

Project Information

Title

Hardware mechanism for blind people.

Target

Public

Proposer Information

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IP(Intellectual Property) Information

All the property rights are belongs to group members.

Project Description and Background Information

Description

In this project, we are going to design a hardware tool to help blind people identifying the objects in the environment. Users will be informed about the distance, size and type of the objects vocally through headphones.

Similar Products / Projects

Manovue Project:

It is a multi-utility wearable haptic device which enables the user to read any printed text by moving his finger over the text and helps him move around freely outside well known environments by providing haptic feedback.

<https://www.imaginecup.com/Team/Index/95562>

Justification of the Proposal

The purpose of the project is to create a sense of vision for blind people through a hardware device. The user will be informed about the objects in the environment.

Basically, 2 cameras will be used to capture the images in front of the user. These images will be processed by Raspberry Pi and the result will be transformed in a speech. It is expected to work as real-time application.

Contributions, Innovation and Originality Aspects of the Projects

Our product will enable blind people to navigate without any help on outside. The product will guide the user through the obstacles with the help of the headphones so that, user can experience handling his/her job freely and safely.

There is not any national product that does what we propose in this project. There exists a project called Manovue. They use a wearable haptic device which enables that the user can read a text by moving his finger through it. They too uses a tiny camera, however they utilize some haptic actuators for feedback. Moreover, Manovue project helps blind people read texts, whereas our project will enable them to move securely without any help.

This project has the potential to initiate further research and development activities.

Technical Aspects of the Project

There will be two technical challenges in order to complete this project.

1. Hardware Design and Construction:

System combines two cameras, headphones, Raspberry Pi and a power bank. Careful and safe power management subsystem is required to maintain portable system. System will be implemented as a glass, therefore, it needs to be safe to wear for end users.

Processing two cameras' data in real time also requires well planned structure. In addition to that Raspberry Pi must be configured to work properly with other third party cameras and headphones.

2. Software Design:

In order to identify objects, image processing will be done on raspberry pi board. Data from two cameras will be compared in an efficient way since Raspberry Pi has limited resources. OpenCV library is strong candidate to use on image processing. It is implemented in both Python and C. Those programming languages will be used to process the image.

Finally, a text to speech subsystem will be implemented in software to transform text result to speech. That will be the output of the system to the user.

Targeted Output, Targeted User/Domain Profile

The end-product will be a glass embedded with two cameras, headphones, and a processing unit.

The main accomplishment measure is the object detection and object recognition accuracy. The aim is accurately identify the objects and their distance for the end-users.

Targeted user profile consists of blind people. There is not any age restriction for the end-user since, the glass will be safe to wear.

Project Development Environment

Needed Software: OpenCV, python, C, C++, linux based Operation System(Raspbian)
Needed Hardware: Raspberry Pi b+, 2 cameras, headphones, laptop

External Support

There is no external support.

References

<https://www.raspberrypi.org>
<http://www.opencv.org>
<http://www.ispeech.org/api>