Google Assistant And Image Detection Based Alerting System For Blind People

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Abstract- *Blind people face several problems in their life; one of the most challenging issues is the obstacles when they are walking alone. Our research is on obstacle detection in order to reduce dependency for visually impaired people. To help the blind people the visual world has to be transformed into the audio world by alerting them with a voice message. We try to present an application called smart belt. In this project we have used an algorithm, real time object detection using deep learning. This model is trained with more than lakhs of images to recognize an object. It recognizes all the objects. For example, chairs, TV monitor, etc. we have used a USB camera which is interfaced with the raspberry pi. It also has Google based smart assistant which informs the location, time, weather report for the user. In case of any emergency situation for the user (blind person), the Switch is used to send the alert for the guardian mobile with the location of the place.*

Keywords- Object Detection, Smart Belt, USB Camera, Google Assisstant.

I. INTRODUCTION

Vision is one of the very essential human senses and it plays the most important role in human perception about surrounding environment. The blind people face a lot of problem in their daily life. Some face this problem from the time they are born while others due to accidents or of different causes they encountered in this life. For blind persons it will be really difficult to recognize a product of their daily use. This smart belt aims to help the blind in object detection and to provide an audio information about the object detected. The system helps the blind to navigate independently using real time object detection and identification. The proposed system has a Raspberry Pi-3 processor which uses deep neural network for image processing. The processor is connected to a camera. The processor is coded in python. The camera captures the image in real time and will be provided to the Raspberry Pi-3processor for processing it. The python code uses the COCO model to detect and classify the objects. It will draw boundary boxes around the detected and will also show the category index of the object. The category index of the detected objects will be stored in a text file. The category index consists of the class name and class id of the detected object. The content of the text file is converted to voice using the Text to Speech Synthesizer (TTS) software e Speak. This system is portable and the user can easily carry it. In addition, the system also has ultrasonic sensor to detect the obstacles and the system will alert them in presence of obstacles. There also present a switch which is used to alert the family person *when* the blind people is in emergency situation. The google assistant set up is also attached with the system that will indicate the person about their live location and also about the weather conditions around them.

II. OBJECTIVE

The main problem for a blind person is to walk in the indoor and outdoor environment as they have to overcome many obstacles in the surroundings. So they had to walk with someone along to help them. To be able to walk through the surrounding environment without someone's help, we tried to create this alerting system for the blind people with USB camera and Google assistant voice output to give them extra confidence. This project works as a secondary vision for a blind person.

III. LITERATURE REVIEW

IchsanPratama Adi, Hendra Kusuma designed a stereo camera based assistive-system which can detect objects and/or obstacles around the blind people. The ZED Stereo Camera and Computer is used and can detected the distance of obstacles around the system and will be informed to the blind-user via stereo sounds. By this approach, we expected that the blind people can walk faster. From the experimental results, this system works well when used by the blind people. In the end of experiment, the system could achieve83.16% in accuracy and able to guide blind people to find the walking path confidently.

Hojun Son, Divya Krishnagiri, V. Swetha Jeganathan, and James Weiland designed a commercially available, wearable goggle system to detect crosswalk signals, to plan a path across the street, and to provide verbal guiding cues with real-time semantic features to keep the user on the correct path. During verification testing, we found crosswalk signal detections were typically reliable but depended on hyper-parameters to reduce false positive errors in the crosswalk signs in a small number of cases. Testing with visually impaired subjects resulted in successful guidance at an outdoor crosswalk.

Huijin Park, a, Heesoo Won,b, SoobinOu,c and Jongwoo Lee designed a crosswalk lights recognition system for the visually impaired providing real-time lights state by voice so that safe walking environment of the visually impaired can be guaranteed. The proposed system implements crosswalk lights recognition system prototype using IoT parts like Raspberry Pi. Unlike the conventional sound guidance, we tried to provide voice guidance through crosswalk lights image recognition. The performance evaluation achieved a recognition success rate of 92.7% by day and 67.3% by night.

Walter C. S. S. Simões, Manaus, J. da Silva designed aindoor navigation system built in a wearable device. The system allows visually impaired users to perform guided audio navigation safe, fast and has a low computational complexity. The methodological approach chosen divides the process into two phases: offline and online. In offline phase, the indoor mapping is done by data fusing of radio frequency and visual markers, constructing a unique and consistent representation. In the online phase navigation and recognition of each of the internal positions are performed through the fusion representation or only by the wi-fi or visual signals when one of the sensors is strongly affected by noises or other interferences. The results showed that the recognition levels of wi-fi, visual and fusion markers were 87.59%, 90.92%, and 92.03%, respectively. The error margin after the data fusion application was 0.8 m, with an average time of 0.62 ms.

IV. EXISTING SYSTEM

In the existing system, the blind person has presented with a wearable navigation system of an RGB-D camera, a laptop and a wearable device CUFF, which can provide normal and tangential force cues through the control of a stretching state of a fabric. The target application is blind people guidance in an unknown indoor environment. The final layout of the system and obstacle avoidance techniques was based on the elaboration of requirements and opinions collected from blind individuals and people working in the field of assistance of the visually impaired. The system is tested with blindfolded participants and blind users, in different indoor environments, and verified if it could be a viable solution to increase performance of users with regard to autonomous navigation with and without the walking stick.

V. DISADVANTAGES

- This system is hard to handle for the blind people.
- This system cannot be used in outdoor environment.

VI. PROPOSED SYSTEM

In this proposed system, a smart belt is given for the visually impaired person. This Proposed system consists of Raspberry pi, camera module, distance sensor and speaker. When the camera identifies an object in front of the blind people, then it will capture the image of object and send an image to raspberry pi to identify the name of the object using deep neural network, after that identification of the object, the voice message should be sent to the blind people. It also has Google based smart assistant which informs the location, time, weather report for the user. If any obstacles in the road, it identifies before the certain distance of the blind people and again it sent as voice message to the blind people. In case of any emergency situation for the user (blind people), the Switch is used to send the alert for the guardian mobile with the location of the place. It will help the blind people to live without a dependent and boost the confident of the blind person.

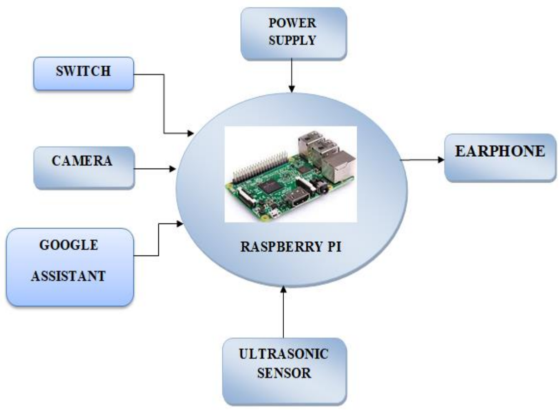
VII. ADVANTAGES

- Blind people can be able to walk around without others help.
- This project works as an secondary vision for the blind people.

VIII. SUMMARY

The papers in the background study helped in analysing and obstacle avoidance for the blind person which is highly reliable and beneficial. The system which is already in existing not a portable one, even though the portable cannot be used effectively.

IX. BLOCK DIAGRAM



X. CONCLUSION

The system has a simple architecture that transforms the visual information captured using a camera to voice information using Raspberry Pi. Unlike other systems available in the market, the subject needs only to wear the smart belt and doesn't require any particular skills to operate it. The proposed system is cheap and configurable. Any blind or visually impaired person can use it simply since he/she has to only power up the device. The device is a real-time system that monitors the environment and provides audio information about the Environment conditions also. The system also notifies their family in case of an emergency situation.

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