for obstacle detection ,camera is helpful for capturing the images of objects also we provide a feature of fire detection etc. so basically this system act as a secure guard and helps the blind to be aware of their surroundings.

XII. FUTURE SCOPE

VLSI Technology: It can be further enhanced by VLSI technology to design the PCB unit. This makes the system future more compact. Also use of active RFID tags will transmits the location information automatically to the PCB unit, when the stick is in its range.

Robotics: Smart stick for blind People is used to provide the basis for improvement in robotics based systems for usage in various application this is carried out as a research project in Smart stick for blind man, results of this project will be vastly advantageous in future researches as well as industry related applications.

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