



# Raspberry Pi Based Smart Navigation System for Blind People

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**ABSTRACT:** This paper shows the improvement of a show route for incapacitate individual utilizing google application producer where we will build up our very own API for visually impaired and low vision users. Google application creator additionally, provides devices for designers who need to incorporated openness highlights with their apps. In this task we will utilize raspberry pi to which will make keen stick for cripple individual which will be installed with dampness and ultrasonic sensor to identify the continuous obstacles while strolling with the google maps cloud joined to the raspberry pi for ideal route for the low vision or handicap person. This will make a brilliant system which will be exceptionally valuable for debilitate individual and furthermore in the meantime increasingly exact and safe. The impair individual cooperate with the framework in voice. The cloud stage speak with the advanced mobile phone utilizing 4G Technology. The proposed framework can give more abundant encompassing data and progressively precise navigation, and check the practicability of the recently proposed framework.

**KEYWORDS:** raspberry pi 3, Google API, 4G technology.

## I. INTRODUCTION

Most secure route and definite route localization in new territories are a testing action for the visually impaired individuals. This paper proposes a cloud stage and vision-based route framework for the visually impaired. The principle objective of the framework isn't just to give a more secure route, yet in addition to influence the visually impaired individuals to see the world in however much detail as could be expected and live like each typical person. Raspberry Pi3 is associated with dampness sensor to distinguish the environmental condition. ultrasonic sensor is utilized to identify the impediments by passing ultrasonic waves, In this framework MCP3008 is utilized, so associated with 3.3v stick from raspberry to all sensors. Raspberry Pi gathers all the data and procedure them all the while, through this the ecological circumstance is plainly considered, if there should be an occurrence of crisis the implication is given to the client through voice. The whole procedure happens in division of seconds. The sensors and interfacing gadgets are dynamic all the time prepared to react, in light of the fact that a little time slack in handling may prompt mishap. Courses to the goals are furnished with the assistance of Google application interface (API), the propelled Google Maps and different applications gives more information to the client, for example, shorter course, traffic, swarm, and surmised travel time. These little subtitles makes more favorable position to outwardly tested individuals. The association among framework and client is made progressively less demanding, the questions can be given by client through voice direction, in this way the client can pass on his musings effectively.

## II. HARDWARE REQUIREMENTS

Raspberry Pi 3, Ultra-Sonic Sensor, Moisture Sensor, MCP3008 (ADC IC), SD card, Monitor are used in this system which is very helpful for determining the location for blind people to reach the destination in accurately. where raspberry pi 3 is programmed with the help of the google API Maps. Moisture and ultrasonic sensors are used to determine the climatic condition and measure the distance between the person and object.

### III. RASPBERRY PI 3

The Raspberry Pi 3 equipment has developed through a few forms that highlight varieties in memory limit and fringe gadget support. Raspberrypi square capacity v01. This square outline portrays Model B and B+; Model An, A+, and the Pi Zero are comparative, however do not have the Ethernet and USB center point parts. The Ethernet connector is connected with an extra USB port. In Model An, A+, and the Pi Zero, the USB port is associated straightforwardly to the framework on a chip (SoC). On the Pi Zero, the USB port is likewise associated straightforwardly to the SoC, yet it utilizes a smaller scale USB (OTG) port. The Raspberry Pi 3+ utilizes a Broadcom BCM2837B0 SoC with a 1.4 GHz 64-bit quad-center ARM Cortex-A53 processor, with 512 KB shared L2 cache. The Raspberry Pi 3, with a quad-center ARM Cortex-A53 processor, is depicted as having multiple times the execution of a Raspberry Pi 1. This was suggested [by whom?] to be exceedingly reliant upon assignment threading and guidance set use. [citation needed] Benchmarks demonstrated the Raspberry Pi 3 to be roughly 80% quicker than the Raspberry Pi 2 in parallelised tasks. Most Raspberry Pi frameworks on-chip could be overclocked to 800 MHz, and some to 1000 MHz. There are reports the Raspberry Pi 2 can be likewise overclocked, in outrageous cases, even to 1500 MHz (disposing of all security highlights and over-voltage restrictions). In the Raspbian Linux distro the overclocking choices on boot should be possible by a product direction running "sudo raspi-config" without voiding the warranty. [30] In those cases the Pi consequently closes the overclocking down if the chip temperature comes to 85 °C (185 °F), however it is conceivable to abrogate programmed over-voltage and overclocking settings (voiding the guarantee); a fittingly measured warmth sink is expected to shield the chip from genuine overheating. Fresher adaptations of the firmware contain the choice to pick between five overclock ("turbo") presets that when utilized, endeavor to expand the execution of the SoC without disabling the lifetime of the load up. This is finished by checking the center temperature of the chip and the CPU load, and powerfully changing clock speeds and the center voltage.

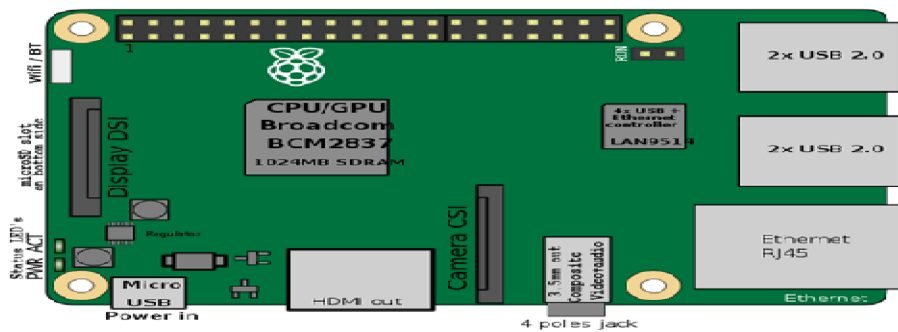


Fig1:Raspberry pi 3

At the point when the interest is low on the CPU or it is running too hot the execution is throttled, yet in the event that the CPU has a lot to do and the chip's temperature is worthy, execution is briefly expanded with clock paces of up to 1 GHz, contingent upon the load up form and on which of the turbo settings is utilize. The Raspberry Pi Foundation gives Raspbian, a Debian-based Linux appropriation for download, just as outsider Ubuntu, Windows 10 IoT Core, RISC OS, and specific media focus distributions. It advances Python and Scratch as the fundamental programming dialects, with help for some other languages. The default firmware is shut source, while an informal open source is available. Many other working frameworks can likewise keep running on the Raspberry Pi, including the formally checked microkernel, seL4. Other outsider working frameworks accessible by means of the official site incorporate Ubuntu MATE, Windows 10 IoT Core, RISC OS and particular conveyances for the Kodi media focus and classroom the board.



V. MCP 3008

The MCP3008 is a minimal effort 8-channel 10-bit simple to computerized converter. The exactness of this ADC is like that of an Arduino Uno, and with 8 channels you can peruse many simple signs from the Pi. This chip is an incredible choice on the off chance that you simply need to peruse basic simple signs, as from a temperature or light sensor. To use hardware SPI first make sure you've enabled SPI using the raspi-config tool. Be sure to answer yes to both enabling the SPI interface and loading the SPI kernel module, then reboot the Pi. `values[i] = mcp.read_adc(i)`. This line is calling the `read_adc()` work from the MCP3008 Python library. The capacity takes one parameter, the channel number to peruse (an estimation of 0 to 7). Therefore the capacity will restore the current ADC estimation of that channel.

VI. ULTRASONIC SENSOR

ultrasonic sensors measure separate by utilizing ultrasonic waves. The sensor head passes ultrasonic wave and gets the wave reflected once again from the objective. Ultrasonic Sensors measure the separation to the objective by estimating the time between the discharge and gathering.



Fig2:Distance measurement

An optical sensor has a transmitter and beneficiary, while a ultrasonic sensor utilizes a solitary ultrasonic component for both emanation and gathering. In an intelligent model ultrasonic sensor, a solitary oscillator discharges and gets ultrasonic waves on the other hand. This empowers scaling down of the sensor head. The distance can be calculated by  $L = 1/2 \times T \times C$ , Where L is distance, T is the time between transmission and reception and the value is multiplied by half.

VII. block diagram

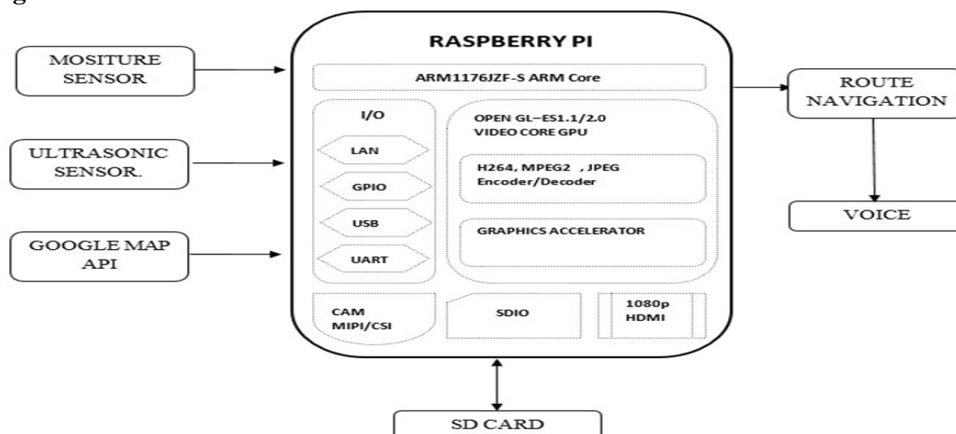


Fig3:process block diagram

In this system,raspberry pi process the data from the sensors such as moisture sensor ultrasonic sensor.The moisture sensor is used to determine the climatic conditions of the atmosphere and these data are send to the raspberry pi .the ultrasonic is used to measure the distance between the person and object by passing ultrasonic waves ,and these data from the sensors are processed and the help the blind people to know the climate and any other objects infront of them by the mp3 file or audio with the earphones.where the google API maps is connected with raspberry pi which helps the

blind people for route navigation by voice command through the earphones .they can interact with the system this provides easier by the 4G technology.where web camera is connected with the raspberry pi and it detects whether a person moving nearer to the blind person instructing through the earphones.the web camera taking images of the person for the future reference.these images are stored in raspberry pi.

## VII. RESULT AND DISCUSSION

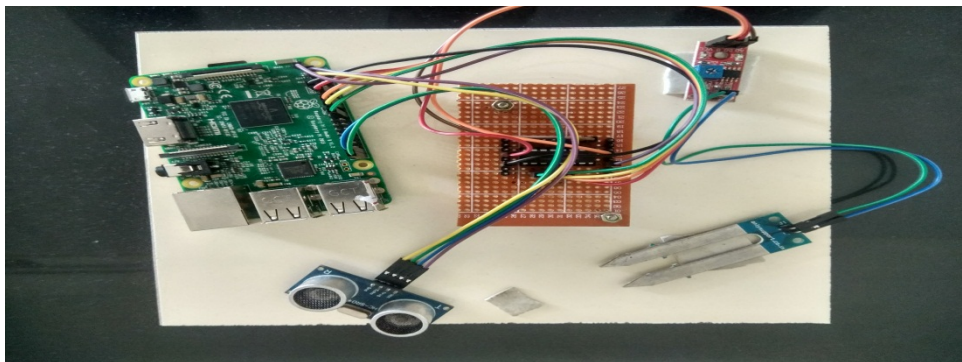


Fig4:prototype

In this system,smart navigation is achieved by ultrasonic sensor are used to determine the object infront of them and raspberry pi was programmed,the blind people can be easily communicate with the system through earphones.

## VIII. CONCLUSION

As per this framework, the visually impaired individuals connect with the framework in voice. The cloud stage speaks with the cell phone through Wi-Fi or 4G versatile correspondence innovation. For testing the framework execution, two gatherings of tests have been directed. One is discernment and the other is route. Test outcomes demonstrate that the proposed framework can give increasingly copious encompassing data and progressively precise route, and check the practicability

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