Assistance and Navigation Application for visually impaired people using Android

Mr. Akshay Kumbhar[1], Mr. Sohail Pathan [2], Mr. Darshan Thorat[3], Mr. Omkar Punyarthi[4]

Department of Computer Engineering,
Savitribai Phule Pune University
Late G.N. Sapkal College of Engineering, Nashik, India.

***Abstract*: Blind people are liable to get in contact with whatever obstacle which pass before them during walking, subjecting them to risk of injury caused from fall and it could also cause great damage to them. The aim of this project is to develop a smart system with distance measurement system. The system is made up of an ultrasonic sensor as input and earphone as the output. Ultrasonic sensor is used to measure distance from the obstacle. Data is then sent to National Instrument myRIO-1900 controller for processing which later produce beeping sound as the output. The process was graphically programmed using LabVIEW with FPGA as the intended target. Performance of the system has been ascertained through several verification tests. In general, the device will alert blind people of the obstacles through the audio output through which they can walk safely without any problem.**

***Keywords*: Robot, data reliability, Controlling, Arduino, Obstacle Detection.**

INTRODUCTION

India is now 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 [1], [2]. Most of these people are from families with very poor economic condition and they rely on other people to help them or use white canes, to roam around. The project proposes a navigation system that includes a white cane capable of detecting obstacles and providing feedback. Since blind people are more efficient in hearing and possesses strong perception than normal people, therefore the system focused on alerting the user through vibration and voice feedback. This novel navigation system is designed for helping the blind people to navigate around safely. User does not need to move the white cane around to detect obstacle like they do with the normal cane. Therefore user can easily walk with the white cane and continuously get information about obstacles around with the help of sonar sensor. Many researches are being conducted on building a navigation system for the visually impaired people. Several researchers [3], [4], [5], [6], [7], [8] address this challenge in indoor and outdoor environment. However most of these approaches have limitations, since this challenge involve many issues (e.g., accuracy, coverage, usability and

AREA OF PROJECT

- Blind People: Blindness is the condition of lacking visual perception due to physiological and/or neurological factors. Complete blindness is the total lack of form and light perception and is clinically recorded as “No Light Perception” or “NPL”. Eye injuries, mostly occurring in people under 30, are the leading cause of monocular blindness (vision loss in one eye). People who are blind or visually impaired have devised a number of techniques that allow them to complete daily activities using their remaining senses and recently created accessible technology such as screen reading software enables visually impaired people to use mainstream computer applications including the Internet. Listed below are historically famous people with visual impairments including total blindness, sight conditions, or blindness in one eye.
- Blind School :- Most blind and visually impaired students now attend their neighborhood schools, often aided in their educational pursuits by regular teachers of academics and by a team of professionals who train them in alternative skills: Orientation and Mobility (O and M) training - instruction in independent travel - is usually .

DRAWBACKS OF EXISTING SYSTEM

- **Less User Friendly:** The existing system is not user friendly because the retrieval of day-to-day activities data/records is very slow and records are not maintained efficiently and effectively.
- **Lengthy time:** Every work is done manually so we cannot generate report in the middle of the session or as per the requirement because it is very time consuming.

1. LITERATURE SURVEY

M.F. Saaid, 2016, "smart system with Range Notification for Blind People." [1] : In this paper Blind people are prone to sweep or knock whatever obstacle which pass before them during walking, subjecting them to risk of injury caused from fall. The aim of this project is to develop a smart system with distance measurement system. The system comprise of an ultrasonic sensor as input and earphone as the output. Ultrasonic sensor is used to measure distance from the obstacle. Data is then sent to National Instrument myRIO-1900 controller for processing which later produce beeping sound as the output. The process was graphically programmed using LabVIEW with FPGA as the intended target. Performance of the system has been ascertained through several verification tests. In general, the device will alert blind people of the obstacles through the audio output.

P.Bhavishya, 2018, "IoT based route assistance for visually challenged, In this paper, The intelligent devices have taken us to a convenient and fashionable era, however while we use a pedometer to calculate the number of steps, the blind even do not have the ability to walk independently. There is no doubt that they are eager for convenience and freedom based on this, we propose an intelligent system that assists the blind in walking. The system consists of three ultrasonic sensors (attached to a Blind) which are not used to just detect the obstacles but the visually challenged will be directed in the direction (front/right/left) which has no obstacles, when other two directions are blocked by an obstacle. Or when there is an obstacle in only one direction then the distance of other two directions will be calculated and he/she will be directed to go in a direction at which the distance is longer. The Mq2 gas sensor is also appended to the system to warn the user in case he/she is too drunk and make them wary.

Ayat A. Nada, 2018, "Assistive infrared sensor based smart stick for blind people, Blind people need some aid to feel safe while moving. Smart stick comes as a proposed solution to improve the mobility of both blind and visually impaired people. Stick solution use different technologies like ultrasonic, infrared and laser but they still have drawbacks. In this paper we propose, light weight, cheap, user friendly, fast response and low power consumption, smart stick based on infrared technology. A pair of infrared sensors can detect stair-cases and other obstacles presence in the user path, within a range of two meters. The experimental results achieve good accuracy and the stick is able to detect all of obstacles.

2. MOTIVATION

- Our main motivation are they blind who need to suffer a lot while travelling from place to place.
- We noticed that normal blind Blinds used by blinds have certain limitations like detecting pot-holes, stairs, distant objects, above knee obstacles, etc
- We feel very bad about the blind and disabled people so we came up with the idea of developing a economical sensor equipped Blind capable of assisting blind to navigate easily.

3. METHODOLOGIES OF PROBLEM SOLVING

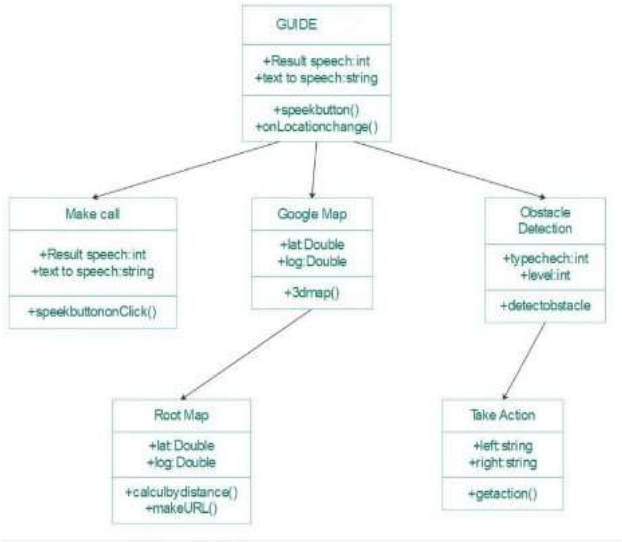
The single problem can be solved by different solutions. This considers the performance parameters for each approach. Thus considers the efficiency issues.

- Problem Solving Methods are concerned with efficient realization of functionality. This is an important characteristics of Problem Solving Methods and should be deal with it explicitly.
- Problem Solving Methods achieve this efficiency by making assumptions about resources provided by their context (such as domain knowledge) and by assumptions about the precise definition of the task. It is important to make these assumptions explicit as it give the reason
- The process of constructing Problem Solving Methods is assumption based. During this process assumptions are added that facilitate efficient operationalization of the desired functionality

4. ADVANTAGES

1. Low power consumption.
2. Easy to use
3. Voice controlled
4. Notification

CLASS DIAGRAM



4. CONCLUSION

To sum up, this smart system can act as a complete guide for blind people to walk with the help of a single stick without any complex hardware or software incorporated into it. This simple Blind, is not used to just detect obstacles present in any direction and alert the person , but uses the distance calculation to give the optimum direction(by detecting obstacles) in which the person can proceed. There is only use of one buzzer for every direction that makes different sounds for left, right, front instead of using three different buzzers. A battery powers the Blind. This Blind not only shows the direction, but can also indicates the person if he/she is blocked on three sides.In this system it includes GPS module trough which live location of the person can be traced.

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