



SMART STICK FOR VISUALLY CHALLENGED PEOPLE

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Date: 18-11-2022

A MINI PROJECT REPORT

Submitted by

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BATCH GUIDE

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Project Guide Signature

CONTENT:

- INTRODUCTION
- ABSTRACT
- NEED FOR THE PROJECT
- PROPOSED WORK
- BLOCK DIAGRAM
 - i. Function of each Block as Sub headings
 - ii. Components used
 - iii. Result/Output
 - iv. Hardware/Software Details
- APPLICATIONS
- CONCLUSION
- Prototype of project
- Photo of Team members with Guide

INTRODUCTION:

Globally, the number of people of all ages living with sight loss is estimated to be 285 million, of who 39 million are visually impaired according to the World Health Organization (WHO). Among many constraints faced by a visually impaired person, the challenge of independent navigation and mobility is prominent. Generally, visually impaired people rely on assistance of sighted persons to find their way or need an accompanying person to follow; at least during a training period. This means that the majority of visually impaired people cannot find their way autonomously in an unknown area. Generally visionless persons use a white cane or walking cane.

Electronic oriented technology like Ultrasonic sensor can be used to assist the visually impaired person. In this technology, energy waves are emitted ahead, then it is reflected from obstacles in the path of the user and detected by a matching sensor. Thus, the distance to the obstacle is calculated according to the time variance between the two signals. We have used different vibration intensities to indicate the distance of the object using the vibration motor. If the visually impaired person is too close to the obstacle the motor will vibrate at a higher intensity and also a buzzer will be turned on, alerting the visually impaired man to walk in different direction.

1 .EYE SIGHT PLAYS A MAJOR ROLE IN COLLECTING MOST OF THE INFORMATION FROM THE REAL WORLD AND THAT INFORMATION WILL BE PROCESSED BY BRAIN, VISUALLY IMPAIRED PEOPLE SUFFER INCONVENIENCES IN THEIR DAILY LIFE AND SOCIAL LIFE. BLINDNESS OR VISUAL IMPAIRMENT IS CONDITION THAT AFFECTS MANY PEOPLE AROUND THE WORLD.

2. . THIS CONDITION LEADS TO THE LOSS OF THE VALUABLE SENSES OF VISION.WORLDWIDE THERE ARE MILLIONS OF PEOPLE WHO ARE VISUALLY IMPAIRED , WHERE MANY OF THEM ARE BLIND. THE NEED FOR ASSISTIVE DEVICES WAS AND WILL BE CONTINUOUS.

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ABSTRACT:

1. IN THIS WORK, A SMART STICK FOR VISUALLY IMPAIRED PERSONS IS DESIGNED. THIS SMART STICK HELPS BLIND PEOPLE TO PERFORM THEIR DAILY TASKS WITH AN EASE AND COMFORTABLE.

2. . IN A NORMAL STICK THE DETECTION OF OBSTACLE IS NOT DONE AND IT IS NOT EFFICIENT FOR VISUALLY IMPAIRED PERSONS, WHEREAS IN THIS SMART WALKING STICK, THE OBJECT IS DETECTED AND ALSO IT MEASURES THE DISTANCE BETWEEN OBJECTS BY USING ULTRASONIC SENSOR. HOWEVER THIS SMART STICK CAN ALSO DETECT OVERHANGING OBJECTS.

3. THIS STICK GIVES PRIOR INFORMATION ABOUT THE PRESENCE OF OBJECTS BEFORE ACTUALLY TOUCHING THE OBJECT. THIS SMART STICK IS ALSO PROVIDED BY WHEELS WHICH MAKE THE BLIND PERSON TO MOVE THE STICK EASILY WITHOUT LIFTING IT, AND THIS COULD AVOID ANY SUDDEN COLLISIONS TO AN OBSTACLE.

NEED FOR THE PROJECT:

1. THE MAIN OBJECTIVE OF OUR PROJECT IS TO PROVIDE A SOUND BASED ASSISTANCE TO BLIND PEOPLE. HERE WE ARE TRYING TO DEVELOP A SYSTEM THAT HELPS BLIND PERSON TO TRAVEL INDEPENDENTLY AND WORKS EFFICIENTLY.

2. OUR PROJECT FOCUSES ON DESIGNING A DEVICE FOR BLIND PEOPLE THAT HELP THEM TO TRAVEL INDEPENDENTLY AND ALSO IT MUST BE COMFORTABLE TO USE.

3. THE PROPOSED DEVICE IS USED FOR GUIDING INDIVIDUALS WHO ARE BLIND OR PARTIALLY SIGHTED. THE DEVICE USED TO HELP BLIND PEOPLE TO MOVE WITH THE SAME EASE AND CONFIDENCE AS A SIGHTED PEOPLE.

PROPOSED WORK:

THE PROPOSED SYSTEM CONSISTS OF THREE MAIN UNITS :- ULTRASONIC SENSOR UNIT, ARDUINO UNIT AND CONVERSION PART.

Ultrasonic Sensor Module

Ultrasonic sensor is used, as, it is less affected by target materials or by colour, it is capable of detecting objects within a range of 4 meter. These ultrasonic sensors are designed to resist external disturbances such as vibration, infrared radiation, ambient noise, and EMI radiation. The sensor used is a SRF-04. It requires a short trigger pulse and it provides an echo pulse. Ultrasonic waves are emitted from the module and bounce back when hits an objects and obstructions in the path of the user. The output of the sensor provides change in voltage with respect to the distance of the obstacle. Also potholes can be detected using this system

1. ULTRASONIC SENSOR - HIGH FREQUENCY SOUND WAVE GENERATED ULTRASONIC SENSOR. THE TIME INTERVAL BETWEEN SENDING THE SIGNAL AND RECEIVING THE ECHO IS CALCULATED BY SENSOR TO DETERMINE THE DISTANCE TO AN OBJECT.

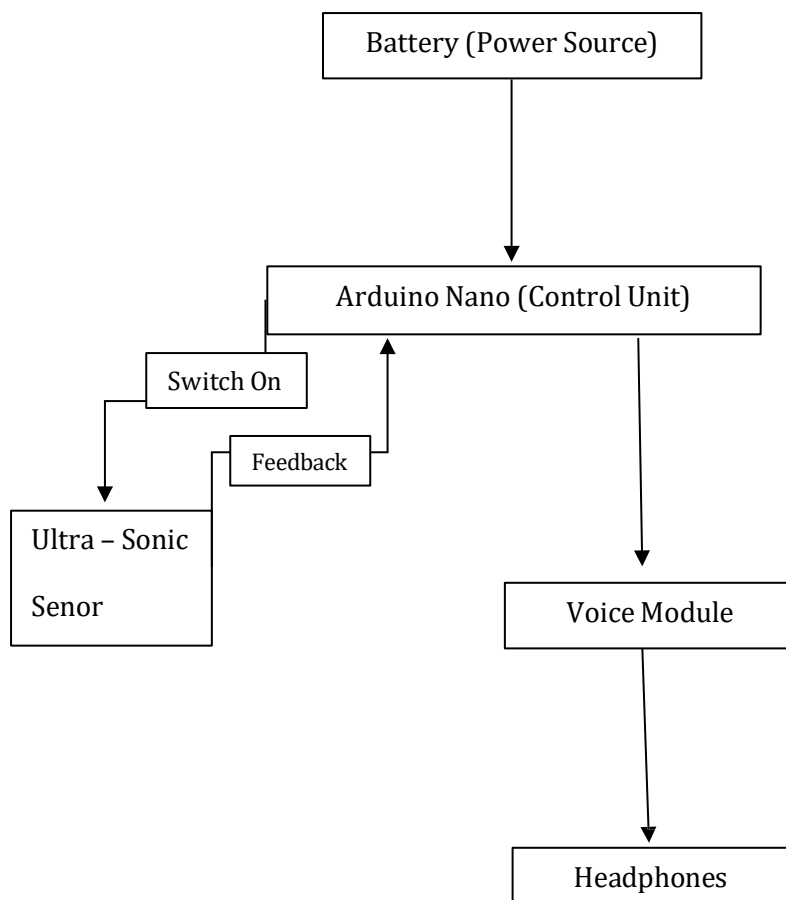
Control Unit

The control sub-system consists of an Arduino Board having an ATMEGA328P microcontroller merged in it. Arduino is an open-source single board microcontroller, heir of the open-source Wiring platform, thus helping in designing electronics projects easily. The hardware consists of a simple open hardware design for the Arduino board with an Atmel AVR processor and on-board input/output support. The software consists of a standard programming language compiler and the boot loader that runs on the board. The sensor output is provided to an Arduino which calculates the distance based on the program. The obtained value is compared with the fixed value and a vibratory pattern of different intensities is generated

2. ARDUINO UNIT - THIS MODULE DEALS WITH THE TAKING INPUT FROM THE OBSTACLES COMING ACROSS THE WAY AND GIVING OUTPUT ACCORDING TO THAT INPUT USING SOUND NOTIFICATION.

3. VOICE COMMAND MODULE.- THIS MODULE DEALS WITH GIVING THE INSTRUCTION TO THE BLIND USER ABOUT THE OBSTACLES THROUGH BUZZER SOUND.

BLOCK DIAGRAM:



COMPENENTS USED:

1. Battery
2. Ultrasonic sensor
3. Voice Module
4. Arduino Nano
5. Head Phones
6. SD card

HARDWARE/SOFTWARE DETAILS:

HARDWARE:

1. ULTRASONIC SENSOR:

* (The HC-SR04 Ultrasonic Distance Sensor is a sensor used for detecting the distance to an object using sonar).

2. BATTERY:

*The battery is used to provide power supply to the system for its operation.

3. Arduino Nano:

*Arduino Nano is a microcontroller board designed by Arduino.cc. The microcontroller used in the Arduino Nano is Atmega328, the same one as used in Arduino UNO.

*It has a wide range of applications and is a major microcontroller board because of its small size and flexibility.

4. SD Card:

*Storing data is one of the most important parts of every project. There are several ways to store data according to the data type and size.

*SD and micro SD cards are one of the most practical ones among the storage devices, which are used in devices such as mobile phones, minicomputers and etc.

SOFTWARE:

ARDUINO FORUM:

*Arduino is an open source electronic platform based on easy to use hardware and software.

*Arduino hardware was designed for artists designers hackers and newbies in creating intracting object or environment.

RESULT:

* The project was made with the working hardware model, detecting the obstacles if come across any obstacles

* The blind stick proposed model can aid the virtually impaired user by helping him/her navigate through different terrains and obstacles.

* Detecting the obstacle with the help of Ultrasonic sensors and it can provide notification to user holding it in the sound form via arduino buzzer.

* Ultrasonic sensor, arduino are tested individually as well as integrated. As ultrasonic sensors work on principle of echo, studying of its reflection on different obstacle is very important.

APPLICATION:

1. IT WORKS AS A NAVIGATION DEVICE FOR THE BLIND PEOPLE BY ALERTING THEM ABOUT DANGERS.

2. *THE SYTEM IS APPLIED IN AUTOMOTIVE PARKING SENSORS AND OBSTACLES WARNING SYSTEM.*

3. *TO DETECT THE OBSTACLES IN VARIOUS DIRECTIONS, DETECTING PITS AND MANHOLES ON THE GROUND TO MAKE FREE TO WALK.*

4. *A DEVICE FOR THE VISUALLY IMPAIRED TO GUIDE THE USER TO RESPECTIVE DESTINATION AND AVOIDING TO COLLIDE WITH THE OBSTACLES.*

CONCLUSION:

** HUMANS ARE NOT DISABLED. A PERSON CAN NEVER BE BROKEN. OUR BUILT ENVIRONMENT, OUR TECHNOLOGIES, IS BROKEN AND DISABLED.*

** THE SMART STICK ACTS AS A BASIC PLATFORM FOR THE COMING GENERATION OF MORE AIDING DEVICES TO HELP THE VISUALLY IMPAIRED TO NAVIGATE SAFELY BOTH INDOOR AND OUTDOOR. IT IS EFFECTIVE AND AFFORDABLE*

** FURTHER ASPECTS OF THIS SYSTEM CAN BE IMPROVED VIA WIRELESS CONNECTIVITY BETWEEN THE SYSTEM COMPONENTS, THUS, INCREASING THE RANGE OF THE ULTRASONIC SENSOR AND IMPLEMENTING A TECHNOLOGY FOR DETERMINING THE SPEED OF APPROACHING OBSTACLES.*