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e-ISSN: 2320-9801 | p-ISSN: 2320-9798



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 11, Special Issue 3, November 2023

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.379



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Voice-Guided Obstacle Detection & Navigation for the Visually Impaired

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ABSTRACT: The project “Voice-guided obstacle detection & Navigation for the visually impaired” presents the development of an innovative navigation system utilizing ultrasonic technology to assist visually impaired individuals in navigating their surroundings. The system employs ultrasonic sensors to detect obstacles, which are then conveyed to the user through vibration, buzzer and auditory . By this technology, the proposed project aims to enhance the mobility and independence of the blind, enabling them to safely navigate through various environments. The abstract highlights the potential benefits of this approach in improving the quality of life and autonomy of visually impaired individuals.

KEYWORDS: - Voice-guided obstacles detection , Ultrasonic sensor, vibration , Auditory

I.INTRODUCTION

Vision is a major part of human physiology because 84% of human information leaves the environment through sight. According to the statistics of the World Health Organization (WHO) in 2018, there are 285 billion visually impaired people in the world, of which 39 billion are blind and 246 are amblyopia. For people with visual impairment, traditional and elderly walkers are white canes and guide dogs. The most important shortcomings of these aids are basic skills and preparation phases, range of motion and little information. With the rapid improvement of modern engineering, both intelligent hardware and software provide intelligent navigation. Recently, an electronic travel tool (ETA) was designed and prepared to help blind people navigate independently and safely. People with visual impairment are exposed to people with low vision. They may be blind or visually impaired. These conditions often limit people's ability to perform routine tasks and influence their current tone.

Blindness can be caused by illness, injury or other conditions that limit vision. The Iowa Department of the Blind said that legal blindness means that a person has a vision of 20/200 or less. For the object course, a person with a 20/200 view picks up objects at a distance of 20 feet, and a person with a perfect 20/20 view can pick up at a distance of 200 feet . Recognizing the challenges posed by blindness can help visually impaired people understand the problems that blind people face everyday.

People who are blind or have impaired vision are often difficult to move outdoors in known environments. Every other day we get report about person is missing; most of them include unsighted people.

II. RELATED WORKS

Our ability to see is vital for understanding the world around us. In 2018, the World Health Organization reported 285 million people with visual problems, including 39 million who were completely blind and 246 million with amblyopia. People with visual difficulties typically use traditional tools like white canes and guide dogs. These tools have limitations, such as the need for training, limited range, and lack of information. Modern technology, both hardware and software, now helps the visually impaired navigate. A recent innovation is the electronic travel tool (ETA), which aids blind people in safe and independent navigation. Visual impairments cover a range of conditions, from total blindness to varying degrees of low vision. Blindness can result from different factors, including illness or injury. Legal blindness means having vision of 20/200 or less. Understanding the challenges of blindness can lead to greater empathy and awareness. Blind or visually impaired individuals can face difficulties when navigating unfamiliar outdoor environments, which can lead to safety concerns and missing person reports..

III. EXISTING METHOD

The microcontroller reads the distance of the obstacle using sensor and also commands the buzzer. The buzzer beeps once for left side obstacle, twice for front obstacles and thrice for right obstacles. The vibrator is also connected in parallel with the buzzer for vibration sensation.

IV. PROPOSED SYSTEM

The proposed system could provide users with a tactile feedback mechanism that complements the auditory alerts from the ultrasonic sensors. The vibration feedback could help users detect obstacles and navigate their environment more effectively, especially in situations where auditory cues might be less reliable.

V. BLOCK DIAGRAM

The power supply (3.3v) is given with the help of booster. It passes through the IC 7805 regulator and moves to the AVR Micro Controller. The input are Ultrasonic sensor and SOS button, the Ultrasonic sensor detect the obstacles and provides three different output as Buzzer, Vibration and Auditory button will act as emergency button which sends message to the authorized person through the mobile application.

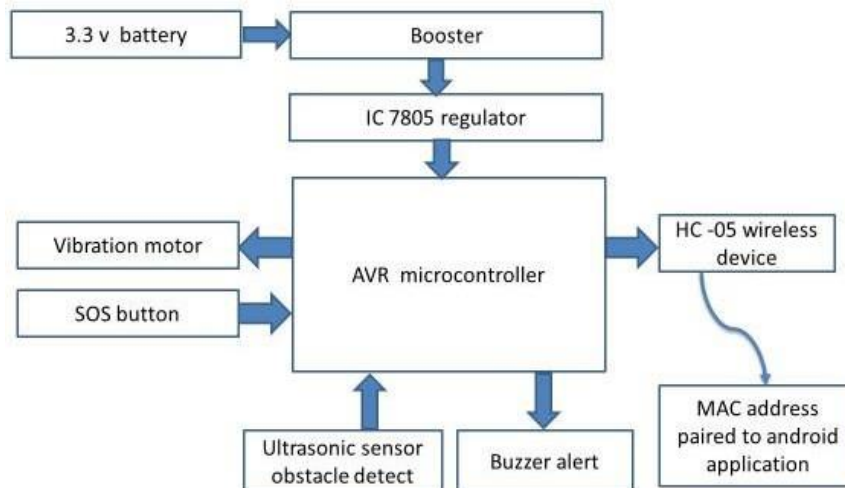


Fig 1. Block diagram for proposed method

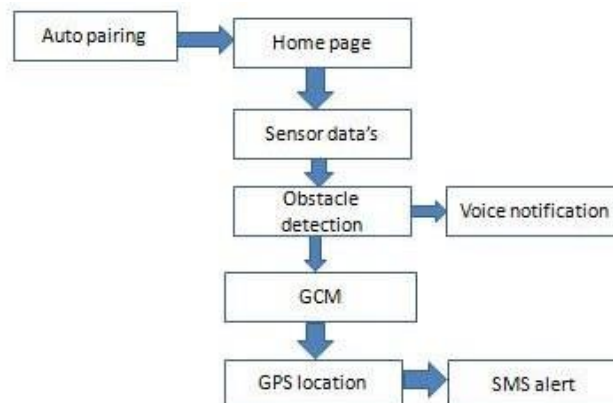


Fig 2. App structure of proposed system

VI. EXPERIMENTAL RESULTS

The sensors sense the nearby obstacles by using sonic technology, if the obstacle is detected means the vibration motor gets activated and buzzer alert also activated. Calculate the distance from the obstacle then alert signal is generated and

information send to android app with voice notification will be activated .In the emergency situation by clicking the SOSbutton , the location information SMS share to authorized person.



Fig. 4 & 5 Text detection process

VIII. CONCLUSION

The concept of system planning and smart phones and it is very easy to use for users without vision. For blinds and physically disable persons in our country no as such arrangements are there. Although they also have the same rights as ours and they also want to enjoy life as we do. Our aim to design a project for blinds is to facilitate them and help them outso they may need not help of any intruder and become self-reliant. Use of sensors in this project is the way blind will be able to get know how and the way he will have to go. With this system now, a blind can go out of home alone too easily. The development can be more transform to extend ranges for obstructions and development in GPS location continues to improve, accuracy will increase. Advances in mobile technology have helped to develop better continuous habitat assessment applications

VII. FUTURE SCOPE

Smart Blind Sticks: Integration of sensors and GPS technology to provide real-time information about the user's surroundings and navigation assistance. Obstacle Detection More sophisticated obstacle detection systems using computer vision and AI to help users avoid obstacles and hazards .Connectivity: Connectivity with smartphones or wearable devices to provide auditory or haptic feedback for navigation and information. Improved Ergonomics: Design improvements for better ergonomics and user comfort.Enhanced Durability: Development of durable, lightweight materials for improved longevity.Cost Reduction: Efforts to make these technologies more affordable and accessible to a wider range of users.Thefuture of blind sticks will likely involve a combination of these advancements to provide blind or visually impaired individuals with improved mobility and independence

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