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THE ASSISTING PAIR – A NEW APPROACH FOR ASSIST THE BLIND PEOPLE

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ABSTRACT

According to The World Health Organization (WHO) estimates that there were 285 million visually impaired people in the world, of which 246 million had low vision and 39 million were totally blind. Of those who are blind, 90% live in the developing world. Most blind people are using Sticks in their everyday life but this is the old way that needs to be changed. For that very reason, we are planning to develop Smart Shoes, Smart Spectacle, and Mobile Application. The most agenda of this prototype is "Detection" and "Direction". They're developed for assisting blind people and thus they will be collectively called "The Assisting Pair". Using Technology, blind people can reach their destination more easily and comfortably.

Keywords: Smart Shoes, Smart Spectacle, Mobile Application.

I. INTRODUCTION

The main concern for blind people is mobility. They need to be dependent on another person. This approach introduces a new system for visually impaired people that will help them to navigate. Nowadays android mobiles are commonly used by everyone. With help of the Android application, the wearable device is to be made to navigate the path. The system will consist of smart shoes embedded with a microcontroller and sensors for sensing the surrounding environment and giving feedback to the blind person about the position of the nearest obstacles in threshold range which will be fixed in between 2-3 meters from the position of the person. The system will also be equipped with a smart spectacle connected to the android phone which will give live video input to the phone and in the phone using deep learning model the prediction for each second from the video will be tested on the model and on the basis of prediction user will be notified via any means let's say vibration or sound. The user will wear shoes for easy mobility. Sensors will sense obstacles, vibrators will vibrate for obstacle detection and send the alert to the google firebase for real-time data. Using smart shoes, smart spectacle blind people need not depend on others for mobility. This paper describes the architecture and discusses the possible benefits of the system we have designed. In this work, the system is designed keeping in mind the economic feasibility for the user hence the sensor and components are cheap, a simple friendly user, smart blind guidance system.

II. LITERATURE SURVEY

In this paper, Manoj and their teammates are prepared a model with the help of smart shoes and a smart cane. Basically, they are used smart shoes for object detection with the help of a microcontroller, sensor, and so on. Here, the smart cane module is used to detecting the existence of the object up to knee level and alert the user with the help of a vibrator. [1In this proposed model the main attention of the author is various kinds of people can able to buy this product. So they are developed a smart shoe which is low in cost. And the author is pretty sure that their proposed model is more efficient and flexible in comparison to smart sticks. [2] This paper presents a design which is specially made for assist the blind student in reading. The wearable design format is the uniqueness of this model. They have used image processing technology for reading purpose and earphone is used for listening. This model prefers a high-quality image and text position to accurate read. [3] Low cost, user friendly, and reliable is the main objective of this model. Ankita and teams proposed a novel model to blind people with help of smart glasses and Voice assistants. They are used ultrasonic sensors in the glasses for detecting purposes and voice assistants to assisting the visually impaired user. The prediction error rate of the model is less than 10% accounted. [4] This proposed model come up with a traveling aid which is smart electronic pair of shoes to navigate the blind user besides the obstacle detection along with the voice assistant. This system also provides the emergency button in case of urgent situation and help out the blind people to the obstacle-free path. [5] The aim of the system is to build smart shoes along with the android application which helps blind people in a flexible way. The author is used different kinds of sensors in the smart shoes and googles Maps API in the android application. The purpose of this model is assist visually impaired people more efficiently.

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III. METHODOLOGY

Here we describe the proposed methodology which will be follow to develop the system for assist the blind people.

- At first, we need an Application to control the Smart Shoes, Smart Spectacle. In this Application we will be using the Google Map API for the direction purpose.
- An Earphone will be connected to their mobile phone so that the person can be guided by the voice command to reach their destination.
- There will be a proximity sensor in the shoes which will be capable enough for detecting any obstacle within 2 or 3 meter radius.
- We will also use a Smart spectacle with a camera to scan the obstacle.
- If any obstacle comes on his/ her way, the shoes will vibrate and it will connect with Google fire base to send the real time data. The apps receive all the data from Google fire base and that time the app will connect with the spectacle and send the data to spectacle.
- The spectacle will scan the front obstacle and send data to the apps
- The Application will test the image captured on deep learning model and if obstacle found alert the user through earphone what kind of obstacle it is.
- Thus, the blind man will then be able to decide his/her next step easily.

IV. PROPOSED DIAGRAM

Here we proposed the work flow chart which is related to our proposed methodology.

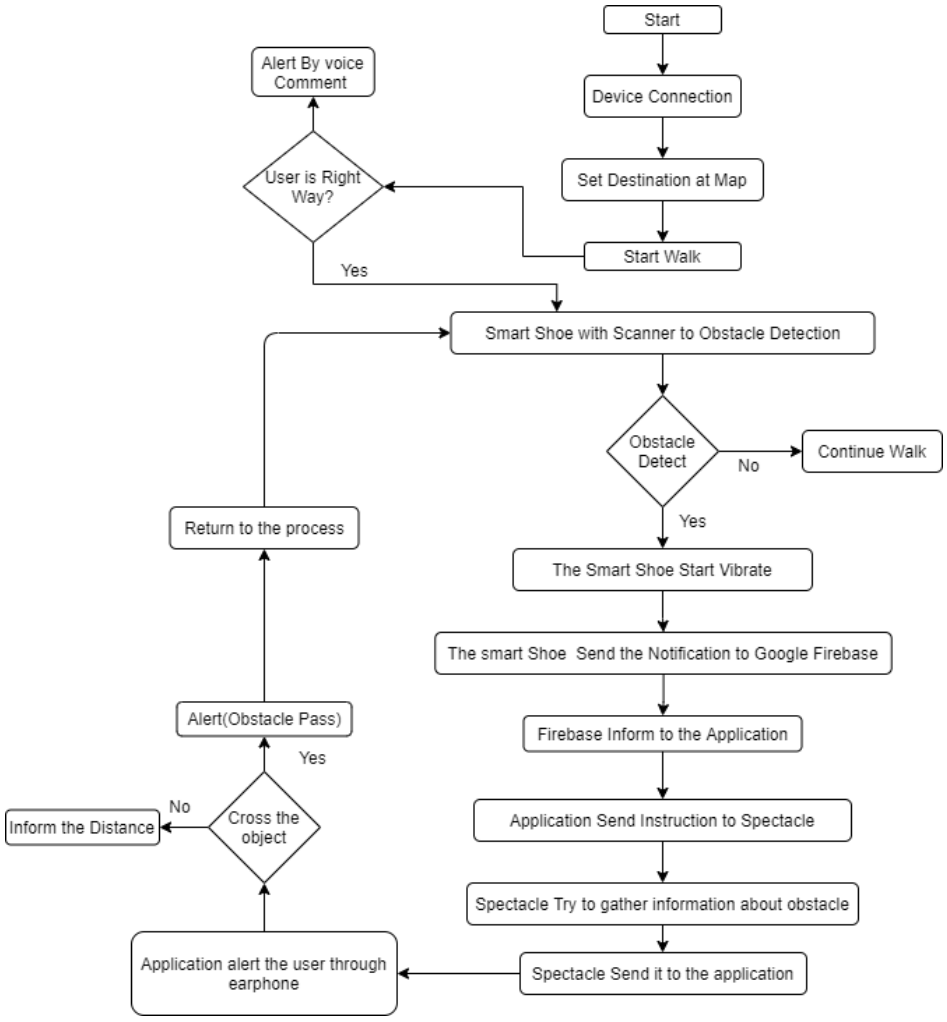

Figure 1: Diagram of Flow Chart.

V. ANALYSIS

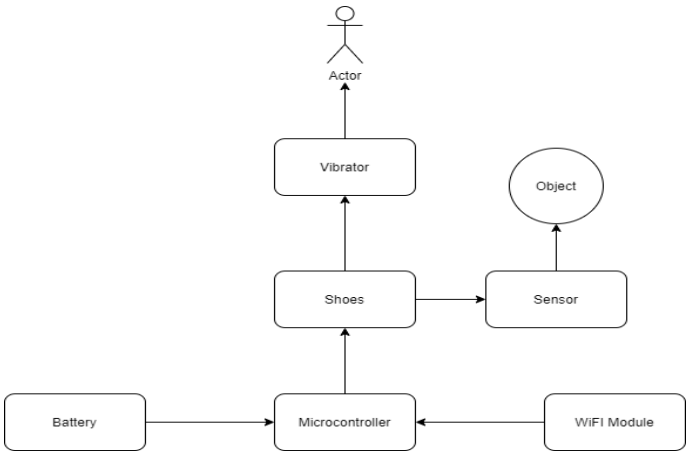

Figure 2: Block Diagram of Smart Shoes

In smart shoes, we will use a microcontroller with an ESP8266 Wi-Fi Module for a better experience. And to back up the microcontroller we will also use a suitable battery that is chargeable. We will also use best sensor which is the Retro-Reflective sensor because is most commonly used LED-Based Photoelectric sensor in clear object detection. To alert the user we will keep the vibrator in the smart shoes.

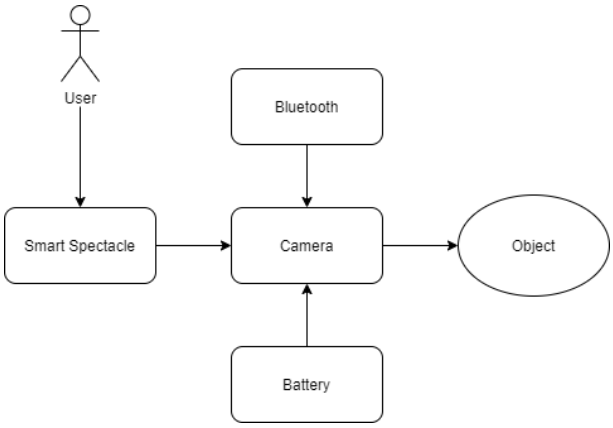

Figure 3: Block Diagram of Smart Spectacle

In the smart spectacle we will use the high quality camera for live video session and it will provide the more details of the object. The smart spectacle connect with mobile application through Bluetooth module.

VI. RESULTS AND DISCUSSION

Especially the system will be very helpful for blind people to walk like normal people. Every time it will alert the blind people about the obstacle. Here we will use google firebase for the real-time database. That means, it will consequently be getting updates with the most current data. Here we will use the ESP8266 Wi-Fi Module to connect all the devices with the apps. This is very fast to connect and transfer the data. We predict that our training model will give a high accuracy rate and for further preference, we will also use high parameter tuning to increase the accuracy rate. We think that it will be economically feasible for every blind people. If we see for the long run it will ultimately benefit in road traffic management and blinds will also be saved from any unfortunate accidents.

VII. CONCLUSION

The best and modern technology we will use in our system. The main uniqueness of our system is user friendly because in our system we will use the daily use material like a smartphone, spectacle, earphone, and pair of shoes. We will make our proposed system within the limit price in mind so that various kind of people are able to buy our product. In comparison with another system, our system will be much more flexible for blind people.

FUTURE WORK

We will further test the prototype for feasibility in different areas such as we will try to develop the system in such a way that even in small bandwidth area such as hilly region the smart shoes and android application can work properly as network bandwidth is the major area of concern when we use Wi-Fi module and gps at same time so we will try to develop the system in such a way that even in distant area which is not connected to high bandwidth internet it will work smoothly Also the risk factors will be kept in mind and also we will add functionality about whether forecasting and alert blind if there will rainfall or storm it will eventually help them save their lifes

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