

# A Survey On Assistance Glove for Visually Impaired

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*Abstract*: It is quite well known how important our sense of vision is on the course of our daily lives. And as for people who are visually impaired must resort to some kind of counter measures such as a cane or a walking stick to cope with their daily activities. But such solutions are not accurate let alone be perfect. In this paper there are various presentations which are sophisticated yet simple contraption which exactly meets the above-mentioned needs, which is accuracy, using an ultrasonic sensor latched up on a glove and functioning with the help of a microcontroller. Upon receiving input from the microcontroller, the vibrator and buzzer notify the person wearing the glove if an obstacle has been detected with the help of the glove.

*Keywords*: Indoor navigation, visually impaired, ultrasonic, glove.

### 1. Introduction

As of 2020 there about 7.83 billion people in the world and according to visual impairment data collected by WHO, the total number of visually impaired people are 285 million, and out of which 39 million people are blind.

Also, globally there are 1 billion individuals who have short sightedness or long sightedness that might have not been tended to. These 1 billion people include those with moderate or serious short sightedness disability or blindness due to untreated refractive mistake.

The hardest test for a visually impaired individual is to navigate around places. Clearly, daze individuals meander effectively around their home with no assistance since they know the situation of everything in the house. Individuals living with and visiting blind people must make a point not to move things around without illuminating or asking the visually impaired individual. Business spots can be made easily accessible for the blinds with material tiles. This isn't done in the majority of the spots. This makes a major issue for daze individuals who should visit the spot.

Populace development and maturing are primary reasons to build the danger that more individuals obtain vision weakness. So, it is basic to make strides on the two fronts, the counteraction and the arrangement, our exploration basically centres around giving a substantially more exact arrangement than what is been accessible to the mases, for example, a mobile stick. For a plan to work in a superior device, it is important to understand which sensors a visually impaired individual will utilize in his day-to-day life.

The Assistance Glove which is referred in this paper performs and productively and helps the visually impaired with assistance of the vibrating sensors and buzzer in their grasp, moreover it works on solar energy making it more efficient and easier to use.

2. Block Diagram



Fig. 1. Block diagram

The proposed assistance system uses Atmega microcontroller, which is a high performance RISC based microcontroller.

It has flash memory which can perform many operations such as reading while writing. It also has general purpose registers and 3 timers. The ultrasonic module here consists of a transmitter and a receiver. When the ultrasonic module detects an object, it sends signals to the microcontroller. In turn the microcontroller is programmed in such a way that upon receiving signals from the ultrasonic module it processes that information and if there is an object that has been detected then the microcontroller will send signals to turn on the vibration motors and the buzzer, both situated in the glove which notifies the person wearing the glove about the object. And depending on the distance between the glove and the object, the volume of the buzzer ringing may vary. Closer the distance, louder the

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ringing and vice versa. This system is solar powered hence a solar cell is being seen connected to the battery and making this setup both eco-friendly and easy on the pocket in the long run.

# 3. Literature Review

The paper [9] describes how the author Adam Keyes has proposed a system for Blind People to navigate by utilizing a remote sensor which significantly depends on the segment zigduino. It is a remote handy glove to help the visually impaired in navigation using Zigduino. Zigduino is a type of Arduino based microcontroller which is capable of communicating a large scope of various gadgets, and it is used for the ease of programmability. The Zigduino they have utilized has 2 employments,

- 1) Beacon for triangulation of area
- 2) Tag An extension between the guide and the server.

Beacon transfer bundles of information through tag, which at that point sends that information to the server to do Triangulation calculation, and process the required Algorithm. And beacon is attached piezo speakers which are used to navigate and also are attached with small infrared ranger.

[4] Smart Assistance Navigational System for Visually Impaired have used system containing ultrasonic sensor, water sensor, radiofrequency transmitter and receiver, Global Positioning System (GPS), Global System for Mobile Communication (GSM), Arduino, Vibrator and buzzer. The use of GPS and GSM is to improve the safety measures of a visually impaired person, so at a time of crisis he or she may notify his/her closed ones so that they may immediately come to help them.

The paper [2] discuss about Pyramid SSD: Outdoor Object Detection algorithm for blind people have written an algorithm for blind people, they have utilized SSD method. Older version of SSD uses Maps for detection which is not up to the mark in real time. To overcome the challenge Pyramid SSD is combined with classical SSD.

The paper [1] describes an assistance system for blind people which is similar to previously mentioned models

But it is more complicated. The design is developed in the form of Glove which consists of Arduino UNO, Ultrasonic sensors and flat vibrating motors. In this proposed system it is observed that the usage of three ultrasonic sensors is opposed to just of many previous cases, each implemented in three different directions that are left, right and front. It also has three different vibrating motors situated on three different fingers which are little finger, middle finger and thumb.

In the case of paper [8] The "Robotic Assistance in Indoor Navigation for People who are Blind" is a different approach compared to the previously mentioned papers which involve the usage of a robot-based navigation for blind people. The idea was similar to dog guides or human guides where the blind can hold on to, which will lead the way for them. In this the wooden shaft has been selected as a handle, and then the shaft was attached to a pivot point with springs, thus providing a small degree of flexibility. Furthermore, two 20pound weights and a steel block mounted on top of the P3DX robot. The pivot joint and weights keep the robot stable so it will not tip over when someone pulls or pushes it.

[7] Wearable Navigation Assistance System for the Blind and Visually Impaired uses HC-SR04 ultrasonic sensor, Arduino board, coin flat vibrator, buzzer. Here it has used 4 ultrasonic sensors made different modules which can be mounted on top of helmets clothes near arms and legs. By referring these papers, it came as an inspiration to use Arduino as microcontroller processor and HS-CR04 ultrasonic sensors. It also consists of a prototype to test the detecting procedure and range from which the setup can be used efficiently. The prototype consists of an ultrasonic sensor, vibrational motor and a buzzer, which is recharged by solar energy to increase the convenience.

### A. Convolutional Neural Network (CNN)



The paper [2] In this case, CNN model has been utilized in

The paper [2] In this case, CNN model has been utilized in android which has TensorFlow as an interface. The CNN graph is changed to frozen graph before being used in an android device. The parameters are stored in protobuffer file.

# B. Single Shot MultiBox Detector (SSD)



Fig. 3. Single Shot MultiBox Detector (SSD)

The paper [2] It has been observed that Deep neural networks can establish a vivid portrayal. The faraway objects are usually appeared to be small in feature maps. While searching objects in original feature we might not get best results in terms of resolution. So, for higher resolution and a better object localization Shallow features are used. When shallow features and Deep features are used together it can produce higher resolution and semantically strong features. The scale should be invariant.

From large receptive field position from featured maps the deep layer featured maps are extracted, hence deep features have richer semantics.

# 4. Future Scope

There are many possibilities as to how this can be upgraded and integrated in the modern society, one such being the boom of 5g we can utilise the blazing fast internet speed in our favour to notify the blind of multiple obstacles as one with minimal number of sensors, it could very well act as an artificial eye notifying the person not just of the obstacles but his entire field of view as well.

# 5. Conclusion

The assistance Glove for the visually impaired, is intended to assist the visually impaired with conquering the absence of visual sense, by utilizing different senses like sound and contact. As the distance of the glove and obstacle reduces, both sound and vibration signals increase. Its primary objective is to aid the visually impaired people in navigating from one place to another. But the question arises on efficiency when its used outdoors as it can only detect obstacles to certain range and it is well suited for finding your way in a closely packed environment. Another hurdle is the affordability. What's more, to supplement the navigation a GUI should be actualized to have the option to recognize and learn regular ways taken by the individual. At last, a total plan of the handy glove which is deficient in all the previous referenced papers which requires vibration sensors at the individual's hand and position of ultrasonic sensor at an appropriate spot for more prominent usability. So as to overcome all of the above-mentioned flaws in an earlier attempt to aid the visually impaired in navigating this glove is an eco-friendly option which relies on solar energy.

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