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Voice Assisted Blind Stick using Ultrasonic Sensor

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Abstract -*Blind people* *need some aid to feel safe while moving.* ***Smart stick*** *comes as a proposed solution to improve the mobility of both blind and visually impaired people. Stick solution use different technologies like* ***ultrasonic****,* ***infrared*** *and* ***laser.*** *The software concept together of the structure of the respective application has been presented in detail.*

This is application is for assisting blind and partially sighted people for ***smartphone use****. It is equipped with a lot of predefined voice commands many activities can be performed including making calls, sending and receiving text messages, using the "phone book" with ease, determining the user's position, obtaining information about present time, and controlling the battery level. Full assistance for forgotten commands and charging connect or disconnect will be provided for blind peoples in this App. The Blind Stick of the blind user will also be included in the system. The blind stick will be equipped with sensors and will detect the obstacle in the user's path. It will calculate the distance of obstacle from user and convert it into footsteps. The user will be given a* ***voice message*** *that the obstacle is certain footstep ahead.*

1. INTRODUCTION

The visually impaired are at a considerable disadvantage because they often lack the information for avoiding obstacles and hazards in their path. They have very little information on self- velocity, objects, direction which is essential for travel.

The system designed will **detect** an object or **obstacle** using ultrasonic sensors and gives audio instructions for guidance. An obstacle as close to minimum distance can be detected by this module. A resolution of obstacle distance has been designed and achieved. It is very important to maintain efficient information while traveling to the blind people. This system has been aimed at design and development of a smart and intelligent blind stick which helps in **navigation** for the visually impaired people. The navigator system designed will detect an object or obstacle using ultrasonic sensors and gives audio instructions for guidance. The signals from the ultrasound sensor are processed by a **microcontroller** in order to identify sudden changes in the ground gradient and/or an obstacle in front. The algorithm developed gives a suitable audio instruction depending on the duration of ultrasound travel. We developed this system to detect the obstacle while travelling and give voice notification to visually impaired people. Making calls, sending and receiving text messages, using the "phone book" with ease.

2. Literature survey

The main aim of this system is to permit blind persons to explore autonomously in the outside environment. Ordinary route navigational systems in the outdoor environment are expensive and its manufacturing is time consuming. Blind people are at extensive drawback as they regularly do not have the data which is required, while passing obstacles and dangers. They generally have little information about data such as land marks, heading and self velocity information that is crucial for them to explore them through new environment.[1]

This system presents a concept to provide a smart electronic aid for blind people. The system is intended to provide overall measures artificial vision and object detection, real time assistance via global positioning system (GPS). 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 around them.[2]

In this paper, a solution is proposed to move safely and detect obstacle in their path. Solution was composed of a foldable stick with a pair of IR sensor mounted on it. Connected to an earphone to alert the blind with speech warning message about the detected obstacle.[3]

3. Designed and Proposed work

The main objective is to provide a talkative assistance to blind people. We are going to develop a intelligent system that works efficiently good in outdoor. Current navigation device for the visually impaired focuses on traveling from one location to another, this system focuses on designing a device for visually impaired people that help them to travel independently which is comfortable to use. This device is used to help blind people to move with the same ease and confidence as a sighted people. The device is linked with a GPS to identify the location of the blind person. Moreover, it provides the voice alert to avoid obstacles based on ultrasonic sensors. An emergency button is also added to the system. The whole device is designed to be small and is used in conjunction with the stick.

Blindness or visual impairment is a condition that affects many people around the world. This condition leads to the loss of the valuable sense of vision. The need for assistive devices was and will be continuous. There is a wide range of navigation systems and tools existing for visually impaired individuals the blind person truly requirements and identifying objects.

4. Technology Used

Android Studio:

Android Studio is the official integrated development environment (IDE) for Google's Android operating system, built on Jet Brains' IntelliJ IDEA software and designed specifically for Android development. It is available for download on Windows, mac OS and Linux based operating systems. Android is an open source and Linux-based operating system for mobile devices such as smartphones and tablet computers. Android was developed by the Open Handset Alliance, led by Google, and other companies. This tutorial will teach you basic Android programming and will also take you through some advance concepts related to Android application development.

Ultrasonic Sensor:

Ultrasonic sensors are basically used to measure the distances between the obstacle / object and the sensor. The ultrasonic sensor works on Doppler Effect. It consists of a ultrasonic transmitter and a receiver. The transmitter transmits the signal in one direction. This transmitted signal is then reflected back by the obstacle and received by the receiver. So the total time taken by the signal to get transmitted and to received back will be used to calculate the distance between the ultrasonic sensor and the obstacle.

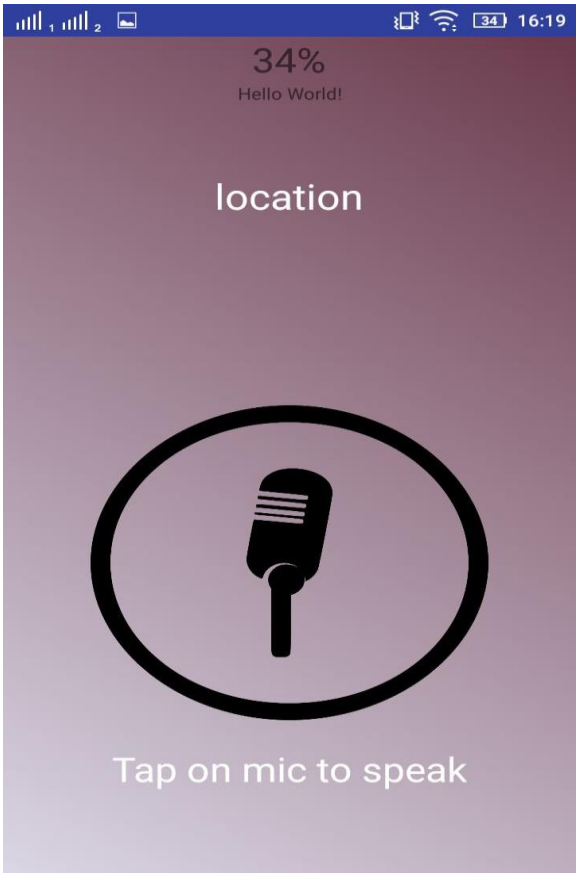
5. Future scope

One of the Future scope of this project is to improve the capabilities by the system by incorporating landmark as saved destination .We would also like developed an algorithm for position and velocity so that other methods of navigation such as dead reckoning can be implemented accurately. And to use the online route , for obtaining the route from the Google maps , so that the blind person can travel to the places which are not stored in the database. This is implemented on the cane to provide a safer feeling to the blind .The project can be improvised by the use of wireless LAN connections which supports the use of GPS. This helps the user to navigate more accurately and effectively as a GPS module can actuate the position using GPS co-ordinates.

6. CONCLUSIONS

The Smart Stick 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.

7. Result



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