iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 10 **Issue:** V **Month of publication:** May 2022

DOI: https://doi.org/10.22214/ijraset.2022.42497

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue V May 2022- Available at www.ijraset.com

Blind Stick Using Ultrasonic Sensor with Voice Announcement

B. Manikandan[1], S. Jayalakshmi[2], R. Sivaranjani[3], R. Rahul[4], G. Nishanth[5]
[1]*Assistant Professor, Department of Information Technology*
[2, 3, 4, 5]*Student, Department of Information Technology, Hindusthan Institute of Technology, Coimbatore, India*

Abstract: ***Traditionally visually impaired people used a stick to find out if any obstacles are present in front of them. The ultrasonic blind walking stick is way more advanced than the traditional walking stick as the use of sensors makes object detection easier. The system has one more advanced feature integrated to help the blind find their stick if they forget where they kept it. A wireless RF based remote is used for finding the lost stick by pressing the remote button and buzzer sounds on stick. Thus this system allows for obstacle detection as well as finding stick if misplaced by visually disabled person. The another feature of this stick is to detect water on the ground. This stick also indicate day or night vision for blind person. This project discuss about how this stick is built and how it will help blind people.***

I. INTRODUCTION

The visually impaired are at a considerable disadvantage because they often lack the information for avoiding obstacles and hazards in their path. They have very little information on self- velocity, objects, direction which is essential for travel. The system designed will detect an object or obstacle using ultrasonic sensors and gives audio instructions for guidance. An obstacle as close to minimum distance can be detected by this module. A resolution of obstacle distance has been designed and achieved. It is very important to maintain efficient information while traveling to the blind people. This system has been aimed at design and development of a smart and intelligent blind stick which helps in navigation for the visually impaired people. The navigator system designed will detect an object or obstacle using ultrasonic sensors and gives audio instructions for guidance. The algorithm developed gives a suitable audio instruction depending on the duration of ultrasound travel. We developed this system to detect the obstacle while travelling and give voice notification to visually impaired people. In this paper, a solution is proposed to move safely and detect obstacle in their path. Solution was composed of a foldable stick with a pair of IR sensor mounted on it. Connected to an earphone to alert the blind with speech warning message about the detected obstacle.

II. LITERATURE REVIEW

The main aim of this system is to permit blind persons to explore autonomously in the outside environment. Ordinary route navigational systems in the outdoor environment are expensive and its manufacturing is time consuming. Blind people are at extensive drawback as they regularly do not have the data which is required, while passing obstacles and dangers. They generally have little information about data such as land marks, heading and self velocity information that is crucial for them to explore them through new environment.

The aim of the overall system is to provide a low cost and efficient navigation aid for blind which gives a sense of artificial vision by providing information about the environmental scenario of objects around them.

Today technology is improving daily in different aspects in order to provide flexible and safe movement for the people. In this technology driven world, where people strive to live independently, this paper propose a low cost 3D ultrasonic stick for blind people to gain personal independence, so that they can move from one place to another easily and safety. A portable stick is design and developed that detects the obstacles in the path of the blind using ultrasonic sensors. It consists of these sensors to scan three different directions, a microcontroller, buzzer and DC vibration motor.

This study aims to develop a tool that can be used to detect obstacles for blind people. This tool also uses the HC-SR04 ultrasonic sensor. The method used in the manufacture of blind assistive prototypes in the form of sticks using Arduino and Ultrasonic Sensors for blind people with the method obtained by hardware design techniques used consists of ATMEGA328 as the main controller, Ultrasonic sensor HS-SRF04 as detecting objects and LM2596 Regulator modules used for lowering the DC voltage level, this study has produced a prototype design stick for blind people using sensor technology to help alert and move blind people who are able to detect objects at a minimum distance of 7 centimeters with output in the form of sound and vibration.

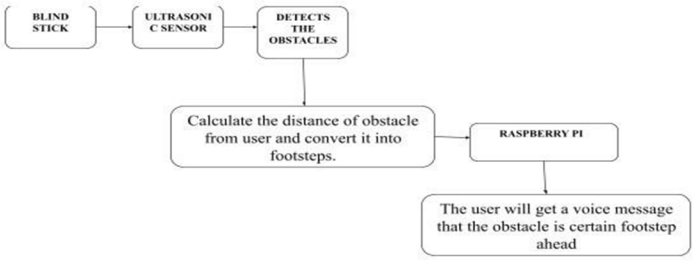
The objective of this study is to improve the quality of life for the visually impaired by restoring their ability to self-navigate. In this paper we describe a compact, wearable device that converts visual information into a tactile signal. This device, constructed entirely from commercially available parts, enables the user to perceive distant objects via a different sensory modality. Preliminary data suggest that this device is useful for object avoidance in simple environments.

III. DESCRIPTION OF MODULES

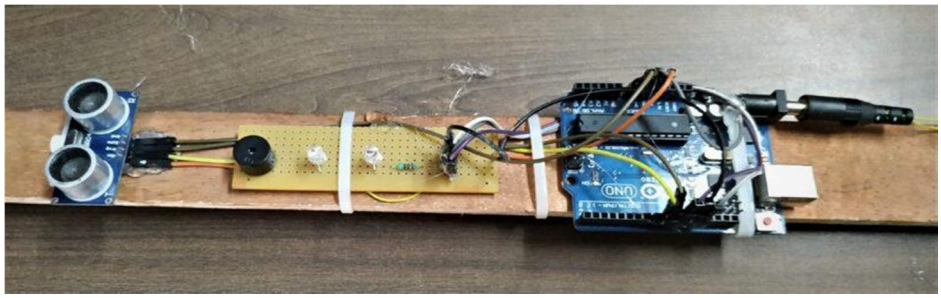
1) *Ultrasonic Transducers:* Generating, detecting & processing ultrasonic signals Ultrasonic sensor is produce the sound waves above the frequency of human hearing and can be used in a different variety of applications such as, sonic rulers, proximity detectors, movement detectors, liquid level measurement. Ultrasonic Sensor Ranging Module HC - SR04.
2) *IR Sensor:* To detect small size of obstacles: pit, staircase, or stone, as it located at the lower side of the stick. After detecting the small size of obstacles on ground, IR sensor will send the signal to the Arduino, as result it will send a voice instruction for small obstacle available. And at the same time it will enable the buzzer for informing the blind person about presence of obstacles on ground.
3) *Water Sensor:* A water sensor is located at the base or bottom of the stick to have precaution against the wet surface which it can causing slipping on the floor and thus can hurt. When the water sensor comes in contact of the wet surface, it produces an electrical signal which triggers the Arduino controller. A voice instruction for wet surface is produced and also a buzzer is enabled for alarming against a wet floor.
4) *LDR Sensor:* Light Dependent Resistor, changes its resistances due to change of the light intensity. During night, LDR will have high resistance and no current pass through it but through a LED connected parallel to it which illuminates and acts as a Flashlight, which can be easily noticed by others. It alerts people about the presence of blind person to let him to pass the way.
5) *Arduino Nano:* The Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328. Arduino can control the environment by receiving input signals and can effects its surroundings by controlling lights, relays and other devices.
6) *Raspberry Pi:* The Raspberry Pi is a low cost, credit-card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. It is a capable little device that enables people of all ages to explore computing, and to learn how to program in languages like Scratch and Python.

IV. DATA FLOW DIAGRAM

A. *Diagram*



V. IMPLEMENTATION



Implemented Blind Stick

VI. CONCLUSION

All the studies which had been reviewed show that, there are a number of techniques for making a ultrasonic blind stick for blind people. The aim of this paper is to get familiar with the work done in making walking stick smarter and more helpful. The literatures related to this topic were reviewed and analysed. As technology improves these smart sticks need to be modified. The simulation results are expected for the ultrasonic sensors, water sensor in one microcontroller. So in this paper wide survey of the work related to this project is done and we have shortlisted some useful aspects from each project. This will also help to decide designing approach. The Smart Stick acts as a basic platform for the coming generation of more aiding devices to help the visually impaired to be more safe. It is effective and afford. It leads to good results in detecting the obstacles.

REFERENCES

[1] Osama Bader AL-Barrm International Journal of Latest Trends in Engineering and Technology (IJLTET)
[2] Smart Cane Assisted Mobility for the Visually Impaired, World Academy of Science, Engineering and Technology International Journal of Computer, Electrical, Automation, Control and Information Engineering Vol:6, No:10, 2012
[3] Lise A. Johnson and Charles M. Higgins, ―A Navigation Aid for the Blind Using Tactile-Visual Sensory Substitution.

BIOGRAPHY

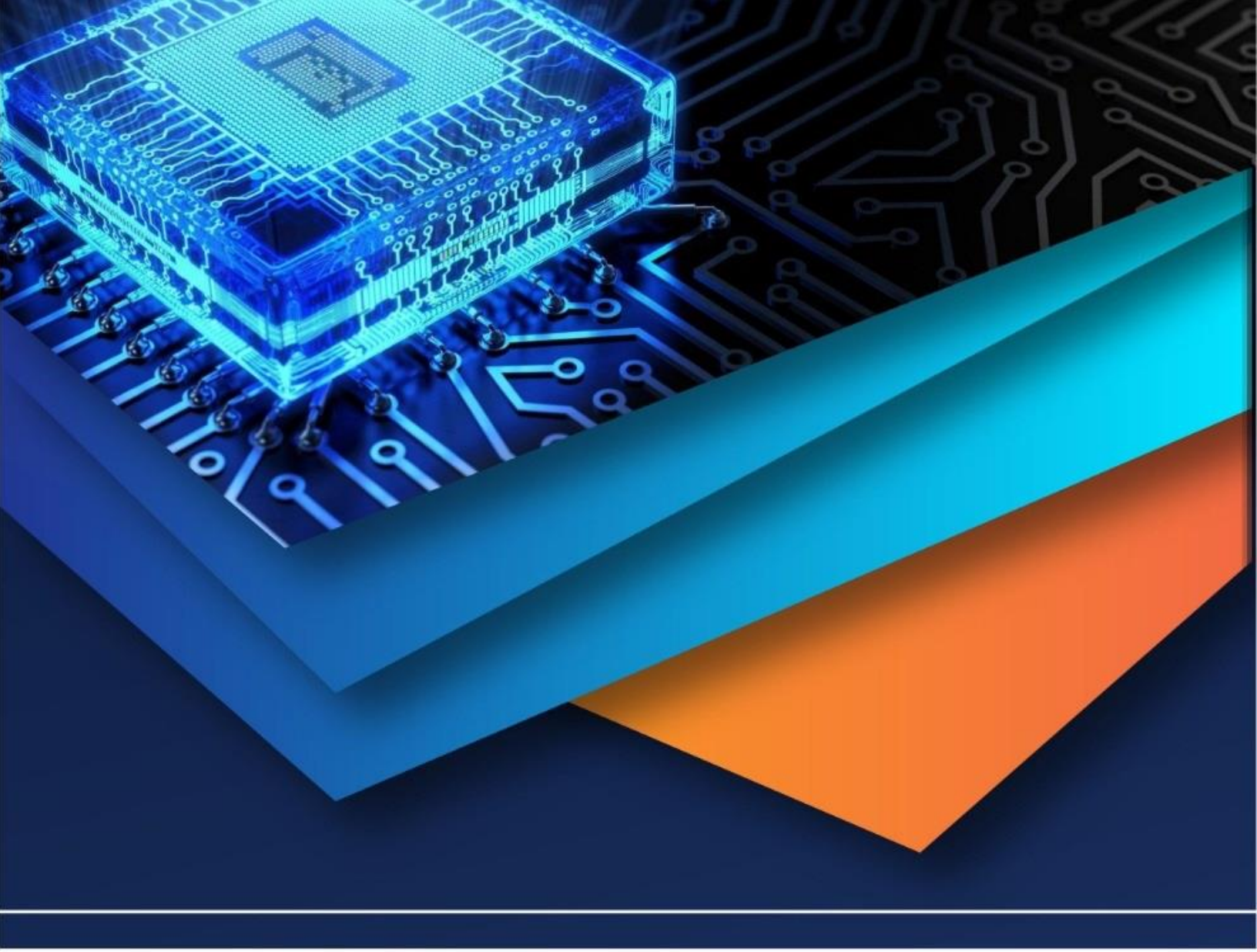
Manikandan B is Assistant Professor in the Department of Information Technology at Hindusthan Institute of Technology, Coimbatore. He completed his Master of Information Technology M.S(IT) from Bharathidasan University in 2002 and M. E (CSE) Degree from Sathyabama Institute of science and technology in 2007, Chennai. His area of interest is Computer Networks and Web Technology. His interested area of research is situated in the field of Technology & Innovation, with a special focus on software defined networking, academic entrepreneurship and collaborative R&D in high technology industries. He teaches several courses on Web Technology entrepreneurship and the networking courses to engineering students.

Jayalakshmi S is a Final year student in the Department of Information Technology at Hindusthan Institute of Technolog.Her area of interest is in IOT

Sivaranjani R is a Final year student in the Department of Information Technology at Hindusthan Institute of Technology.Her area of interest is in IOT

Nishanth G is a Final year student in the Department of Information Technology at Hindusthan Institute of Technology.His area of interest is in IOT

Rahul R is a Final year student in the Department of Information Technology at Hindusthan Institute of Technology. His area of interest is in IOT



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY