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2. Title of the project: *"VISUAL ASSISTANT FOR BLIND PEOPLE USING RASPBERRY PI"*

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6. Introduction

Vision is most important part of human Physiology as 83% of human gets information from the environment via sight. The 2011statistics by the World Health Organization (WHO) estimates that there are 285 billion people in the world are visually impaired; 39 billion people in that are blind and 246 billion with low vision. The Oldest and Traditional mobility aids for visually impaired people are walking stick and guide dogs. The guide dogs are assistance dogs, and they are trained to lead visually impaired around obstacles. The main Drawback of this aids are necessary skills, training phase, range of motion and very little information conveyed. Also, this White cane has several restrictions such as long length if cane, limitations in recognizing obstacle and difficulty to keep in public places.

The Advance modern technologies are introduced for the visually impaired people for navigation includes both hardware and software. Recently there has been lots of Electronic Travel aids(ETA) designed and devised to help visually impaired people navigate independently and safely. Also recently, high end technological solutions have been introduced to help blind people navigate independently. The Blind people use the Global Positioning System (GPS) technology for outdoor navigation to identify position and orientation and location due to need for the line-of-sight access to satellite, they still need additional components to improve on the resolution and proximity detection to prevent collision of the blind persons with other objects and hence person life in danger. However, in comparison to other technologies many blind guidance systems uses an array of ultrasonic sensors which is basically works on the principle of the ultrasonic sound generation and alert mechanism.

7. Objectives

❖ Identify the objects captured by the camera on the person's wearable cap. 2.

❖ Process the voice input given by the user using Alexa Voice Service and respond to the user's requirements.

❖ Convert the identified object's text description to voice and narrate the description to the user using ear phone.

❖ Identify the text in the image and narrate to user.

❖ Interface a panic button to provide emergency alerts with live location to be displayed on Google map.
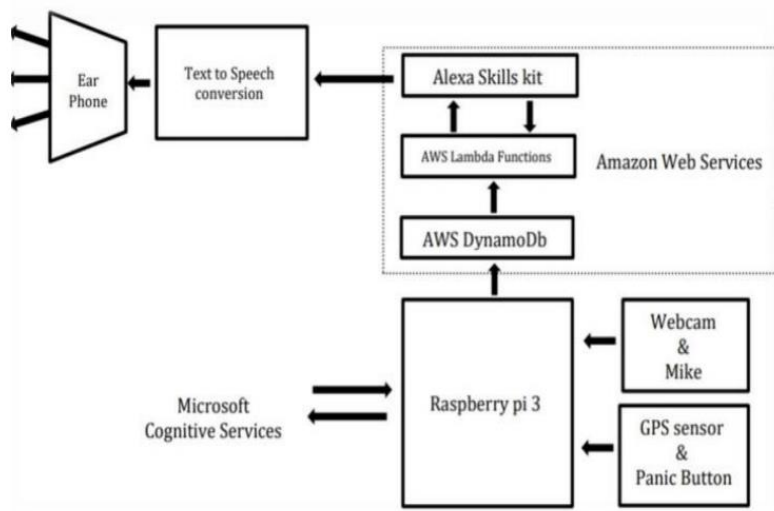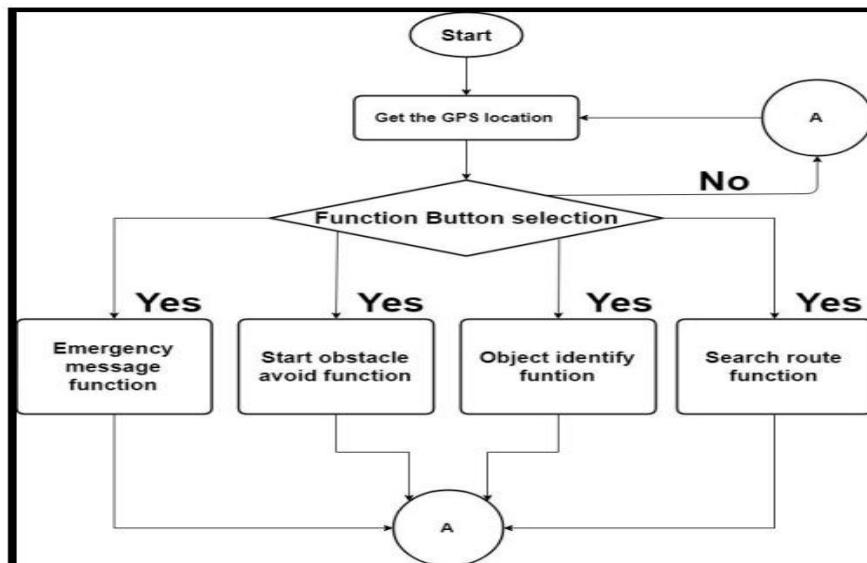
8. Methodology

Fig 1 Block Diagram

Fig 2 Flow Chart

MATERIALS USED

- ➢ Raspberry-pi 4
- ➢ GPS Module
- ➢ GSM Modem
- ➢ Ultrasonic Sensor
- ➢ Raspberry Pi Camera
- ➢ USB to UART bridge

Raspberry-pi 4

The Raspberry Pi 4 Model B is the latest product in the popular Raspberry Pi range of single board computers. It offers ground-breaking increases in processor speed, multimedia performance, memory, and connectivity compared to the prior generation Raspberry Pi 3 Model B+ while retaining backward compatibility and similar power consumption. For the end user, Raspberry Pi 4 Model B provides desktop performance comparable to entry-level x86 PC systems.

GPS Module

The GPS module is a wireless chip module combined on the mainboard of a mobile phone or machine. It can communicate with the global satellite positioning system in the United States. It can locate and navigate according to the condition of a wireless network signal. Many mobile phones have Equipment with a GPS module can communicate with GPS synchronous satellites for free at any time and area.

GSM Modem

A GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone

Ultrasonic Sensor

An ultrasonic sensor is an electronic device that measures the distance of a target object by emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal. Ultrasonic waves travel faster than the speed of audible sound.

Raspberry pi Camera

The pi Camera module is a camera that can be used to take pictures and high definition video. Raspberry Pi Board has CSI (Camera Serial Interface) interface to which we can attach the Pi Camera module directly. This Pi Camera module can attach to the Raspberry Pi's CSI port using a 15-pin ribbon cable.

USB to UART Bridge

The USB-toUART bridge acts like a translator between the two interfaces to allow a device to send/receive information on one interface and receive/send the information on the other interface. This document explains the software and hardware solutions used in creating and using the USB-to-UART bridge

9. Conclusion

This project presents a novel technique for assisting visually impaired people. The proposed system has a simple architecture and makes it user-friendly thus, making the subject independent in his/her home. The system also aims at helping the blind to navigate in his/her surroundings by detecting obstacles, locate his necessities, read signboards and texts. Preliminary experiments show promising results the user can freely navigate in his surroundings safely. The system is made much more user-friendly by accepting speech as the input to access his basic necessitate.

10. Future scope

In the future, we can use more robust and the efficient algorithm to read the images and separate the text from the images. The captured images was blurring, and then also we will deblurred the image in the less time and can separate the info efficiently to convert them to the speech. Applying this technique to the impaired person can bring changes to new era with sufficient indeed things on gadgets to prevent visual impaired problem and this make future mass production of the gadgets to recover the impaired person ratio's in the country.

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