Research Paper

Volume : 2 | Issue : 8 | August 2013 • ISSN No 2277 - 8179

Implementation of Navigation System for Visually Impaired Person

Engineering

KEYWORDS : Comparator, Microcontroller, Infra Red sensor, APR sounds system.

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ABSTRACT

This paper covers the basis and design of the Blind audio guidance system. It describes a guidance system for blind and partially sighted people with the aim of coping in the known and unknown internal and external spaces without the assistance of human guides. This represents a significant step forward in the application of innovative technological solutions to increase independence and improve the quality of life for people with disabilities. It describes the technical and functional architecture of the system for orientation and guidance of a blind person using available modern technology. The Blind Audio guidance is systems that will help blind people navigate through buildings. The system is implemented using proximity sensors (IR sensors) that are located at various locations in a particular building (say an organization).

I.INTRODUCTION

There are approximately 37 million people across the globe who are blind, over 15 million are from India. Currently most blind people rely on other people or dogs. Many disabled people prefer to do things independently rather than rely on others. The Blind Audio Guidance System can provide a solution to this problem. It can detect the explosives and save many lives. Blind and visually impaired are disadvantaged because they lack information about the obstacles and dangers, they have little information about the visual markings in space, they have no sense of direction and speed,

Essential to the people who can see for navigation through familiar, as well as through the unknown environments using maps or instructions. The main goal of our project is to provide a cost-effective way to support the blind people for automatic identification and tracking of the desired destination.

In this project, using the APR 9600 IC chip, we have recorded the route guidance for the blinds. As soon as the proximity sensor senses a person, it guides the person using speakers installed near the sensors. With the help of this report the Blind Navigation system will be very useful for blind person. In which Infra red sensors are used to detect the object or obstacle in path and navigate the blind person use of audio instructions. We also hope that such a system will allow blind travelers to develop much better representations of the environment through which they are traveling than is currently the case without information about what lies off-route. So, the blind person will be navigated by using "Blind Audio Guidance System". By use of system the blind person will be able to walk without use of stick and also used for both indoor and outdoor.

The project contains 3 main parts. The first part is the proximity sensor (IR sensor), microcontroller and voice recorder/replay IC. These proximity sensors will be placed around the building, indicating different parts of the building (i.e. classrooms, elevators, stairs, and labs etc). The blind person will walk around the building, as soon as blind person passes through the various proximity sensors installed at different locations, the sensor senses the person and a signal is fed to the microcontroller and accordingly pre-feeded data gets selected within microcontroller and finally with the help of the APR9600 IC the blind person will be guided to his particular destination [1].Our long-term goal is to create a portable, self-contained system that will allow visually impaired individuals to travel through familiar and unfamiliar environments without the assistance of guides.

II.BLIND NAVIGATION SYSTEM

For reliable navigation (of blind) pedestrians, it is necessary to determine current position of the user, using different sensors that are integrated into the system. This is called "Integrated Positioning" [2]and it consists of the following tasks:

1. Tracking the movement of pedestrians in real time using the appropriate location sensors in order to optimally estimate the current position of the user.
2. Achieving the uninterrupted monitoring of the position during the transition from outdoor and indoor areas.

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b) microcontroller
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III.IR SENSOR UTILITY

Based on a simple basic Idea, this proximity sensor, is easy to build, easy to calibrate and still, it provides a detection range of 35 cm (range can change depending on the ambient light intensity).This sensor can be used for most indoor applications where no important ambient light is present. For simplicity, this sensor doesn't provide ambient light immunity, but a more complicated, ambient light ignoring sensor should be discussed in a coming article. However, this sensor can be used to measure the speed of object moving at a very high speed, like in industry or in tachometers. In such applications, ambient light ignoring sensor, which rely on sending 40 KHz pulsed signals cannot be used because there are time gaps between the pulses where the sensor is 'blind'... The solution proposed doesn't contain any special components, like photo-diodes, photo-transistors, or IR receiver ICs, only a couple if IR LEDs, an Op amp, a transistor and a couple of resistors. In need, as the title says, a standard IR led is used for the purpose of detection. Due to that fact, the circuit is extremely simple, and any novice electronics hobbyist can easily understand and build it[3].

Object Detection using IR light: It is the same principle in ALL Infra-Red proximity sensors. The basic idea is to send infra red light through IR-LEDs, which is then reflected by any object in front of the sensor (fig.1).Then all you have to do is to pick-up the reflected IR light. For detecting the reflected IR light, we are going to use a very original technique: we are going to use another IR-LED, to detect the IR light that was emitted from another led of the exact same type! This is an electrical property of Light Emitting Diodes (LEDs) which is the fact that a led produce a voltage difference across its leads when it is subjected to light. As if it was a photo-cell, but with much lower output current[4].

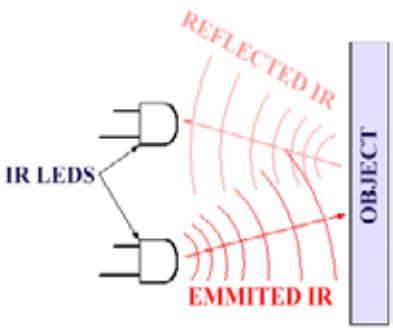

Fig. 1. Object detection using IR light

IV.BLOCK DIAGRAM

Different sensors are located at different locations in an organization. As soon as the person passes through the proximity sensor (IR sensor), sensor senses the person and the signal is fed to the comparator[5]. It compares the signal with the reference signal, and feds the output to microcontroller. The coding has been done in such a way that microcontroller operates only at negative comparator's output voltage. In accordance with comparator's output, pre –feeded data gets selected by the microcontroller, and accordingly the person would be guided towards the next sensor and so on, until his destination arrives. This guidance has been done by using the APR 9600 IC, which is an audio recorder/replay IC. This is a person is guided through our project[6].

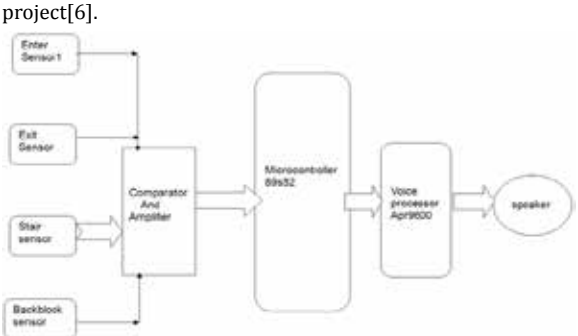

Fig. 2. Block diagram of blind audio guidance system

V. HARDWARE IMPLEMENTATION

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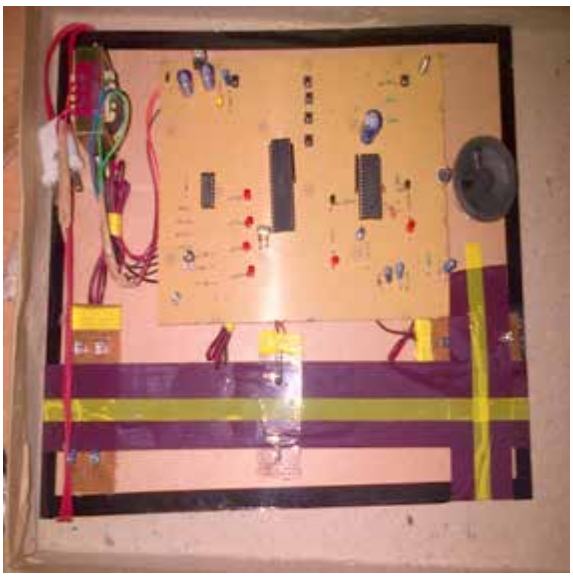

Fig. 3. Hardware implementation

VI.CONCLUSION

With the help of this report the Blind Navigation system will be very useful for blind person. In which Infra red sensors are used to detect the object or obstacle in path and navigate the blind person use of audio instructions. We also hope that such a system will allow blind travelers to develop much better representations of the environment through which they are traveling than is currently the case without information about what lies off-route. So, the blind person will be navigated by using Blind Audio Guidance System. By use of system the blind person able to walk without use of stick and also used for both indoor and outdoor[9].

This report has described a system to transform visual information to auditory information. The broad beam angle IR sensors allow wide-range environment recognition. The main functions of this system are clear path indication. The visual information acquired by the IR sensors is ultimately transformed into auditory information[10].

VII.FUTURE SCOPE

1. In this system, wireless technology can be implemented in future.
2. Up gradation of our project can be done by using high voltage proximity sensors i.e.25V so its range can be extended .
3. With the help of recording, we can store and identify past events.

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