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Smart Blind Stick using IoT

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Abstract: A smart blind stick is a device that uses advanced technology to assist visually impaired individuals in navigating their surroundings. In normal blind stick the distance between the obstacle and the person is not get recognized accurately also the object Infront of them did not get recognized. They always get problem while moving from here to there or we can say that the actually problem is faced during the crowded area. So to solve this problem we have used the some sensors to solve this problems also some sensor is used to detect the water present over the ground and the output will be generated in the form of audio/voice. This system is very useful for those who are blind or get accidentally blind and are often need help from others.

Keywords: Blind stick, Smart cane, Assistive technology, Navigation aid, Mobility aid, Ultrasonic sensors, Infrared sensors, Object detection, Haptic feedback, Bluetooth connectivity voice. This system is very useful for those who are blind or get accidentally blind and are often need help from others

I. INTRODUCTION

Visually impaired persons find it difficult to interact and feel the environment freely. They do have little contact with the surrounding but not all the visually impaired persons have same sensing power. Physical movement is the biggest challenge for them as they don't know what is appearing next in front of them. Which is affecting their activity like interacting with people and social activities.

Smart blind stick is specially designed to detect obstacle which will help the visually impaired persons to move freely with normal people. The audio output will result in less accident cases. This system will not disturb the public space as this system have a Bluetooth connection . so, it will only inform the user without making any kind of sound pollution or disturbing the environment. The proposed system consist of ultrasonic sensor which will measure the obstacle. When any International obstacle come in range of an ultrasonic sensor then through Bluetooth the obstacle which is in front of the stick will get notify the distance to the user. The smart blind stick is a simple and purely mechanical device to detect the obstacles on the ground. This device is light in weight and portable. The camera will help to identify the object which is in front of the stick and inform the user . Water present over the ground will be get detected using water sensor and it will notify the user via Bluetooth connection. To run the system we have a power bank which is the source of power supply.

II. SYSTEM CONFUGURATION

The smart blind stick system configuration using Raspberry pi 3b model have some of the components and technology used are:

- Raspberry Pi 3B Model: This is the core of the device and serves as the main processor. It comes with a quad-core ARM Cortex-A53 processor, 1GB RAM, Wi-Fi, and Bluetooth connectivity, making it powerful and versatile enough to handle a wide range of applications.
- Sensors: Smart blind sticks use various sensors to detect obstacles and provide feedback to the user. Some of the sensors used in the configuration of a smart blind stick include:
- Ultrasonic Sensor: These sensors use sound waves to detect objects in the user's path. It detects the object present over 100cm of the distance. Whenever it detect the object the signal is passed to the microcontroller

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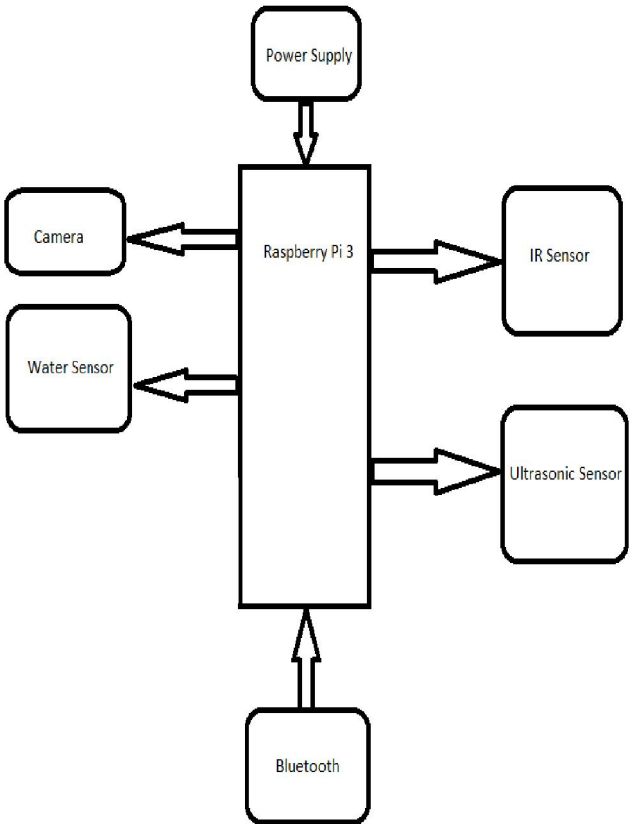
for processing after processing the signal is converted in the form of audio. Which is converted using the python library i.e. textto speech convertor library. And usingBluetooth user get notify about the obstacles.

- Water sensor is used to detect the water present over the ground. Infrared sensors use infrared light to detect objects in the user's path. Camera is used for identifying the object which is infront of the stick.
- Speaker or Headphones: The device uses a speaker or headphones to provide audio feedback to the user.
- Pi Camera: It will help to detect the object which come in front of the user as well as those objects who comes within the angle of camera.
- Power Supply: The device is powered by a battery or external power supply.
- Software: The software used in the configuration of a smart blind stick includes the operating system that is Raspbian. And the programming is done in python language.

III. CONTROL APPROACH

Block Diagram



Pin numbers

Water Sensor:
Signal: 14
Ultrasonic Sensor:
Trigger: 11
Echo: 2
IR Sensor:
Echo: 3

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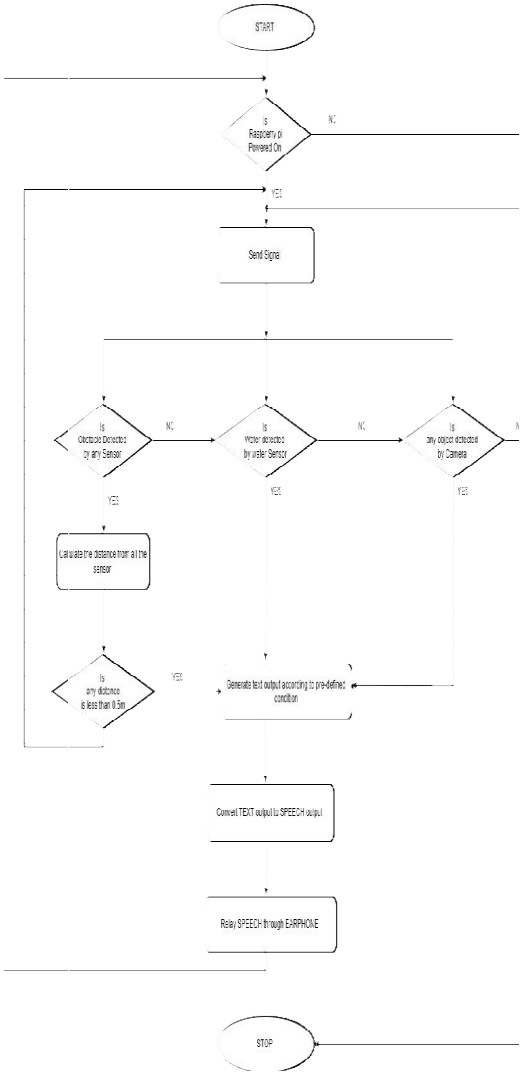
IV. FLOW CHART



V. RESULT

A smart blind stick using Raspberry Pi 3B model is to provide people with visual impairments greater independence and mobility by enabling them to navigate their surroundings more safely and confidently. Here are some specific results that is achieved with a smart blind stick:

- Enhanced Safety: By using sensors to detect obstacles a smart blind stick can help to prevent accidents and improve the safety of the user.
- Increased Independence: A smart blind stick allows users to navigate their surroundings more independently, reducing their reliance on others for assistance.
- Improved Mobility: With a smart blind stick, users can move around more freely and explore new environments with greater confidence.
- Real-time Feedback: The audio feedback provided by the device helps users to navigate their surroundings in real-time, allowing them to make quick decisions and avoid potential hazards.

Overall, the result of a smart blind stick is to improve the quality of life for people with visual impairments by providing them with a tool that enhances their safety, independence, and mobility. With the help of advanced technologies we can help the visually impaired persons and make them feel just like a normal person.

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VI. CONCLUSION

In conclusion, a smart blind stick using IoT technology can greatly improve the safety and independence of visually impaired individuals. The integration of sensors such as ultrasonic and infrared, coupled with machine learning algorithms, allows the blind stick to detect obstacles and provide haptic feedback to the user, aiding navigation in unfamiliar environments. Overall, a smart blind stick using IoT technology has the potential to significantly improve the quality of life for visually impaired individuals.

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