

## Design of the third eye for the blind personnels

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### Abstract

This paper highlights the design of the third eye for the blind personnels. One of the biggest problems that people who are blind face on a daily basis is movement. The loss of their eyesight severely limits their quality of life and activities. In their long-term exploration, they typically use a blind navigation system or their stored recollections. The major goal of the current effort is to provide a strong, dependable, user-friendly, portable, low-power, low-cost solution for efficient navigation. As stated in this study (Smart Glasses for Blind People), the intended audience is those who are visually handicapped. It includes a built-in sensor that emits ultrasonic waves in the direction the user is moving while scanning a maximum of 5–6 metres over a 30 degree angle. The sensor recognises the impediment and transmits a signal to the buzzer, which alerts the user with a beeping sound. The work given here is a mini-project that is taken up as a part of the curriculum completed by electronics and communication engineering students in the second year of the electronics & communication engineering department at Dayananda Sagar College of Engineering in Bangalore.

**Keywords:** Eye, Blind, Special, Sensor, Impaired, Handicapped

### 1. Introduction to the work

According to WHO figures from 2011, there are around 285 million visually impaired persons in the world, of which 39 million are blind and 246 have limited vision. Around 90% of the world's visually impaired persons reside in low-income areas, and 82% of those who are blind are 50 years of age or older. The majority of blind people in the world currently reside in India. Over 15 million of the 37 million blind persons globally are from India. The worst part is that 75% of these cases of blindness could have been prevented. There is a severe lack of donated eyes for the treatment of corneal blindness in India as well as optometrists.

India barely has 8,000 optometrists while having a requirement for 40,000. Most of the time, blind people require support from others. Assistance may come from people, dogs, or certain electronic equipment [1]. There are currently numerous tools available to assist the blind in walking. The most typical is a straightforward cane or walking staff. By sweeping the cane back and forth, the blind man uses it to detect impediments, although occasionally he discovers them after they have already passed. [2] The typical walking cane has been transformed into a blind stick with an ultrasonic sensor attached thanks to current technological advancements. It has a number of drawbacks. As a result, the solution suggested in this paper is an affordable, dependable, sturdy, and portable device that would aid the blind in moving [3].

## 2. Problem Statement

One of the difficulties that those who are blind or visually impaired must overcome in order to live is having to deal with sight loss or low vision. In order to improve their ability to live independently, blind people need more care and attention from society as a whole. The largest issue, though, is how safe it is to live a blind life. Traditional navigational aids are typically canes, which blind people use to tap the ground or walk around an object to determine the direction. Although the canes' simple structures and single functions make them simple to use, their secondary effects are less obvious. [4] In reality, blind people using canes will often run into difficulties due to poor road conditions, uneven surfaces, and hanging in front of obstacles. This has a serious impact on the safety of blind travellers [5]. Because visual impairments restrict how a person can connect with people, access information, and gain new knowledge and experience, the necessity for aiding aids with the ability to multitask in order to deal with various scenarios is a crucial issue [14]. The majority of users of the aids and technologies now on the market are people with normal or low incomes, thus new gadgets with comparable functions and lower pricing are required [6].

## 3. Proposed Methodologies Adopted [13]

Hardware & Software tools used in the mini-project:

- Arduino Nano9
- Ultrasonic Sensor
- Piezo Buzzer
- 1000mAh Battery
- Switch
- Jumper Wires
- Black Glass
- ARDUINO IDE 1.8.19 SOFTWARE

Arduino Nano:-

It has 22 I/O pins in total in which 14 are Digital (6 are PWM output) and 8 are Analog pins.

Operating Voltage (Logic Level): 5V.

Supports Serial, I2C, SPI Communication Protocols.

Flash memory: 32KB in which 2KB is used by Bootloader

DC Current per I/O Pin: 40 mA

DC Current per I/O pin: 40mA

Ultrasonic sensor:-

Operating voltage: +5V

Operating Current: <15mA

Theoretical Distance that can be measured: 2cm to 4m

Practical Distance that can be measured: 2cm to 80cm

Accuracy: 3mm

Measuring angle covered: <15

Switch:-

Voltage: 100V

Current: 2A

Piezo Buzzer:-

Wide operating voltage: 3~250 V.

Lower current consumption: less than 30 mA higher rated frequency.

Higher sound pressure level.

Battery:-

Battery Type: Lithium Polymer Battery. Configuration: 1S1P.

Capacity: 1000mAh.

Voltage: 3.7V.

Jumper wire:-

Current:4-20 mA

Cable Length: 20 cm - 8 Inch

#### 4. Constructing the POV display [12]

The Proposed system consists of the equipment like Arduino nano, Ultrasonic Sensor, Buzzer for detecting the obstacles and letting the user know about the obstacle, switch, jumper cables, charging module. The wiring of the device is done in the following manner [7] :

- The negative of the Buzzer is connected to the ground and the positive of the Buzzer is connected to the Digital Pin number 12 of the Arduino.
- The Ultrasonic Sensor Pin Vcc is connected to the +5V Pin of the Arduino.
- The Trig Pin is connected to the digital Pin number 10 of the Arduino.
- The Echo Pin is connected to the digital Pin Number 11 of the Arduino.
- The Ground Pin is connected to the ground Pin of the Arduino.
- The Switch here is used for selecting the mode and is connected to the Vin Pin of the Arduino and the other terminal is connected to the out+ Pin of the charging module.
- The positive of the battery is connected to the B+ Pin of the charging module and negative Pin of the battery is connected to the B- Pin of the charging module.
- The Out- Pin of the charging module is connected to ground pin of the Arduino [11]

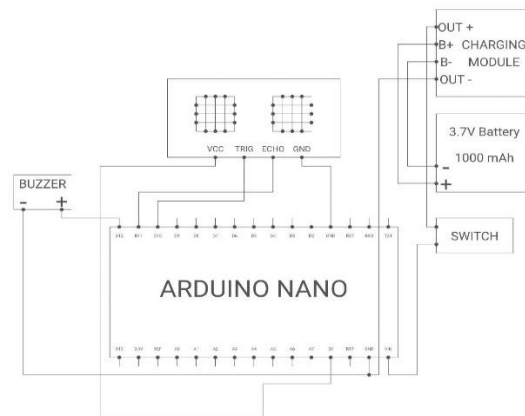


Fig. 1 : Overall block diagram of the project

#### 5. Results & Discussions

- The POV display or the rotating LED display is a simple concept where we light LEDs at a variety of sequences in order to get an illusion of text being displayed [8].
- The POV display, displays the given message without any errors or fluctuations [9]
- POV LED displays are better than other displays in terms of power savings, less complexity, easy configuration, attractiveness etc [10].
- POV LED displays can attract a large audience and helps with marketing.

#### 6. Conclusion & Future Work

The presented system is designed and configured for the use of the blind and visually disabled people. This device is able to handle several states that the visually impaired people face. This device responds to the user in all the circumstances faced by the blind people with the help of the ultrasonic sensors and the Arduino board. It serves as what is called a 'Mobility Aid', to assist those who are visually disabled, have what is close to a normal lifestyle and perform certain daily activities independently. With this in mind, the information system is simple, portable and easy to use. With some improvements in the hopes to extend the up time and make it last longer. There is also works

in progress to add voice feedback to the users so as to still make things easy for them. These upgrades would include a GPS tracker and Bluetooth function so as to be integrated into an automated wheelchair and the technology can only skyrocket from there. To conclude, it is clear that not all users will be able to grasp this kind of technology, as most of the mobility still relies mainly on their feeling of their environment and through natural instincts. However, the project and research can actually open up the flood gates to new sets of advancement in human development as it aims to bring disabled people back into the society, as most of them have become a discriminated section of the modern day community.

**Applications :** Movement & Detection of obstacles

**Problems faced during construction :** Soldering the wires, Buzzer not buzzing due to loose connections and forming connections AND difficulty in coding the Arduino Nano board.

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