



BLIND NAVIGATOR

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Problem / Question

About 285 million people are visually impaired worldwide: **39 million** are completely blind and of them over **15 million are from India**. They face problems to navigate in their day to day life.

Hypothesis

- A device which assists visually impaired to navigate.
- Compact and handy design, easy to use.
- Substitute for stick.
- Medium to interact with environment.
- Low cost and Affordable

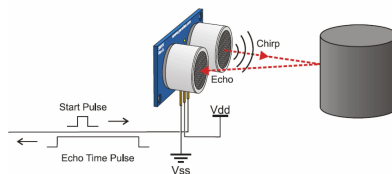
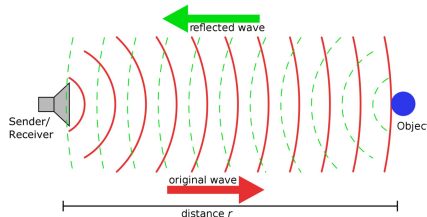
Project Overview

- The aim of the Project is to make an embedded device which is able to give the blind person some details of his environment in form of acoustic and haptic feedback.
- At the same time it can be used to give instant directions to the blind to reach his destination, so that he doesn't need to depend on others for help while walking.
- Low power embedded component improves the battery life to help the blind whole day.

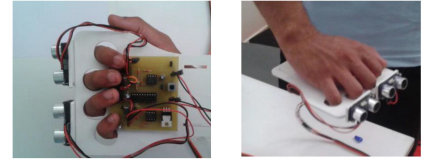
Technical Overview

- Use of HCSR04 ultrasonic sensors as range finders with maximum range of 2 meters.
- 4 ultrasonic sensors are used , 2 for front ,1 for above and 1 for obstacles below.
- Use of ultra low power AVR Atmega 8L as embedded microcontroller to reduce the power consumption.
- Use of 4 vibrator motors used in mobile phones for haptic feedback.
- The vibrators are actuated by giving a Pulse-Width-Modulation (PWM) output from the micro-controller; the intensity increases as the distance of obstacle decreases.
- Use of 2-cell 7.4v Li-Po battery for longer battery life.
- Use of acrylics for light weight.
- Knuckle punch ergonomic design

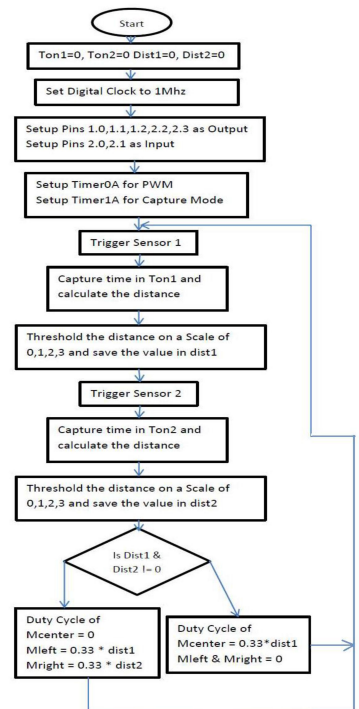
Ultrasonic Sensors



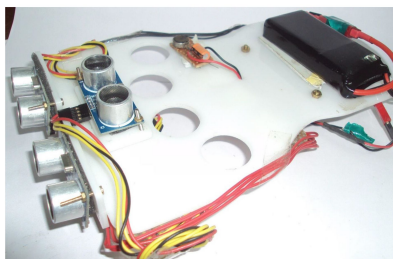
Design



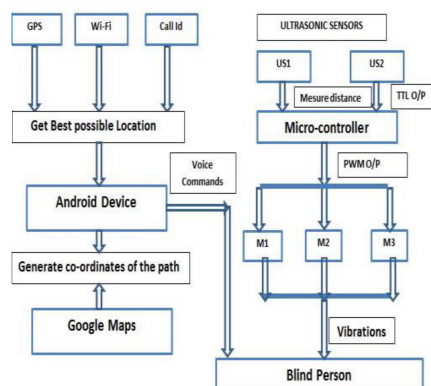
Algorithm



Blind Navigator



System Level Block Diagram



Achievements



- Awarded 3rd position at Texas Instrument Innovation Analog Design Challenge 2013.
- Published in IEEE Explorer Digital Library.
- Filed for an Indian patent for innovation and design.
- Featured in various newspapers.