IJAREEIE

e-ISSN: 2278-8875
p-ISSN: 2320-3765

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

Volume 13, Issue 4, April 2024

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 8.317

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 8.317|| A Monthly Peer Reviewed & Referred Journal |

||Volume 13, Issue 4, April 2024||

| DOI:10.15662/IJAREEIE.2024.13040011 |

Roadway Blind People Assistance Using IOT

Mr.Antony Robinson[1], Anose.I[2], Aswin.VR[3], Rathinapathi.M[4], Siva Kumar.M[5]

Assistant Professor, Department of EEE, Francis Xavier Engineering College, Tirunelveli, India[1]

Student, Department of EEE, Francis Xavier Engineering College, Tirunelveli, India[2]

Student, Department of EEE, Francis Xavier Engineering College, Tirunelveli, India[3]

Student, Department of EEE, Francis Xavier Engineering College, Tirunelveli, India[4]

Student, Department of EEE, Francis Xavier Engineering College, Tirunelveli, India[5]

ABSTRACT : Among different forms of disability, blindness is one of the most suffering that can happen to people of all ages and it affects the victim's life severely. Nowadays, a number of researches have been conducted in designing and developing tools that may protect the blind persons from dangerous accidents. Most of the visually challenged people today still use simple sticks as the tool to help their movements especially when they are moving in outdoor spaces. Major developments and advancements in IoT technology can assist the blind person to walk around more comfortably and easily. There are many research papers that are related to this invention of speaking walking stick in which different design implementation such as infrared sensor, radio signal and ultrasonic sensor detection, vibration detection for various applications. This paper proposes ultrasonic sensor for obstacle detection and DHT 11 sensor, Blynk app etc.

KEYWORDS: IOT, DHT 11, Infrared sensor,

I. INTRODUCTION

Vision is the most significant a part of human physiology as 83% of knowledge person gets from the surroundings is via sight. The count of visually impaired individuals rises each year. The 2011 statistics by the World Health Organization (WHO) estimates that there square measure 285 billion individuals in world with visual defect, thirty-nine billion of that number are blind and 246 with low vision. In existence they bear drawback of navigation to go from one place to a different safely and timely. They usually rely on external help which may be provided by humans, trained dogs, or special electronic devices as support systems for deciding. The foremost necessary drawbacks of those aids consists of necessary skills and coaching part, range of motion and extremely very little information sent. With the fast advances of contemporary technology, each in hardware and software package front have brought potential to produce intelligent navigation capabilities.

1.1 PROBLEM STATEMENT

There are a number of blind people who use the simple walking stick to assist them in their daily movement. The stick helps them to detect obstacles in their path and to avoid them from dangerous situations. The common walking stick used by blind persons can implement simple functions only. So, the development of a new smart walking stick, that can detect any object near the person before the user collides with it with the bottom of the stick, is needed.

1.2 OBJECTIVE

The main objective of this project is to build a smart speaking walking stick that can detect obstacles in front of visually challenged people. This smart stick will be able to calculate different distances between the person and the objects for up to 300 cm long and to be able to help more the stick will speak the distance of the nearest object to the blind person. This stick will also be able to detect the fall of the stick using accelerometer. If the person will not pick up the stick for 30 seconds then it will be assumed that the person is in problem and needs immediate help. In order to receive help, the location of the person will be detected using GPS module which will be sent via twitter feed to the guardians of the blind person. In addition, the objective of this project is also to assist motion activities of blind person in their daily routine. Nonetheless, this project also aims to build a low cost, fast, durable and robust speaking walking aid for blind.

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 8.317|| A Monthly Peer Reviewed & Referred Journal |

||Volume 13, Issue 4, April 2024||

| DOI:10.15662/IJAREEIE.2024.13040011 |

1.3 SCOPE AND STUDY

There are two major parts involved in this project, namely hardware and software modules. The hardware part involves the physical development of the walking stick, an accelerometer, an Arduino, raspberry pi, GPS and GSM module, an ultrasonic sensor, earphones and a switch. The software part includes the programming of the sensors. The software used to program Arduino is Arduino 1.0.6 and to program Raspberry Pi is Python on Raspbian operating system. Accelerometer sensor, GPS and GSM module has been configured with Arduino using Arduino programming language. The ultrasonic sensor has been configured with raspberry pi using python. Text to speech module and messaging module have been implemented using python on Raspbian operating system installed on raspberry pi.

II. COMPONENTS

2.1 COMPONENTS AND SPECIFICATIONS:

- Buzzer
- DHT 11
- Node MCU
- Ultrasonic sensor
- Gas sensor
- Arduino IDE software
- Embedded C programming

III. BLOCK DIAGRAM

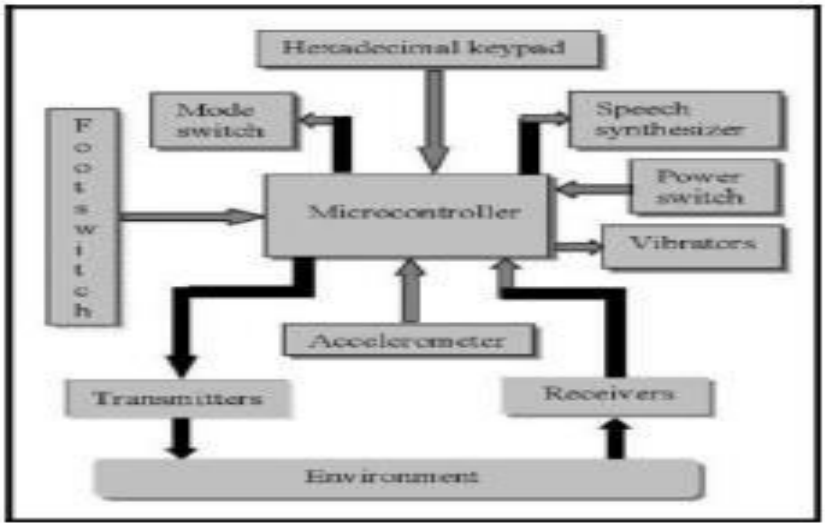


Fig -1: Block Diagram of System

3.1 WORKING

The basic concept of this project is to design a smart electronic guiding stick with obstacle avoidance system by using InfraRed sensor. The designed smart electronic stick is integrated with InfraRed sensor to measure the distance in range of approximately 100-550 cm. The InfraRed consists of a transmitter and a receiver which are combined with each other. The InfraRed beam is transmitted from InfraRed LED (Light Emitting Diode) transmitter which is the range of 100 to 550 cm. The transmitted beam detects the obstructions and is reflected back to photodiode receiver end. Then, the Microcontroller (Arduino Uno) processes the signal and active a vibrator or a buzzer as output indicators that are attached with the handle of the guiding stick.

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 8.317|| A Monthly Peer Reviewed & Referred Journal |

||Volume 13, Issue 4, April 2024||

| DOI:10.15662/IJAREEIE.2024.13040011 |

IV. CIRCUIT DIAGRAM

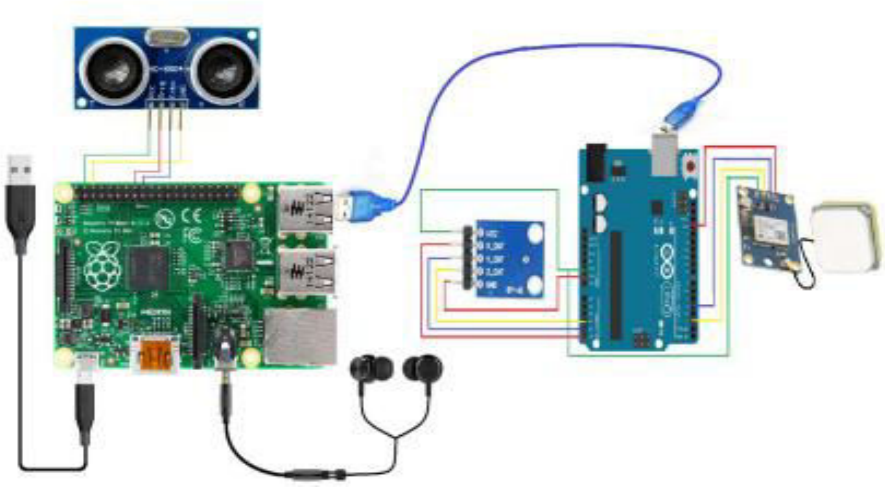


Fig -2: Circuit Diagram of the system

V. RESULT AND DISCUSSIONS

Enhanced Navigation and Mobility: The system can guide visually impaired individuals through complex urban environments using audio cues, haptic feedback, or both, significantly improving their ability to travel independently.Real-Time Traffic Information: By integrating real-time traffic data, the system can warn users about nearby vehicles, busy intersections, and other hazards, helping to prevent accidents.Improved Spatial Awareness: IoT devices can help users "sense" their surroundings more accurately by providing information about nearby landmarks, pedestrian crossings, and changes in the walking path.Emergency Assistance: In case of an emergency, the system can automatically alert authorities or predefined contacts, providing them with the user's exact location.Data Collection and Analysis: By collecting data on how visually impaired individuals interact with their environment, researchers and city planners can better understand their needs and challenges, leading to more accessible urban designsCommunity and Social Integration: Such technologies can also facilitate social interactions and community integration by connecting visually impaired individuals with volunteers or assistance services nearby.Adaptive Learning: Over time, the system can learn the user's preferences and habits, further customizing assistance to enhance the user experience.Implementing a roadway blind people assistant using IoT involves addressing several challenges, including ensuring the privacy and security of users, achieving high levels of accuracy and reliability, and making the technology affordable and accessible to those who need it. However, the potential benefits in terms of increased independence, safety, and quality of life for visually impaired individuals are significant.

VI. CONCLUSION

We practically designed a prototype of an electronic system that helps an assailable/unsafe person to be connected with alert his/her family in times of danger. While most appliances marketed as smart walking stick incorporate only GPS connectivity with some basic features, our project envelopes fall detection, hazard detection, obstacle detection and combine these with the Internet of Things to give a practical solution that puts the technology in service to those in need.In the future, this project can be extended by interfacing a camera to the walking stick. The live video feed of the camera is processed continuously using various digital image processing techniques and by connecting it to a cloud, the surroundings of the person can be estimated and instructions can be given according to it. Whereas this requires High Definition camera, continuous connectivity to high-speed internet, complex data processing techniques, high-speed processor and a cloud server in a remote location.

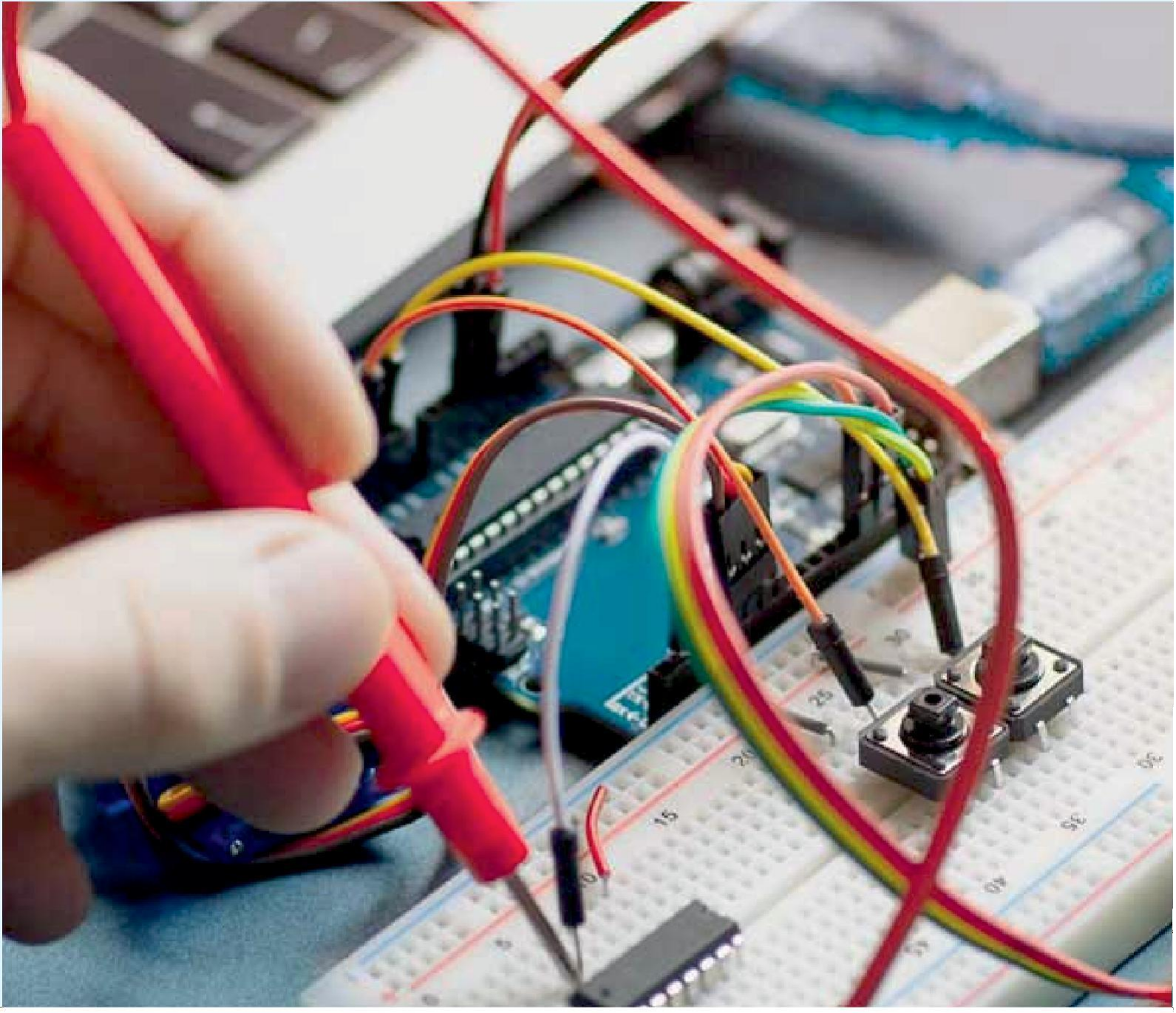
| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 8.317|| A Monthly Peer Reviewed & Referred Journal |

||Volume 13, Issue 4, April 2024||

| DOI:10.15662/IJAREEIE.2024.13040011 |

VII. REFERENCES

[1] Md. MilonIslam;Muhammad Sheikh Sadi;Kamal Z. Zamli;Md. Manjur Ahmed,2019, "Developing Walking Assistants for Visually Impaired People: A Review", IEEE Sensors Journal, vol: 19, no: 8,pp.2814 – 2828.
[2]Wan-JungChang;Liang-BiChen;Ming-CheChen;Jian-PingSu;Cheng-YouSie;Ching-Hsiang Yang,2020,"Design and Implementation of an Intelligent Assistive System for Visually Impaired People for Aerial Obstacle Avoidance and Fall Detection", IEEE Sensors Journal,vol: 20, no: 17,pp.10199 – 10210.
[3] Wan-Jung Chang;Liang-BiChen;Chia-HaoHsu;Jheng-HaoChen;Tzu-ChinYang;Cheng-Pei Lin,2020, "MedGlasses: A Wearable Smart-Glasses-Based Drug Pill Recognition System Using Deep Learning for Visually Impaired Chronic Patients", IEEE Access,vol: 8,pp.17013 – 17024.
[4] GuojunYang;Jafar Saniie,2020,"Sight-to-Sound Human-Machine Interface for Guiding and Navigating Visually Impaired People", IEEE Access,vol: 8,pp.185416 – 185428.
[5] Md. MilonIslam;Muhammad Sheikh Sadi;Thomas Bräunl,2020,"Automated Walking Guide to Enhance the Mobility of Visually Impaired People",IEEE Transactions on Medical Robotics and Bionics,vol: 2, no: 3,pp.485 – 496.
[6] XiaobaiChen;JinglongXu;Zhiyi Yu,2019,"A 68-mw 2.2 Tops/w Low Bit Width and Multiplierless DCNN Object Detection Processor for Visually Impaired People", IEEE Transactions on Circuits and Systems for Video Technology,vol: 29, no: 11,pp.3444 – 3453.
[7]DanieleCroce;LauraGiarré;FedericaPascucci;IleniaTinnirello;Giovanni Ettore Galioto;DomenicoGarlisi;Alice Lo Valvo,2019,"An Indoor and Outdoor Navigation System for Visually Impaired People",IEEE Access,vol: 7,pp.170406 – 170418.
[8] Vidula V. Meshram;KailasPatil;Vishal A. Meshram;FelixChe Shu,2019,"An Astute Assistive Device for Mobility and Object Recognition for Visually Impaired People", IEEE Transactions on Human-Machine Systems,vol: 49, no: 5,pp.449 – 460.
[9] Jean Connier;HaiyingZhou;Christophe De Vaulx;Jian-JinLi;HonglingShi;PhilippeVaslin;Kun Mean Hou,2020,"Perception Assistance for the Visually Impaired Through Smart Objects: Concept, Implementation, and Experiment Scenario", IEEE Access,vol: 8,pp.46931 – 46945.
[10] AboubakrAqle;KamranKhowaja;Dena Al-Thani,2020,"Preliminary Evaluation of Interactive Search Engine Interface for Visually Impaired Users", IEEE Access,vol: 8,pp.45061 – 45070.



INNO SPACE
SJIF Scientific Journal Impact Factor

doi cross ref

ISSN INTERNATIONAL STANDARD SERIAL NUMBER INDIA

निस्केयर NISCAIR

International Journal of Advanced Research

in Electrical, Electronics and Instrumentation Engineering

9940 572 462 6381 907 438 ijareeie@gmail.com

www.ijareeie.com

Scan to save the contact details