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IOT Based Smart Glasses for Blind People

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ABSTRACT: Smart glasses is an assistant for visually impaired that is design to narrate the description of a scene through pictures via webcam. There are millions of visually impaired people in the world. They are not able to experience the world which we people can. So our project Smart cap for visually impaired people will try to provide them the missing experience of the beautiful world. The blind people who live in our society faces numerous problems like People walking on the street, Approaching vehicles Uncertainty of the roads, Numerous obstacles present on the street.

KEYWORDS: face recognition, object detection, python, text recognition.

I. INTRODUCTION

Visually impaired individuals have little or no opportunity of blind people to execute daily tasks and also limits their interaction with the surrounding world consequently affecting quality of life .The mobility of blind people completely depends on their family and friends and limits their freedom. It becomes difficult for them to detect the obstacles in their path while moving and finding the lost normal stick. Over the past decades many solutions have been proposed in favor of blind persons but still have few limitations in implementing them. Based on new technology and previous research, our proposal has been implemented. The main intention of this project is to design a smart walking stick especially for people with complete loss of vision as it alerts visually impaired people over obstacles and water in front that could help them in walking with less accidents and making their navigation around easily without seeking the help from others . It outlines a far better navigation tool for the visually impaired people. It consists of a simple walking stick equipped with sensors to give information about the environment surrounding them and integrated GPS technology that is recorded with pre-programmed locations to determine the optimal route to be taken to reach their destination. The user can choose his destination from the set of locations stored in the memory that will lead the user in the correct direction. This Smart Stick consists of Ultrasonic Sensors that can sense both the distant and nearer objects or obstacles and a RF remote to locate this smart stick and this complete setup is controlled by Arduino UNO .Visually impaired persons will receive all this feedbacks with the help of a buzzer that will automatically get activated and will start producing vibration when the sensors will sense the obstacles .Apart from the 1 obstacle detection this smart stick using GPS can also locate the position of the person to their loving ones and communicate with them .The proposed solution is ideal as it is user friendly ,easy to use and handle, light weight.

II. THE RESEARCH METHOD

Vision smart glasses(University of Oxford,2014) Enhanced awareness of surroundings through spatial awareness. Limited to only people with partial blindness and not suitable for the totally blind.
 Screen readers (American foundation for the blind 2007) Acts as a navigation interface between user, OS and the computer programs Use is limited to the computer or other portable electronic devices

III. THE REFLECTIVE PROCESS

The proposed system will accept the input from the camera, the image captured from camera will undergo a process, after processing image the program will return the object name or the person name in the form of voice for blind person also an android application will be developed for navigation where it will accept the input in the form of voice and will guide the blind person in the form of voice about the path and navigation.
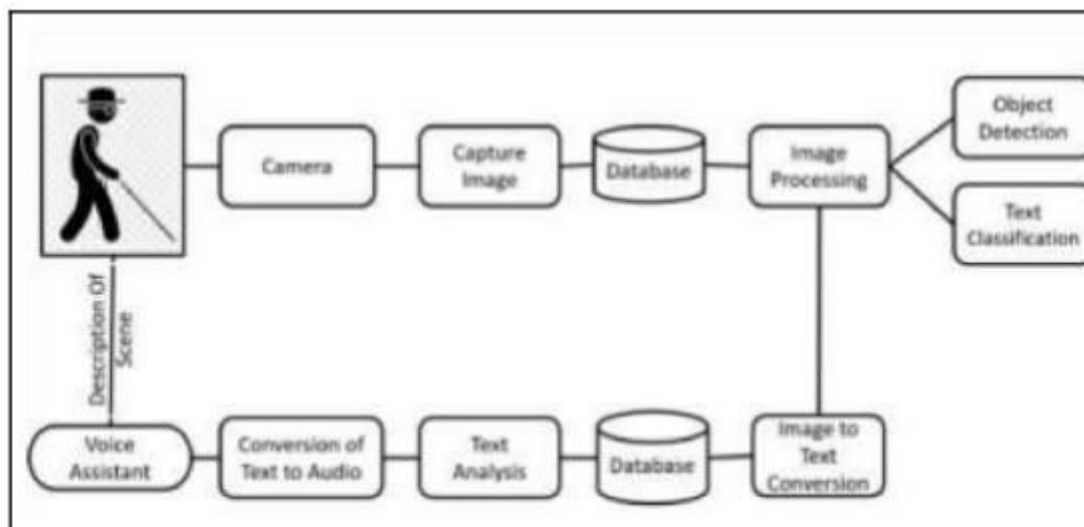
Figure1.BasicBlock Diagram

The image captured by camera will undergo various processes such as :

1. RGB To GrayScale Conversion: RGB to gray conversion is done on the progression of images. Now gamma correction is done on each of the captured gray images to achieve image enhancement.

2. Image Enhancement: The acquired image in RGB is first converted into gray. Now we want to bring our image in contrast to the background so that the appropriate threshold navigation. level may be selected while binary conversion is carried out. This calls for image enhancement techniques. The objective of enhancement is to process an image so that the result is more suitable than the original image for the specific application.

3. Edge Detection: Edge detection methods locate the pixels in the image that correspond to the edges.Edge detection is a basic tool in image processing, machine vision and computer envisage, particularly in the areas of feature reveal and feature extraction. In our project we use "CANNY EDGE DETECTION TECHNIQUE" because of its various advantages over other edge detection techniques.

4. CANNY EDGE DETECTION: The Canny Edge Detector is one of the most commonly used image processing tools detecting edges in a very robust manner. It is a multi-step process, which can be implemented on the GPU as a sequence of filters.

IV. SYSTEM DEVELOPEMENT

HARDWARE DESCRIPTION
1.ARDUINO UNO

Arduino is an open-source electronics software. This makes platform-based software and also easy-to-use. Arduino takes the data from the user and according to that it gets further operations such as reading the inputs - light on a sensor, a finger on a button, and turning it into output by activating a motor or turning on an LED. We can design any circuit on board. By sending the information or instructions to the device, and then according to this it works. To do so we can use the Arduino programming language, and the Arduino Software (IDE), based on Processing free of cost.

2.Ultrasonic Sensor

An ultrasonic sensor is an instrument that measures the distance to an object using ultrasonic sound waves. An ultrasonic sensor uses a transducer to send and receive ultrasonic pulses that relay back information about an object's proximity. An ultrasonic sensor is an electronic device that measures the distance of a target object by emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal. Ultrasonic waves travel faster than the speed of audible sound


3.Speaker

The speaker receives the electrical signals from the glasses and converts them into physical vibrations. A good speaker provides the exact sound that was produced in the microphone. An amplifier will also be used to amplify the sound to a higher level

4.Motor Driver (L293D)

It utilizes a maximum peak motor current of 1.2A. A maximum continuous motor current of 600mA is required. The range of supply voltage is 4.5V to 7V. The L293D is a 16-pin Motor Driver IC which can control a set of two DC motors simultaneously in any direction. The L293D is designed to provide bidirectional drive currents of up to 600 mA (per channel) at voltages from 4.5 V to 36 V (at pin 8!)
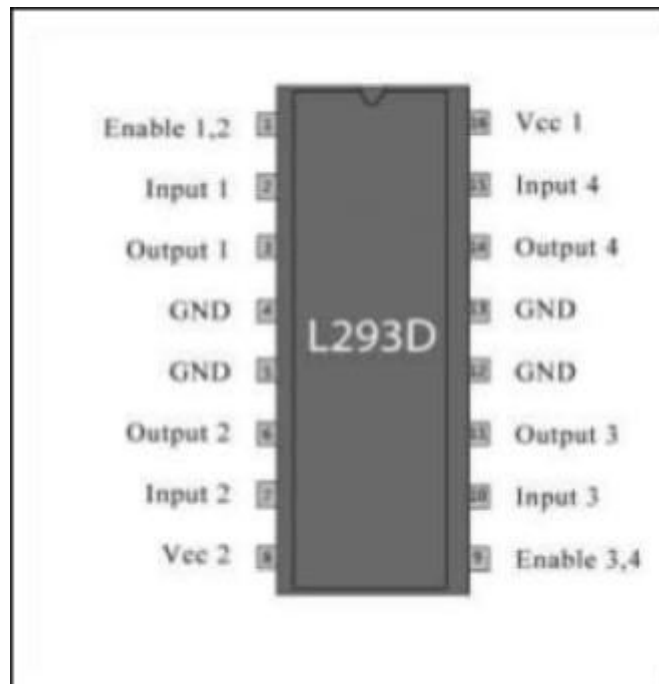
5.GPS Module

Global positioning system is a navigation and precise positioning tool, which tracks the location in the form of longitude and latitude, based on earth by calculating the time difference for signals from various satellites to reach the receiver. In six different orbits approximately 12500 miles above the earth, 24 MEO (medium earth orbit) satellites revolve around the earth 24 hours and transmit location every second. It receives the data of location and transmits it to the Arduino. The Arduino thereby receives the signal from GPS

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6.Bluetooth device (HC05)

Used in wireless communication for a range of about 100m. Modulation used is GFSK and uses FHSS technology to send data serially. It uses a power supply of 3.3V to 5V. It is used in a master slave configuration. Bluetooth serial modules allow all serial enabled devices to communicate with each other using Bluetooth.
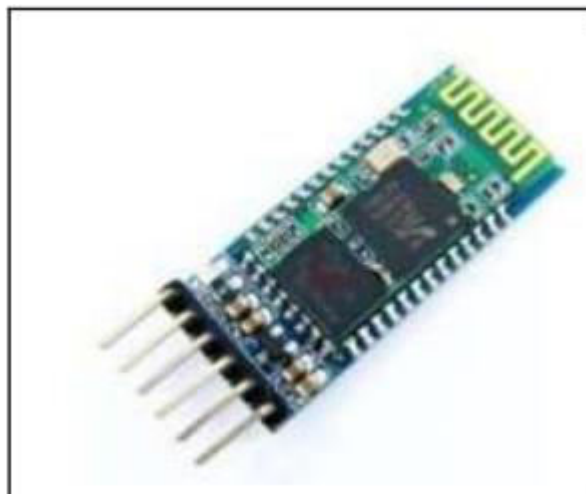
SOFTWARE DEVELOPMENT

1. OPERATING SYSTEM : Microsoft Windows 7 and Above

Microsoft Windows, also called Windows and Windows OS, computer operating system (OS) developed by Microsoft Corporation to run personal computers (PCs). Featuring the first graphical user interface (GUI) for IBM-compatible PCs, the Windows OS soon dominated the PC market. Approximately 90 percent of PCs run some version of Windows.

2 JDK

(Java Development Kit) A Java software development environment from Oracle. It includes the JVM, compiler, debugger and other tools for developing Java applets and applications. Each new version of the JDK adds features and enhancements to the language.The JDK includes tools useful for developing and testing programs written in the Java programming language and running on the Java platform.

3 IDE : ARDUINO

The Arduino Integrated Development Environment (IDE) is a cross-platform application (for Windows, macOS, Linux) that is written in functions from C and C++. It is used to write and upload programs to Arduino compatible boards, but also, with the help of third-party cores, other vendor development boards. User-written code only requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub main() into an executable cyclic executive program with the GNU toolchain, also included with the IDE distribution.The Arduino IDE employs the program avrdude to convert the executable code into a text file in hexadecimal encoding that is loaded into the Arduino board by a loader program in the board's firmware.
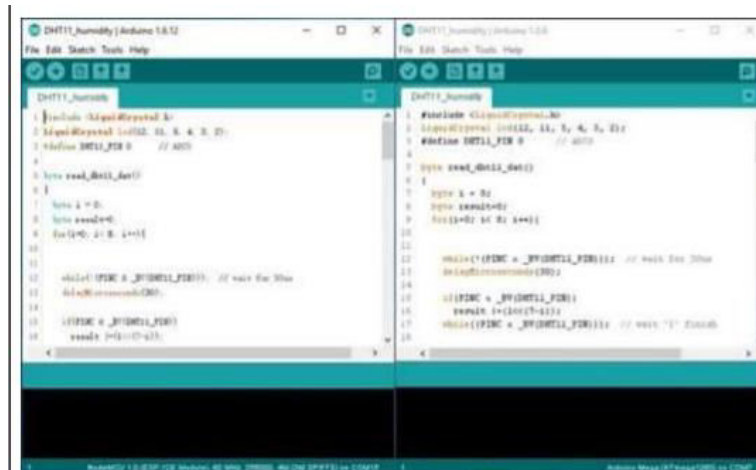
4.MySQL

Microsoft SQL Server is a relational database management system developed by Microsoft. As a database server, it is a software product with the primary function of storing and retrieving data as requested by other software applications — which may run either on the same computer or on another computer across a network (including the Internet). Microsoft markets at least a dozen different editions of Microsoft SQL Server, aimed at different audiences and for workloads ranging from small single-machine applications to large Internet-facing applications with many concurrent users.

OPERATIONAL DETAILS
Algorithm
Step 1: Dataset containing images along with reference caption is fed intothe system
Step 2: The convolutional neural network uses an encoder which extractsimage features 'f' pixel by pixel.
Step 3: Matrix factorization is performed on the extracted pixels. The matrixis of m x n.
Step 4: Max pooling is performed on this matrix where maximum value isselected and again fixed into the matrix.
Step 5: Normalization is performed where every negative value is convertedto zero.
Step 6: To convert values to zero rectified linear units are used where eachvalue is filtered and negative value is set to zero.
Step 7: The hidden layers take the input values from the visible layers andassign the weights after calculating maximum probability.
Flowchart
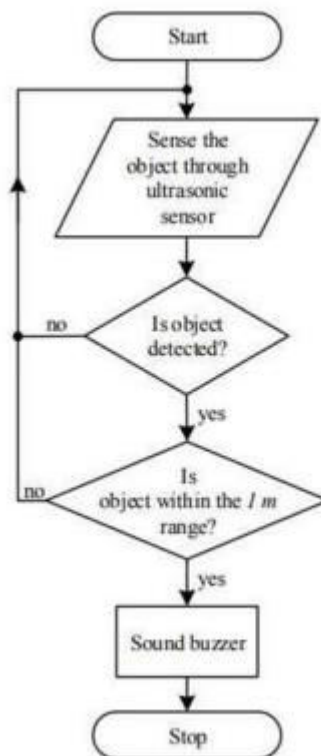
V. CONCLUSIONS

Various research studies have investigated the challenges that disabled people, especially those with visual impairment face during and after disasters. Unfortunately, this group of individuals are constantly being excluded from disaster management plans in different countries, and no specific supporting devices or services are provided for them during

and after disaster situations. These people have been identified as a vulnerable group who may be affected dramatically by disasters. Besides their loss of vision, their challenges also extend to mobility and communication difficulty in disaster scenarios. To address this challenge, this research study has proposed the Smart Glass solution that can be utilized by the visually impaired for normal activities, and especially during disaster situations. This Smart Glass device will provide a real-time navigation and narrative system. The device is cost effective ,which makes it affordable and accessible for the wider community who suffer from this problem. We hope that this proposed Smart Glass can be a step to providing the visually-impaired people with the missing support and services they so desperately need during and after disaster situations. This research work is only a proof-of-work.

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