THE VIRTUAL EYE

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Abstract—**Visual dysfunction is a debilitating disorder that has affected millions of individuals worldwide. Those who are visibly impaired have problems seeing obstacles in front of them, making it dangerous for them to navigate alone. A person who is vision impaired faces a variety of difficulties, however We identified the main issues and made an effort to make their life simpler by constructing a smart goggle employing contemporary technologies. The technology uses a camera which detects the objects at a particular range before the impaired person has the collision with the object ahead. The virtual goggle alerts with the help of speech which will be heard by person using earphones connected with goggle, when an object is encountered in the path of the person. Live recognition of object using camera gives the description about the object in their ears which the impaired person has encountered in front.**

The purpose is to make the visually impaired people independent. The virtual eye uses the machine learning technology to detect the objects which comes in the journey of the impaired people and give them an alert that their is an obstacle ahead.

Keywords—*Blind, Visually impaired, sensor, object detection, goggle ,gps, gsm.*

I. INTRODUCTION

One of the most important components that responds to light and provides vision is the human eye. Life becomes more complicated when this vision is damaged. According to a poll, around 4% of people worldwide are either visually impaired or blind. Electronics experts have been doing numerous studies to improve the lives of those who are blind. Many blind people use a simple white cane to get around, but this is ineffective and offers less safety. Use the enter key to start a new paragraph. The appropriate spacing and indent are automatically applied.

According to the World Health Organization (WHO) report, there are 285 million blind and visually impaired persons in the world. Out of 285 million individuals, there are about 39 million blind people, and sadly, more than 15 million of them are from India. Without sufficient supervision, a blind person's mobility is difficult and unsafe. As a result, individuals frequently use a standard white stick to identify obstacles. Yet, their usage and amenities are restricted, making it difficult to navigate effectively. It most likely recognizes the items on a very basic level. Blind persons have many difficulties getting where they are going, and accidents are very likely, especially in uncharted territory. Even while many blind people are capable of doing a particular job, they often struggle to keep up a consistent daily schedule and job. Together with a few additional functions, a smart goggle should be made to help users navigate through the difficulties they may encounter.

The Virtual eye is a goggle which is developed for the visually impaired people. The virtual eye will act as a medium which will help the visually impaired people to walk freely in the real world without anyone's assistance. The virtual eye uses the machine learning technology to detect the objects which comes in the journey of the impaired people and give them an alert that their is an obstacle ahead Virtual eye aims on eliminating the difference between a normal person and a visually impaired person. We want to create a balanced world where a visually impaired person can walk freely and became able to see the wonders of world beyond their disability. The device is mainly designed for helping the people who are suffering with loss of Vision. The Virtual Eye will provide a way to the visually impaired people to walk in the real world without taking the help of any individual to walk them past their way. The Virtual Eye is a goggle which is coded in machine learning and provides a medium to the visually impaired people to walk fearlessly in real world and reach their destination with the help live location navigation system using GPS. The Virtual Eye will help the people in need who are suffering with loss of vision and will act as a their virtual vision which will guide the people throughout. The world is changing at very fast rate and becoming smart so why to leave anyone behind. The device will efficiently work in changing the lives of people. This project is created for the sake of social service. Through Virtual Eye, we want to provide a virtual aid to the people who are suffering with loss of vision

II. SCOPE OF THE PROJECT

To provide the visually impaired people with a virtual sight which will help them to walk freely in the real world without anyone's assistance.

To create a world where there is no difference between a disabled and a normal person, making them independent to walk freely.

III PREVIOUS RESEARCH

In earlier sections of the paper, some of the existing systems were already reviewed.

Walking canes detect static objects on the ground and uneven surfaces. It limitations is that it can only detect objects within the reach of the cane.

Walking sticks equipped with ultrasonic range finders are recently developed for the blind. One such example is the "smart cane". The main function is to detect the obstacle and provide instructions via earphone or speaker. It also alerts the presence of water via buzzer in two types of sounds to differentiate between two levels of water. The user can use a panic button which is designed to locate the current place and send it to the care taker in form of text during the emergency situations. In uses Arduino MEGA 2560 to detect the obstacles encountered near the user. This device is a voice recording and playback module that includes in-built microphone. It will facilitate with high quality recording and playback.[1].

Another example is a smart handheld device called Indriya is used to help the blind navigate. It is designed to be used in addition to a regular walking cane as a backup aid during object detection appropriate voice feedback is given to the user, mentioning the nature of obstacle and the approximate distance to them. When navigating in uncharted territory, Indriya uses designated buttons and time to immediately notify the blind of his whereabouts. In the event of an emergency, speed dial buttons allow the blind person to reach his contacts right away. [5].

A further example is a "Smart shoe" that can assist the blind on their daily routine and can act as a comfortable and safe companion on their journey. It includes ultrasonic sensors with a step counter that can alert the person of the impending obstacles [4].

IV PROPOSED SYSTEM

The smart devices is comprised of camera (ESP32) module, FTDI module, Arduino Nano, GPS module, GSM module , Lithium Battery, switch , earphones.

Initially ESP32 camera module identifies the object comes in the path coordinating with FTDI module for connecting with laptop through Arduino cable providing IP address of camera for showing the camera vision on laptop.

For detection IP address is used inside the code for detecting the captured object using ML Algorithm.

Here GPS and GSM running parallelly with Arduino Nano providing live location and sending the location to known one. Battery providing power to Arduino for operation.

V PROPOSED METHODOLOGY

The Virtual eye is a goggle which is developed for the visually impaired people. The virtual eye will act as a medium which will help the visually impaired people to walk freely in the real world without anyone's assistance.

The virtual eye uses machine learning technology to detect the objects using ESP32 camera which come in the journey of the impaired people and notifies person using speech that there is an obstacle ahead.

India is home to the world's largest number of blind people. Of the 37 million people across the globe who are blind, over 15 million are from India.

The purpose is to make the visually impaired people not helpless.

Virtual eye aims on eliminating the difference between a normal person and a visually impaired person. We want to create a balanced world where a visually impaired person can walk freely and became able to see the wonders of world beyond their disability.

Helping them reaching their destination using gps which guides them at every instance for right path with live navigation connected with satellite offering hassle free way using object detection through camera connected to the device.

To create a world where their is no difference between a disabled and a normal person , making them independent to walk freely

Fig. 1. Sequence Diagram

A. Hardware components:

1) Arduino Nano:

Arduino is single-board microcontroller used to build digital devices that can sense and control all the activities and is programmable with the Arduino IDE.

2) ESP32 Camera:

The ESP32 CAM WIFI Module Bluetooth with 2 Mega Pixels quality used for recognition.

In the field of IOT is used in smart devices such as smart glasses and quiet preferable.

3) FTDI Module:

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The FTDI is popularly used for communication to and from microcontroller development boards.

4) GSM Module:

We are using SIM900I in our model to send the message in the form of text.

5) GPS Module[Neo 6m]:

The NEO-6M GPS module is a GPS receiver with an integrated 25 x 25 x 4mm ceramic antenna that offers a powerful satellite search capability. The power and signal indicators let you keep an eye on the module's condition.

B. Software components:

1) Image Processing
2) Text to Speech
3) Machine Learning:
4) Arduino Editor:Aruidno IDE

III. FLOWCHART
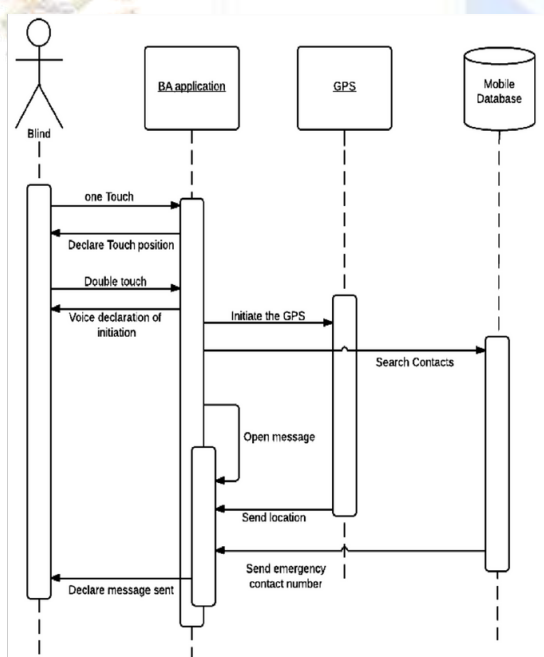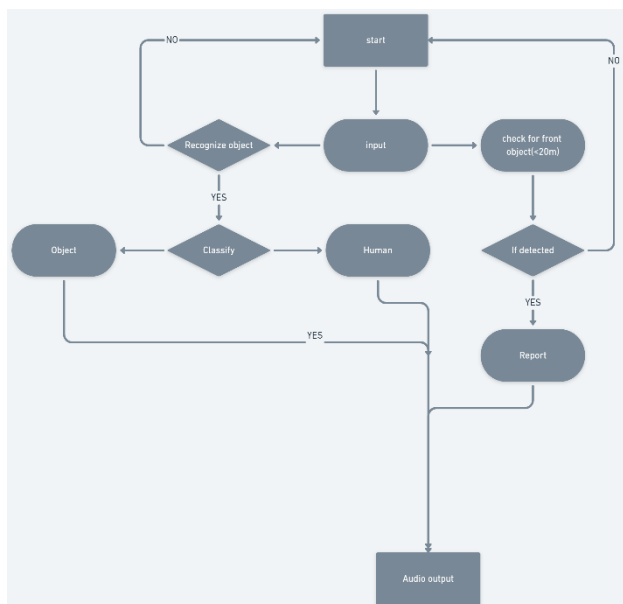

Fig. 2. Flow Chart

IV. CONCLUSION

Virtual eye aims to eliminate the difference between a normal person and a visually impaired person. We want to create a balanced world where a visually impaired person can walk freely and become able to see the wonders of the world beyond their disability. This module offers reliability, low power consumption, portability and a robust solution for navigation in short time response. Though many modules and sensors are implemented on the goggle it is light in weight and easy to carry.

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