Implementation of SMART BLIND STICK with location tracker and voice acknowledge using Raspberry Pi

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Abstract : The Proposed project is smart blind sticks to provide safety for blind person by providing them the assistance while walking on the street or in area with traffic. They can navigate though streets by following the voice generated by system using Google maps. Google assistant will be used to get the input of person where they will speak about the destination they need to reach. With the help of this project they could reach anywhere without requiring any external help. This project has leveraged many Google's services and there state of the art technologies like Google assistance, Google maps, Google text to speech and other IOT devices like raspberry pi, GPS module, etc.

IndexTerms **- IoT (Internet of Things), Raspberry Pi, Blind Stick, GPS, Google Services**

I. INTRODUCTION

Vision is one of the most consequential senses of most of the information humans gets from the environment is via visual perception. The number of people visually impaired from infectious diseases has reduced in the last 20 years according to ecumenical estimates work. 80% of the visual impairments can be obviated or remedied. The rudimentary quandary which every blind person faces is with regard to commutation and navigation in daily life. The most rudimental implements for them are ambulating cane and guide canines and additionally on munificence of fellow commuters. The most commonly used implement is still the blind stick .It suffers from drawbacks like lots of practice, range of kineticism, less reliability in terms of dynamic hurdles and withal range detection. We will endeavor to modify this cane with electronic components and sensors. The ever growing technology and with recent developments can avail in artificial and precise navigation.

According to a report by World Health Organization (WHO) and International Agency for Aversion of Visual impairment (IAPB)

[1] proximately 285 million persons around the world are visually impaired. The purport of this blind stick would be to make blind people more independent [2]. In fact, it will give positive dimensions to their life. The traditional obstruction detection methods are obsolete and need considerable modifications. The purport of this blind stick would be to make blind people more independent [2]. In fact, it will give positive dimensions to their life. The traditional obstruction detection methods are obsolete and need considerable modifications.

The purport of this project is to dispense those exculpations caused by lack of faculty to take consummate control of kineticism for visually incapacitated people through a crowded place along with brobdingnagian types of obstacles which is the well-kenned characteristics of diligent city life. Every day during competing in the ecumenical race to reach absolute perfectness, lifestyle of people plenarily depends upon technology. Our society still contains about 285 million visually impaired, 39 million blind and 246 poor vision infested people as corroboration of WHO [1].

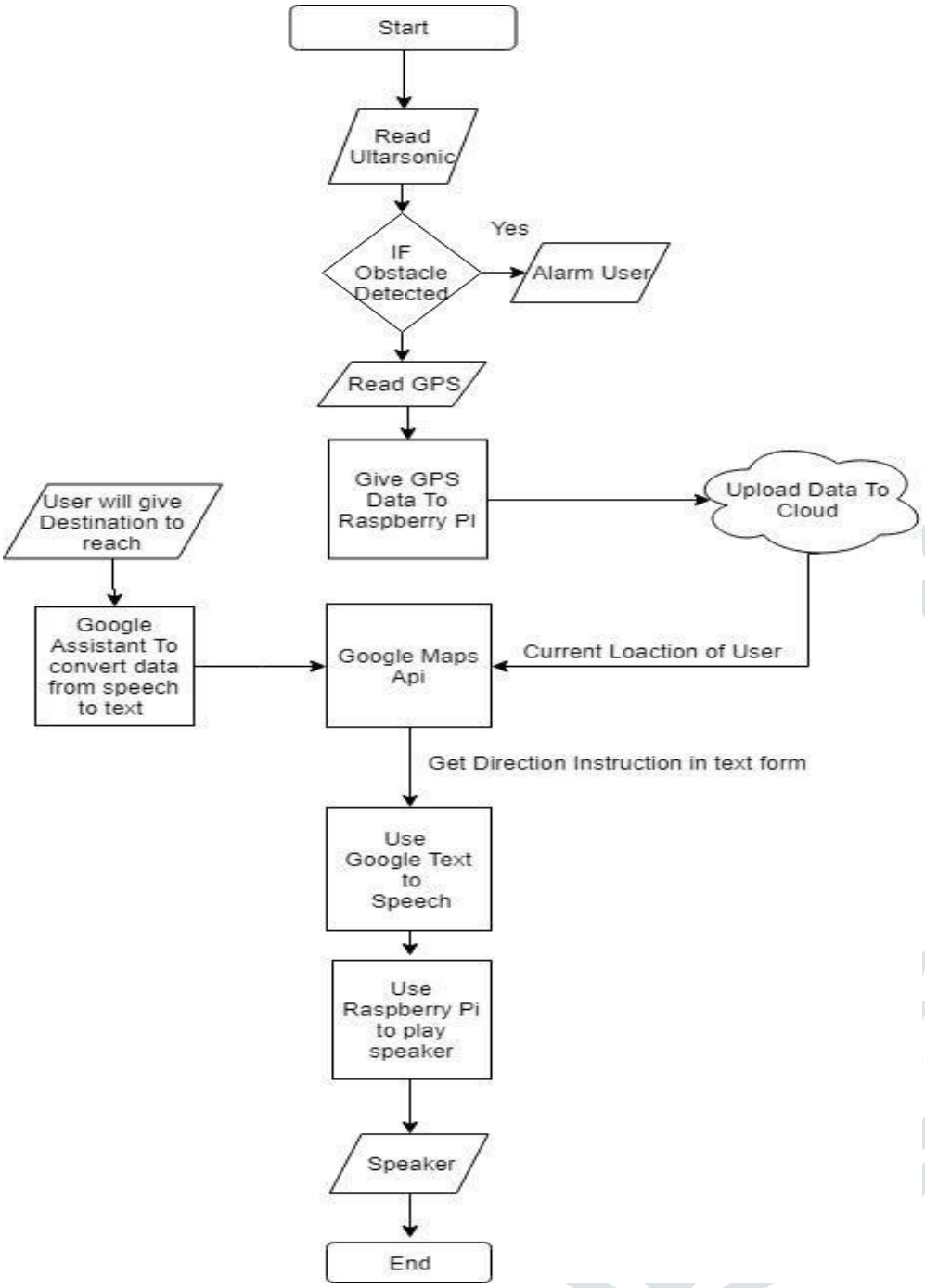
Visually Impaired persons need a capable contrivance so that they can kinetically circumnavigate independently. Today we can optically discern, there are so many techniques, and contrivances have been developed, which avail these persons to move liberatingly even in dynamic environment. The perpetual increase in some blind people brings the development of more reliable assistive contrivances across the world.

II. LITERATURE REVIEW

It has been found that Blind Stick was developed by utilizing sundry different technologies. However the aforetime designed system is to provide an assistant system to plenarily or partially blind people to navigate from one place to other utilizing authentic-time video streaming technology and conventional sensor predicated technology. For further research, we can utilize hard-core image processing and Artificial Astuteness in the system to detect obstacles and decide the best path on its own. [3]. the other system was developed utilizing ultrasonic range detector and Two IR sensors.

III. DESIGN AND IMPLEMENTATION

The core component of proposed system is Raspberry Pi module which can be utilized as motherboard in this system. Ultrasonic sensors can be habituated to quantify the distance between obstacles and the human being. Google accommodations are integrated for the assistant to the visually impaired person.GPS module is withal used to provide the location to the person and location is alimented to the system by verbalization to text conversion. Additionally the system provides the assistant to the person by voice so that visually impaired person can withal track the exact location by this system. The flow chart for the proposed system and description of sundry components are expounded as below.



Flow Chart of the Proposed System

The ultrasonic sensor measures the distance of the most proximate object, sending the result to the serial port. It can work from 2 cm to 3 m. It measures the time spent by the signal to reach the object and return to the sensor.

An electronic obstruction detection system for guiding and admonishing a motorist of obstacles in the detection area while backing-up. The main components of the system include a dyad of sensor clusters to be affixed to the rear of the stick, a dyad of exterior visual designators, and an audio-visual designator located in the stick. Each of the sensor clusters are encased in a housing having angled, stepped portions configured to provide consummate area coverage of transmitted and received signals.

GPS makes utilization of signals sent by satellites in space and ground stations on Earth to accurately determine their position on Earth. Radio Frequency signals sent from satellites and ground stations are received by the GPS. GPS makes utilization of these signals to determine its exact position. The GPS itself does not require to transmit any information. So give this GPS data to raspberry pi. Then pi is automatically uploading data to cloud.

Google Cloud Verbalization-to-Text enables developers to convert audio to text by applying puissant neural network models in a facile-to-use API. The API apperceives 120 languages and variants to fortify your ecumenical utilizer base. You can enable voice

command-and-control; transcribe audio from call centers, and more. It can process authentic-time streaming or prerecorded audio, utilizing Google's machine learning technology.

Google Cloud Text-to-Verbalization enables developers to synthesize natural-sounding verbalization with 30 voices, available in multiple languages and variants. It applies DeepMind's groundbreaking research in WaveNet and Google's puissant neural networks to distribute high fidelity audio. With this facile-to-use API, you can engender lifelike interactions with your users, across many applications and contrivances. Then use raspberry pi for information and this information get from the verbalizer to the utilizer. Descriptions of sundry components utilized in this system are explicated as below.

Raspberry Pi

The Raspberry Pi is a series of minuscule single-board computers developed in the Cumulated Kingdom by the Raspberry Pi Substructure to promote edification of fundamental computer science in schools and in developing countries. The pristine model became far more popular than anticipated, selling outside its target market for uses such as robotics. It does not include peripherals (such as keyboards and mice) and cases. However, some adjuncts have been included in several official and unofficial bundles.

Raspberry Pi

The organization abaft the Raspberry Pi consists of two arms. The first two models were developed by the Raspberry Pi Substratum. After the Pi Model B was relinquished, the Substratum set up Raspberry Pi Trading, with Eben Upton as CEO, to develop the third model, the B+. Raspberry Pi Trading is responsible for developing the technology while the Substructure is a scholastic charity to promote the edification of fundamental computer science in schools and in developing countries.

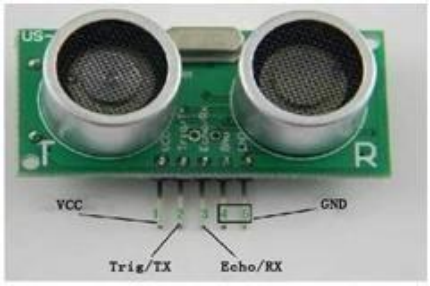
Memory card

Memory Card

A recollection card is an electronic flash recollection data storage contrivance utilized for storing digital information. These are commonly utilized in portable electronic contrivances, such as digital cameras, mobile phones, laptop computers, tablets, PDAs, portable media players, video game consoles, synthesizers, electronic keyboards, and digital pianos.

Ultrasonic sensors

Ultrasonic sensors (additionally kenned as transceivers when they both send and receive, but more generally called transducers) work on a principle homogeneous to radar or sonar which evaluates attributes of a target by interpreting the echoes from radio or sound waves respectively. Ultrasonic sensors engender high frequency sound waves and evaluate the echo which is received back by the sensor. Sensors calculate the time interval between sending the signal and receiving the echo to determine the distance to an object. This technology can be utilized for quantifying wind speed and direction (anemometer), tank or channel level and speed through air or dihydrogen monoxide. For quantifying speed or direction a contrivance uses multiple detectors and calculates the haste from the relative distances to particulates in the air or dihydrogen monoxide.



Ultrasonic Sensor

It can be applicable to develop humidifiers, sonar, medical ultra sonography, burglar alarms and non-destructive testing.

GPS Module

GPS module

GPS stands for Ecumenical Situating System and used to detect the Latitude and Longitude of any location on the Earth, with exact UTC time (Macrocosmic Time Coordinated). This sentence commences from $GPGGA and contains the coordinates, time and other utilizable information. This GPGGA is referred to Ecumenical Situating System Fine-tune Data.

GOOGLE MAPS

Google MAP

Google Maps is a web mapping accommodation developed by Google. or public conveyance.

IV Results and Discussion:

Advantages:

This proposed system is easy to guide. It is also voice operated thus no need to type anything which reduces the hardware and size of product making it more cost effective. The system is also compact in size. There is minimum learning curve for user, thus non tech people or layman also could use it with ease. Data resides in cloud thus mobility for user.

Result:

This project will leverage all state of the art technologies and integrated them to work seamlessly with data flowing from one module to another and from one API to another with great speed and high security. This project will enable especially able person to move freely without any external assistant which will empower then like never before. This project is designed in such a way that user need to give input only once in form of voice and rest all things will be handled by our system and giving them output in form of voice which they can hear from headphones or speaker.

V. ACKNOWLEDGMENT

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