A Project/Dissertation Review-ETE Report

on

Obstacle Detection and Vision using IOT

Submitted in partial fulfillment of the
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Abstract

Electronic travel aids (ETAs) can potentially increase the safety and comfort of blind users by detecting and displaying obstacles outside the range of the white cane. In a series of experiments, it is difficult to balance the amount of information displayed and the comprehensibility of the information taking into account the risk of information overload.

For overcome such problem we have to use latest quality of sensor such as ultrasonic sensor is used for detecting the distance between sensor and obstacles and infrared sensor is used for obstacles recognition and by combining all these, we and at last image processing .

Our device consists of the following 2 parts:

1) Embedded Device.
2) Android App.

Millions of visually impaired people are facing the problems like mobility and orientation in an unknown environment . There is an international symbol tool of blind and visually impaired people just like the white cane with a red tip which is used to enhance the blind movement.

This device is light, portable, but range limited to its own size and it is not usable for dynamic obstacles detection neither than obstacles not located on the floor. Another method is the guide dogs which are trained specially to help the blind people on their movement by navigating around the obstacles to alert the person to change his/her way. However, this method has some limitations such as difficulty to understand the complex direction by these dogs.

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Acronyms

B.Tech.	Bachelor of Technology
M.Tech.	Master of Technology
BCA	Bachelor of Computer Applications
MCA	Master of Computer Applications
B.Sc. (CS)	Bachelor of Science in Computer Science
M.Sc. (CS)	Master of Science in Computer Science
SCSE	School of Computing Science and Engineering

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Introduction

Blindness is a state of lacking the visual perception due to physiological or neurological factors. The partial blindness represents the lack of integration in the growth of the optic nerve or visual centre of the eye, and total blindness is the full absence of the visual light perception . Total blindness is the complete lack of form and visual light perception and is clinically recorded as NLP, an abbreviation for "no light perception". Blindness is frequently used to describe severe visual impairment with residual vision. Those described as having only light perception have no more sight than the ability to tell light from dark and the general direction of a light source. Blindness is the inability to see.

There are four levels of visual function, according to the International Classification of Diseases -10 (Update and Revision 2006):

i)   normal vision

ii)   moderate visual impairment

iii)   severe visual impairment

iv)   blindness

Moderate visual impairment combined with severe visual impairment is grouped under the term "low vision": low vision taken together with blindness represents all visual impairment.

Key Facts

i. 285 million people are estimated to be visually impaired worldwide: 39 million are blind and 246 have low vision.

ii. About 90% of the world's visually impaired live in low- income settings.

iii. 82% of people living with blindness are aged 50 and above. iv. Globally, uncorrected refractive errors are the main cause of moderate and severe visual impairment; cataracts remain the leading cause of blindness in middle- and low-income countries.

iv. The number of people visually impaired from infectious diseases has reduced in the last 20 years according to global estimates work.

v. 80% of all visual impairment can be prevented or cured.

Ages (in years)	Population (millions)	Blind (millions)	Low Vision (millions)	Visually Impaired (millions)
0-14	1,848.50	1.421	17.518	18.939
15-49	3548.2	5.784	74.463	80.248
50 and older	1,340.80	32.16	154.043	186.203
All ages	6,737.50	39.365 (0.58)	246.024 (3.65)	285.389 (4.24)

Table 1. Global estimate of the number of people visually impaired by age, 2010; for all ages in parenthesis the corresponding prevalence (%).
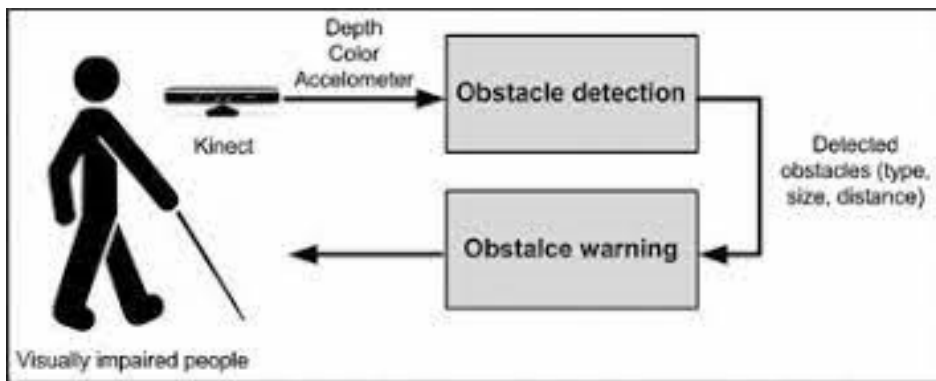
Proposed System

Figure 1. A Proposed System
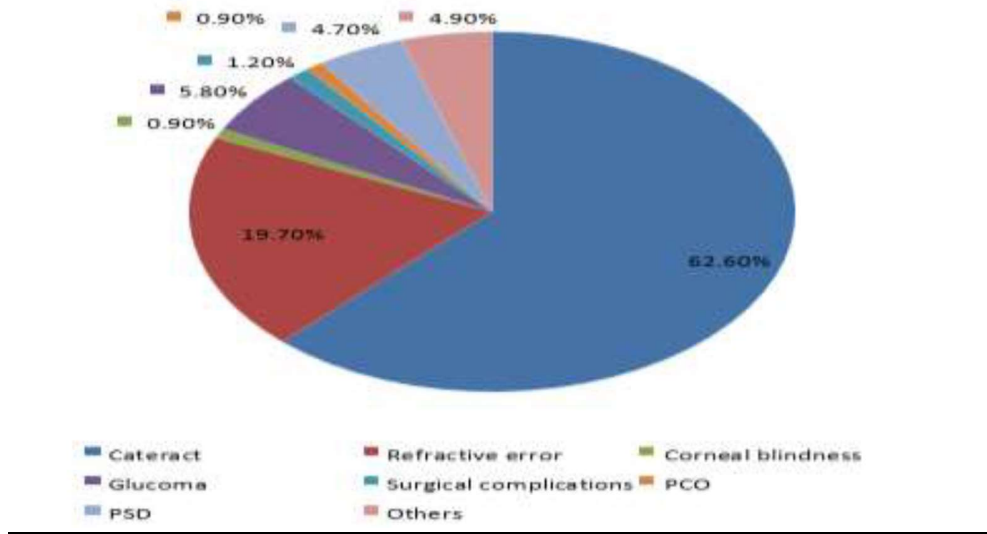
Tools & Technology

Our device consists of the following 2 parts:

1) Embedded Device: can be used to detect local obstacles such as walls/cars/etc. using 2 ultrasonic sensors to detect the obstacles and vibrator motors to give tactile feedback to the blind.

2) Android App: will give the navigation directions. These applications can be installed on any android device: cell phone/tablet/etc. It is clear that the investigators have made a complete prototype which is a light weight, comfortable and accurate device which can be used to navigate by blind people.

Literature Survey

Main causes of Blindness in India:

We are tried developed an affordable technology which is cheap and can be a substitute eyes for blind people. As a first step to achieve this goal we decided to make a navigation system for the blind.
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plane extraction algorithm in open CV within an android application was the next step of this project. This will warn blind person if there is any step or pothole in the path.

We have also tried to presented a novel framework for detecting non flat abandoned objects by matching a reference and a target video sequences. The reference video is taken by a moving camera when there is no suspicious object in the scene. The target video is taken by a camera following the same route and may contain extra objects. The objective is to find these objects. GPS information is used to roughly align the two videos and find the corresponding frame pairs. Based upon the GPS alignment, four simple but effective ideas are proposed to achieve the objective: an intersequence geometric alignment based upon homo graphics, which is computed by a modified RANSAC, to find all possible suspicious areas, an intra sequence geometric alignment to remove false alarms caused by high objects, a local appearance comparison between two aligned intra sequence frames to remove false alarms in flat areas, and a temporal filtering step to confirm the existence of suspicious objects.

Figure 2. Data Flow Diagram

MOTIVATION AND SCOPE

Millions of visually impaired people are facing the problems like mobility and orientation in an unknown environment . There is an international symbol tool of blind and visually impaired people just like the white cane with a red tip which is used to enhance the blind movement. This device is light, portable, but range limited to its own size and it is not usable for dynamic obstacles detection neither than obstacles not located on the floor. Another method is the guide dogs which are trained specially to help the blind people on their movement by navigating around the obstacles to alert the person to change his/her way. However, this method has some limitations such as difficulty to understand the complex direction by these dogs, and they are only suitable for about five years.