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Smart Tool for Blind People

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Abstract: Visually impaired persons have difficulty to interact and feel their environment. The blind people life and activity are greatly restricted by loss of eyesight. To overcome the travelling difficulty for the visually impaired group, this paper presents a novel ETA (Electronic Travel Aids)-smart guiding device in the shape of a pair of eyeglasses for giving these people guidance efficiently and safely. So in our project we are going to develop smart specs for blind people which will help them to navigate from place to another place with the help of voice commands and the path will be traced by the help of GPS.

I. INTRODUCTION

Visually impaired persons have difficulty to interact and feel their environment. The blind people life and activity are greatly restricted by loss of eyesight. They face many problems and one such problem is to navigate to different places and so they need to bring their family members or friends for support. So to overcome this problem researchers have spent the decades to develop an intelligent and smart stick to assist and alert visually impaired persons from obstacle and give information about their location. So in our project we are going to develop smart specs for blind people which will help them to navigate from place to another place with the help of voice commands and the path will be traced by the help pf GPS. These smart specs will also detect the obstacles coming in between the blind person with the help of camera module and inform them through the voice commands using smart earphones.
Loud music and chants from public speakers, sound pollution from road traffic, or just general urban cacophony can make simple reading and sleeping difficult. Smart earphones are an ideal choice for many listeners for their ability to cut out ambient noise without raising the audio volume to levels that might be dangerous for their ears. So in our project we will develop smart earphones connected with smart specs that will cut out all ambient sound and that will help in guiding blind people without any disturbance.

II. LITERATURE SURVEY

In the paper named as [2] “SMART VISION FOR BLIND PEOPLE” it is explained paper replaces human vision by human hearing through equipment. It also seeks to develop a portable Electronic Travel Aid (ETA) with the accompanying radio frequency identification (RFID) localization infrastructure. It also detects obstacles when blind person is walking.
In the paper [6] “SMART GUIDING SYSTEM FOR BLIND” it is specified that the paper presents a Smart system for visually impaired, that make use of ultrasonic sensor and RF transceiver as assistive devices. This system is based on embedded technology. It makes use of ultrasonic sensor and RF transceiver simulator.
The paper named as [1] “OBJECT DETECTION SYMBOL FOR BLIND PEOPLE” it focuses mainly in the development of the computer vision module of the Smart Vision system. The main component of this system is the infrared sensor which is used to scan a predetermined area around blind by emitting-reflecting waves path. They are using buzzer and vibrator, two output modes to user.
In the paper [4] “SMART READING SYSTEM FOR VISUALLY IMPAIRED PEOPLE” the project that they have designed has a new system consisting of a camera attached to the micro controller. This camera has to be placed over the book and it will read the pages and information's will be given by the loud speaker. This project makes the use of Arduino UNO, Web Cam, Optical character recognition, Text to Speech Engine, Audio amplifier.
The paper named as [3] “MUTE: BRINGING IOT TO NOISE CANCELLATION” explains about Active Noise Cancellation (ANC) is a classical area where noise in the environment is canceled by producing anti-noise signals near the human ears. This paper brings IoT to active noise cancellation by combining wireless communication with acoustics. Some of the keywords are Noise Cancellation, Acoustics, Internet of Things, Wearable, Edge Computing, Adaptive Filter, Smart Home, and Earphone.
In paper [7]”THRESHOLD NOISE CANCELLING HEADPHONES” is designing a project in which the circuit takes in an ambient noise signal through a microphone, is processed by our circuit’s filter system, inverted, and finally added with an incoming audio signal and sent to the headphones. The results indicate the possibility for complete functionality. However, this design is a prototype and does not meet the original goal of an in-ear device.

III. MATHEMATICAL MODEL

S= {I, D, SP}
I= {I1, I2} are set of inputs,
Where I1= Voice Input, I2= Image as input
D= {DB, TF, VC} set of Database
Where DB= Database, TF= Tensor flow, VC= Voice Command
SP= {RP, FB, AOT} set of Service Providers
Where, RP= Raspberry Pi, FB= Firebase, AOT= Android of Things

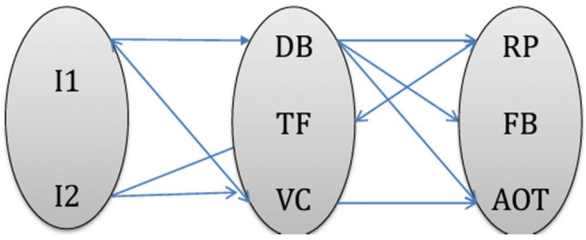

Fig 1 : Mathematical Model

IV. SYSTEM ARCHITECTURE

System architecture of our proposed system has two inputs i.e. Voice input and Image input. In voice input first of all the GPS which is in Raspberry Pi detects the current location of the user. After this through the app that we have developed it asks for its destination which is again located through the GPS. Then the path is detected from the source to the destination. After this the blind person is guided to the destination through the voice commands. So our system helps the blind person to travel from one place to another without any help. The second input that is image is taken from camera module which is present in the Raspberry Pi. From this the image is given as input to the tensor flow which does the work of image recognition. The blind person is then informed about the obstacles. The text-to-speech converter converts the text into the voice commands and then this helps in achieving the detection of the obstacles. Also our system includes smart headphones which totally cut-off the ambient sound present in the background which will help blind person to hear the commands properly without any disturbance.

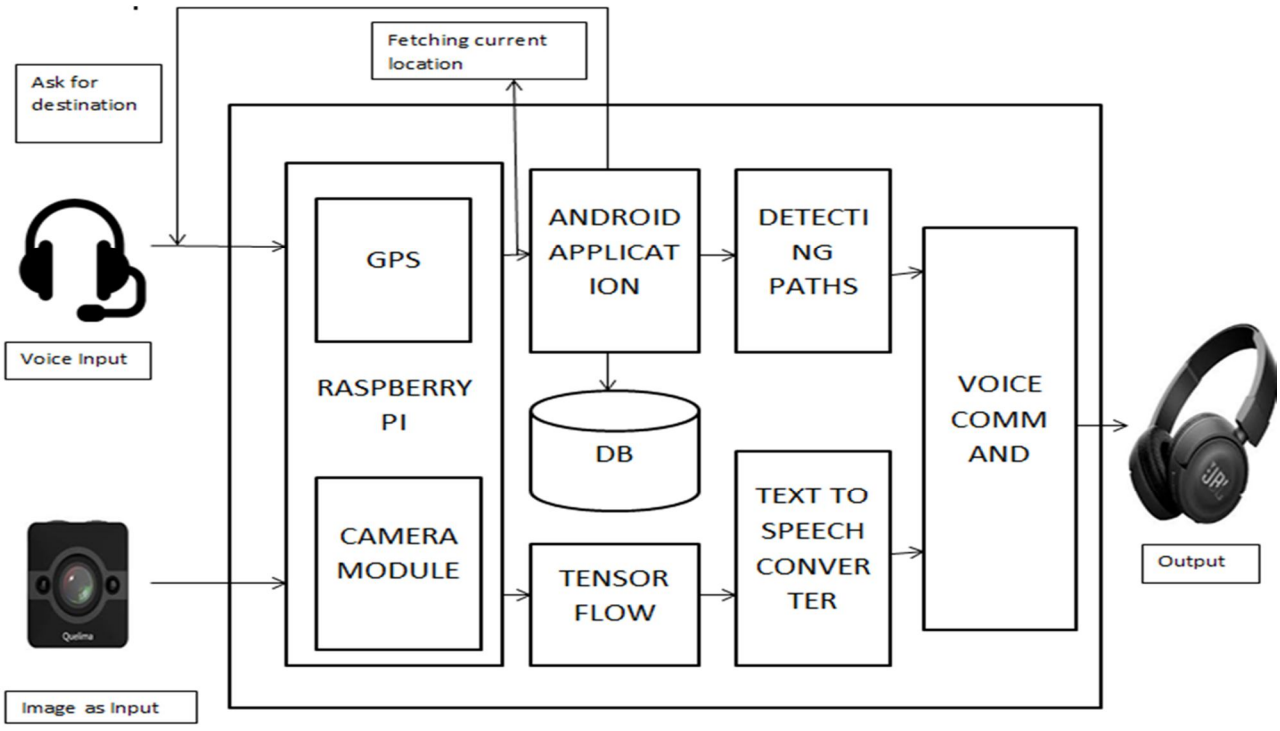

Fig 2: System Architecture

A. Algorithm

1) Algorithm 1: To reach from source to destination

a) Detect current location through GPS.
b) It asks for destination and through GPS it fetches the current location.
c) From Database it will check whether the path is already available or not.
d) If not then it will trace a new path.
e) Through voice commands it will guide blind person to reach the destination.

2) Algorithm 2: To detect the Obstacles

a) It will take image as an input from camera module.
b) Through using tensor flow it will process image.
c) Through voice commands it will inform about the obstacle.

V. CONCLUSION

From the literature survey we have concluded that the previous developed systems have some disadvantages that we are going to overcome in our project. Instead of stick we are going to use smart specs with camera which is easier to manage. In stick it will cover some specific area but in our system we are using GPS. In other systems they are alerting blind people through vibrations but we are going to alert them through voice commands. Smart earphones are an additional feature in our system which cutout the ambient sound completely which help blind person to listen commands clearly.

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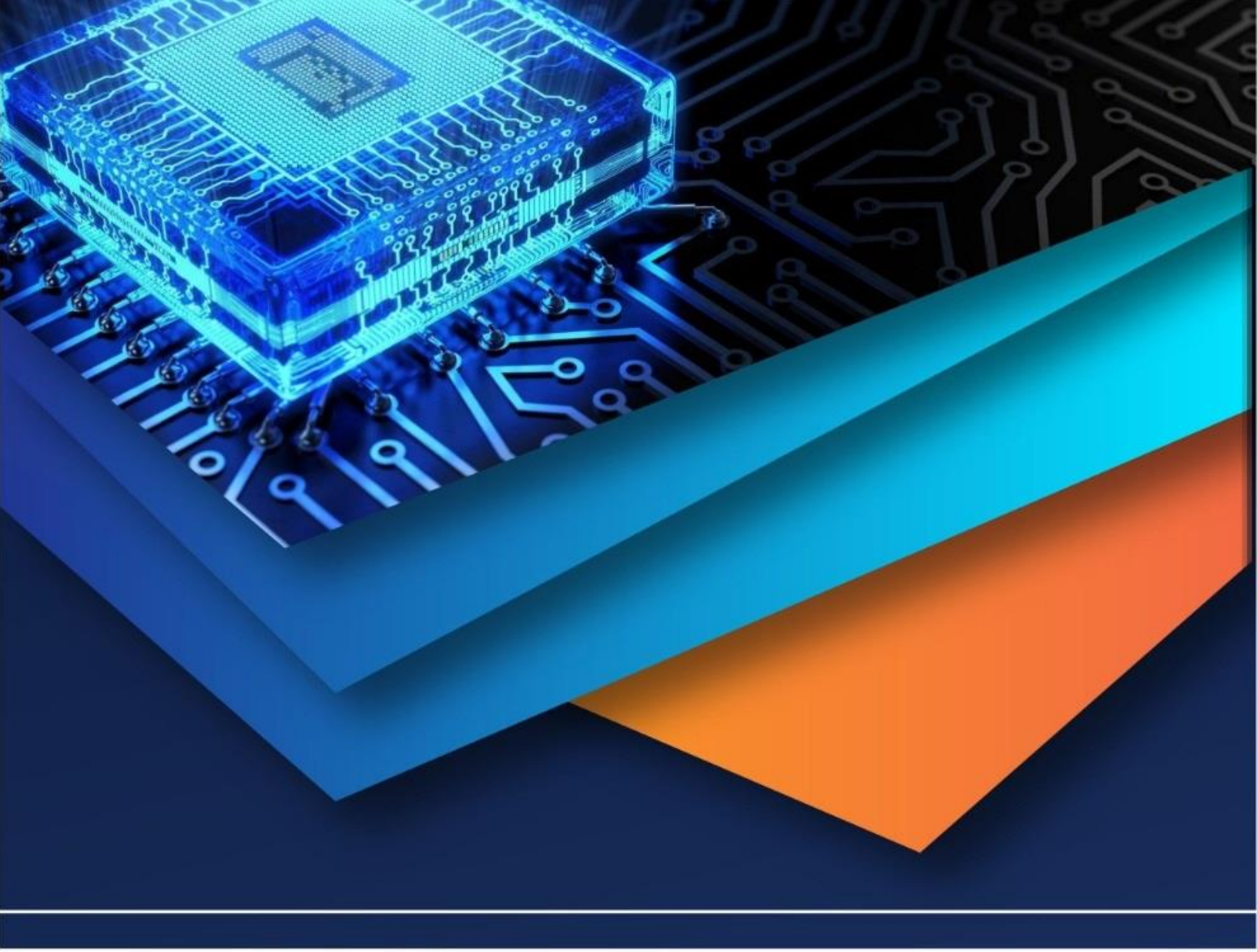

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