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# Visual Assistant for Blind People using Machine Learning and Android Application

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**ABSTRACT:** The goal is to give an "optional sight" to optically impaired people until they have enough resources required to treat them. People with untreatable visual inadequacy can use this to make their common assignments much less difficult and progressively direct. It is the time of man-made thinking and it has expanded huge balance due to gigantic proportion of data and straight forwardness of computation. Using automated thinking it is possible to make these people's life significantly less difficult. This project proposes a smart glass for blind people to help them with expanding singular self-governance. The proposed project describes the design and implementation of the prototype of an "visual assistant using machine learning and android application" for visually impaired people. The system contains computer vision, object recognition, speech synthesis, distance measurement, location detection by using GPS locator in mobile, fall detection by MEMS sensor, and notification to caregivers using GSM.

**KEYWORDS:** MEMS, ARM, CV-COMPUTER VISION, GPIO-GENERAL PURPOSE INPUT OUTPUT PIN, POE - POWER OVER ETHERNET, SD-SECURE DIGITAL, SOC-SYSTEM ON CHIP, HLR-HOME LOCATION REGISTER, VLR-VISTOR LOCATION REGISTER

## I.INTRODUCTION

The life of the person who is always blind depends upon their caregivers and it is quite difficult for them to be alone. Globally, 49.1 million people were blind. This number is predicted to be doubled in 2030. The increasing number of people with disabilities in world attracts the concern of researchers to invent various technologies, hoping that these technologies can assist the disabled people in carrying out their tasks in everyday life like normal people. The primary Problem related with visually impaired individual is that they can't perceive any item, they can't peruse any content and furthermore when they move anyplace, they can't get any legitimate data about any obstructions in their way which can hurt them. Along these lines, these are some huge issues which are related with blinds. So, this project would help them become independent. This can assist them while walking alone in new environments.

Basically, a Special sort of camera which will be mounted on the glasses will get the image of that content which visually impaired necessities to examine, as showed by the direction of visually impaired. Python based code will be used to recognize the object and convert the information to voice using TTS. The system is intended with a mobile application to send the location information to caretaker's mobile number through SMS from GSM using GPS when the blind person has fallen down (detected by mems sensor) due to health issues or due to accident. It is also provided with a panic button. In settling the issues with apparently hindered people we have used the little charge card assessed PC named raspberry pi.

## II.METHODOLOGY

India being the second greatest people on earth, contributes 30% of the general visually impaired masses. Regardless of the way that there are adequate fights being coordinated to treat these people, it has been difficult to source all of the necessities. It is the time of man-made thinking and it has expanded huge balance due to gigantic proportion of data and straightforwardness of computation. Using automated thinking it is possible to make these people's life significantly less difficult. The goal is to give an "optional sight" until they have enough resources required to treat them. People with untreatable visual inadequacy can use this to make their common assignments much less



difficult and progressively direct. In emergency situations, SMS can be sent to the caretaker along with the location of the blind person using GPS.

The essential objective is to help optically impaired people with exploring effectively using improvement advancement. This assignment proposes a smart glass for blind people to help them with expanding singular self-governance. Since this is proficient and not bulky, one can use it successfully.

The proposed structure targets executing a perusing framework for visually impaired utilizing Python and Raspberry Pi. It does the going with limits, Image Capture, Convert to Text and Convert to voice. Measure the distance between the person and object. Fall detection sending notification to the caretaker’s mobile number along with the location using GPS from GSM.

**III.WORKING METHODOLOGY**

This system captures the image through camera and processes the image through computer vision and machine learning to recognize the object and convert the object information to voice using TTS engine and can be heard by using headphone. This system also calculates the distance between the person and the object with the help of ultrasonic sensor.

The GSM and GPS of mobile phone is interfaced with raspberry PI ARM microprocessor through bluetooth communication. Through this Bluetooth interface with the owner’s mobile application, it will send an SMS along with the location detected by mobile GPS to the predefined mobile number. SMS also will be sent when the panic button is pressed by the blind person if he needs his caretakers help or when the blind person has fallen due to some health issues or due to some accidental reasons which is detected by the MEMS sensor provided.

**IV.BLOCK DIAGRAM**

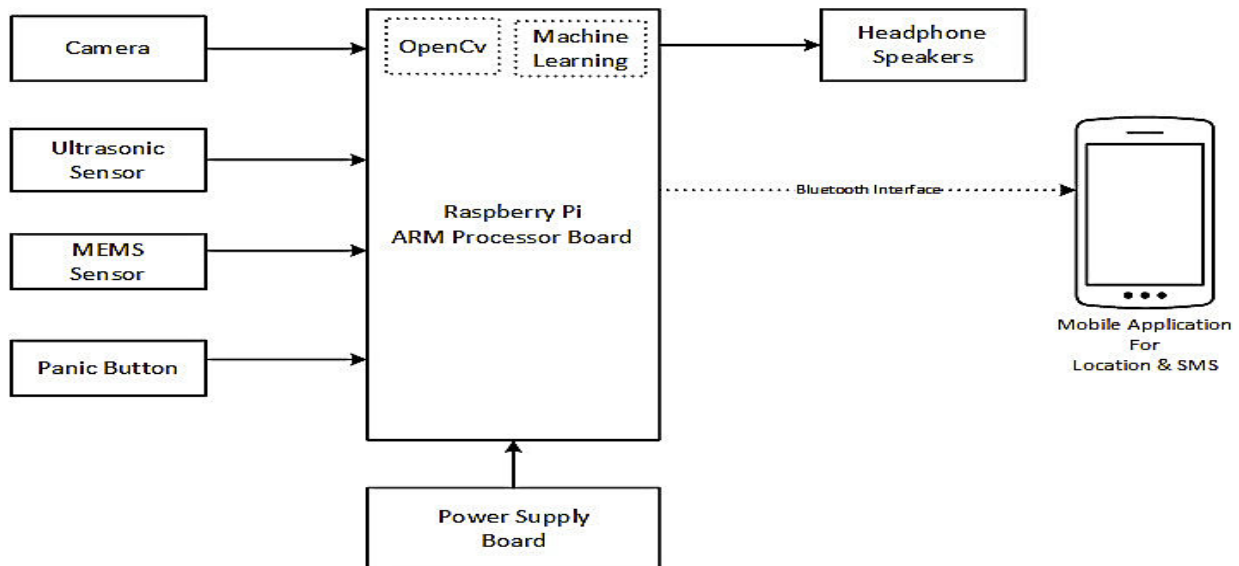


Figure No.1: Block Diagram

**V.WORK FLOW**

The CMOS camera fixed on the smart glasses will capture the image. The image will be processed by OpenCV. The processed image is given to Tensorflow to recognize the captured image. The recognized image is converted to voice by using TTS that can be heard through speaker or headphone. The distance between the person and object is computed using ultrasonic sensor. When the blind person has fallen that will be detected by MEMS sensor (3-axis accelerometer) and instantaneously, the information will be sent to the blind person’s API mobile application





through Bluetooth. Then, the location of the person is detected using GPS in the mobile and an emergency SMS is generated by GSM in the mobile and it is sent to the caretaker's mobile number by using a mobile application.

### VI.RESULT

This system captures the image through camera and processes the image through computer vision and machine learning to recognize the object and convert the object information to voice using TTS engine and can be heard by using headphone. This system also calculates the distance between the person and the object with the help of ultrasonic sensor. The GSM and GPS of mobile phone is interfaced with RASPBERRY PI ARM microprocessor through bluetooth communication. Through this Bluetooth interface with the owner's mobile application, it will send an SMS along with the location detected by mobile GPS to the predefined mobile number. SMS also will be sent when the panic button is pressed by the blind person if he needs his caretakers help or when the blind person has fallen due to some health issues or due to some accidental reasons which is detected by the MEMS sensor provided.

The proposed structure targets executing a perusing framework for visually impaired utilizing Python and Raspberry Pi. It does the going with limits, Image Capture, Convert to Text and Convert to voice. Measure the distance between the person and object. Fall detection sending notification to the caretaker's mobile number along with the location using GPS from GSM. This project acts like a virtual eye to blind people. It helps them in emergency.



Figure No.2: Photo of the Proposed system

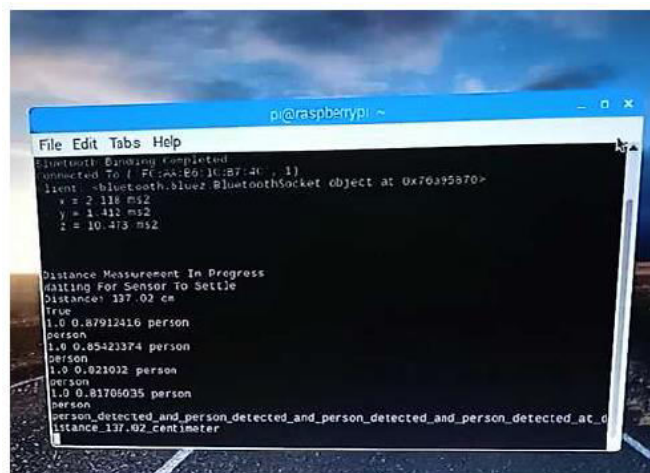


Figure No.3 : OBJECT RECOGNITION



Figure No.4 : BLIND HELPER APP



Figure No.5 : NOTIFICATION TO CARETAKER

## VII.CONCLUSION

Visually impaired people today can read using Braille script but it is still tough for them to recognize and interact with household objects and also on roads. If they can recognize the object more easily or can know if car or bike is coming in their way it would be easy for them to handle them or act according to. This also includes a GPS to track their location and GSM to send notification to their caretaker when they assistance. Thus, this Machine learning based object recognition will help the blind people to feel like normal people. This helps them to live independently. This method can be implemented practically. The principle of the development of science is that “nothing is impossible”. So, we shall look for a bright and sophisticated world.

In future, additional features like camera resolution can be improved; range of distance measurement can be improved. In future, the angle of the camera will be increased, Cloud based monitoring and storing will be provided.

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