Visual Assistance For Blind People Using Image Processing And Raspberry Pi

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ABSTRACT: Visual impairment is one of the issues that several millions of people suffer from. They go through many difficulties even to complete the basic chores. Even in his or her own home or office the struggle to navigate from one place to another without being dependent on anybody. As per the data from WHO(world health organization) there are around 250+ million people with visual disablement out of which nearly 35+ million are totally blind which constitute a huge part of the population.

Even though there are traditional ways to help these people such as a cane to help them navigate or a guide dog, they are not sufficient or error prone. They do not help them visualize the object, which is in the nearby surrounding even though they can help them to avoid any obstacles in their way. The need today is to provide a solution, which will not only help these especially abled people to avoid obstacles and deal with their daily chores but to help them visualize the world around them. This will help them in living a better life. The main objective is to develop a wearable device using computer vision technology for blind people who will help them in avoiding obstacles and visualizing the world around them. This system will assist the blind people by taking speech commands to detect object using image-processing technique and will provide audio output to the person to track their way around the obstacles.

This system will also recognize some major signboards such as sign for "Washroom" and would inform the blind person as soon as the sign is recognized. Main Objective of the system is identification of objects and signboards. This will help the visually impaired person to manage day-to-day activities. Thus, the proposed system will help the visually disabled people to navigate their way through any obstacle and will give them a sense of visualization of world around them.

Keywords— Raspberry Pi 3 B+, Deep Learning, Tensor Flow, gtts, Image Processing.

I. INTRODUCTION

There are colossal number of outwardly weakened individuals, might be somewhat or completely visually impaired. As indicated by the World Health Organization (WHO), the quantity of individuals of any age outwardly debilitated is roughly around 285 million, among which 39 million are visually impaired, this is worldwide measurements. This task is an endeavor to help them, recognize objects in the encompassing and make them mindful of things around them with the assistance of voice message. A visually impaired individual is helped in route by distinguishing the hindrance on his way. It is likewise conceivable to give data in regards to any flight of stairs before him. This may assist with staying away from mishaps. It tends to be an incredible aide for daze individuals making himself-adequate and free. This framework is created utilizing raspberry pi model 3B+, pi camera and Bluetooth headphones. An open source start to finish AI stage, Tensor Flow is utilized for creating clever article identification calculation.

Tensor Flow light, the variant of Tensor Flow is explicitly utilized because it can undoubtedly run Tensor Flow models on IoT, inserted and cell phones. Tensor Flow light is having low dormancy and more modest double size, which makes it simple to plan gadget at the edge of organization. This further develops inertness and network, and security. Google text to discourse (gtts) is a python library interface with Google make an interpretation of text to discourse API (Application programming interface). It can even peruse limitless length of discourse.

This model is tried with various light conditions. Indeed, even without light or faint shine of light this model is giving exact outcomes. Numerous items in same edge are identified effectively. It is tried for up to 5 items. The framework distinguishes protests precisely inside the distance scope of 10 to 12 feet's.

II. PROPOSED SYSTEM

The fundamental thought of framework block chart is function as comparable part eye in human of The individual who isn't visually impaired and assist with blinding individuals for comprehend the item around his life by identification and acknowledgment utilizing camera and mention to the outcome on headphone what's camera can see. This square can descript it.
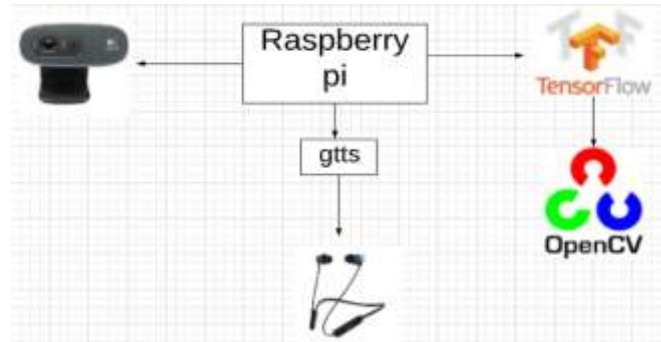

Fig. : Block Outline

The camera is a case that controls the measure of light, which arrives at a light delicate surface inside (either film, a computerized sensor, or another surface). The first camera did not have a glass focal point, however today we can say that most cameras incorporate a light-close box, a glass focal point, and surface that catches light.

The camera has made some amazing progress from its modest start, yet it is still a case that controls the measure of light that arrives at a piece of film (or sensor).The camera has various kinds of body and size and shape in this task we utilize smaller than expected extraordinary camera that utilization in careful it exceptionally little and can however it effectively on glasses and it is awesome in low dim and low current it has 6 LEDS inside camera work in dim and high affectability and high pixel of picture to get great then, at that point is better for quick acknowledgment and associate it USB links to minicomputer .

III. INDENTATIONS AND EQUATIONS

Workflow for implementation of object-detected model is explained: first raspberry pi is updated. Next step is to install dependencies for pi camera, then it is needed to create environment. An environment is created in order to avoid version complexities and to isolate package installation from the system. In that environment install Tensor Flow and open CV. The next step is to set Tensor Flow model with dataset and last but important step is test results.

Image capturing is done with the help of Web camera or pi cam. The model takes input image. It is expected to have image with 300x300 pixels and there are three channels per pixel (Red, Green, and Blue). In addition, object detection model can identify which of a known set of objects might be present and provide information about their positions within the image. The detected object model has flattened buffer of 270,000-byte values (300x300x3) and model is quantized representing value between 0 to 255.

A quantized neural network model is used which has an of 8-bit integer value, because it runs faster and speed up the actions. Frames per seconds (FPS) in Tensor Flow lite model is observed up to 4.4 which is comparatively more than Tensor Flow, which is three.

Output of model has four arrays (0, 1, 2, 3), in which zero represents location that is bounding box [top, left, bottom, right]. One represents classes it is as integer of 10 integers, indicating index of class label. Two represents scores it is an array of 10 floating values between zero and 1, as it is a probability to indicate class detection. Three indicates number and detections it is an array of length 1 indicating total number of detection results.

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IV. FIGURES AND TABLES

There are 42 example pictures in the informational collection, out of which not many were tried, least 51% and most extreme 83%

precision is noticed trying is done inside and outside likewise, also light impacts giving better and exact outcomes, this engineering can accurately name up to 5 articles in a single catch. The led test showed that up to 10 to 12 feet's, this is giving right yield for various items in the reach.

Testing was done for different classes of same article for ex. PDA of 13 unique organizations were tried out of which five were identified precisely. Individual was distinguished effectively until distance of 12 feet's.

Fig. 1: Chair

Fig 2: Mobile

Fig 3: Person and Chair

FIG 4: SMART CAP

V. CONCLUSION

This architecture is tested and it is reliable for visually impaired person. As it uses Tensor Flow lite response time is very less. It even consumes less power, so is desirable for portable application. There are only 42 objects in data set, all are basic object any individual may need in day-to-day life. Most attractive feature of this project is as the output is audio form and visually impaired people can use earphones, which can easily guide blind person thus making user self-reliant without having to ask for assistance.

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