IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 12, April 2025
Impact Factor: 7.67

IoT Based Smart Blind Stick

K.Amarender[1], Ch Sagarika[1], K Raju[2], B Akshitha[3], B Ashwini[4]
Assistant Professor, Dept. of Electronics & Communication Engineering[1]
UG Students, Dept. of Electronics & Communication Engineering[2,3,4,5]
Christu Jyothi Institute of Technology & Science, Jangaon, Telangana, India
amaranvik@gmail.com,sagarikachidurala6@gmail.com,kouderaju8@gmail.com,
akshithabotla321@gmail.com,ashubalaboina20@gmail.com

Abstract: *Optic failure can be named as a visual shortcoming and optic misfortune. Moreover, this hindrance makes numerous challenges in their daily exercises, such as walking, socializing, reading, socializing, and driving. This research aims to implement an IoT stick that will view the image of opportunity, autonomy, and certainty. The proposed smart stick is planned with an impediment identification module, a global positioning system (GPS), pit and flight of stairs detection, water detection, and a global system for mobile communication (GSM) to perform their daily activities quickly. The impediment identification module utilizes an ultrasonic sensor alongside a vibrator sensor to distinguish the obstructions that insinuate recognizing the obstacles and identifying the obstructions pattern. Vibrator sensor is used for the accident identification. In this Project ESP32 is used for person monitoring. A Node MCU is used to advise the weakened people about the barriers and sends notifications using an earphone and a buzzer. The current location of the blind person is located using Wi-Fi Module. The stick activates an alert system in case of loss. Several test cases prove that the functionalities introduced with the stick are performing correctly..*

Keywords: Blind stick

I. INTRODUCTION

Internet of Things (IoT) is an ideal buzzing technology to influence the Internet and communication technologies. IoT allows people and things to be connected anytime, anyplace, with anything and anyone, by using ideally in any path/network and any service. This project introduces a thought or an idea for home computerization utilizing voice acknowledgment, also the development of a prototype for controlling smart homes devices through IoT and controlling of dumb devices through IoT by the means of Wi-Fi driven chipset solution – ESP8266. This is also acknowledged by the need to give frameworks which offers help to matured and physically impaired individuals, particularly individuals who lives alone. Smart home or home automation can be said as the residential extension of building automation, it also involves the automation and controlling of lightings, ACs, ventilation and security which also includes home appliances such as dryers/washers, ovens or refrigerators/freezers which uses Wi-Fi for monitoring via remote for ease of use. Now a day's speed of the processing and communication through smart mobile devices at very affordable costs, to improve the lifestyle concept relevant to smart life, like smart T.V, Smart cities, smart phones, smart life, smart school and Internet of Things.

DOI: 10.48175/IJARSCT-25902

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 12, April 2025
Impact Factor: 7.67

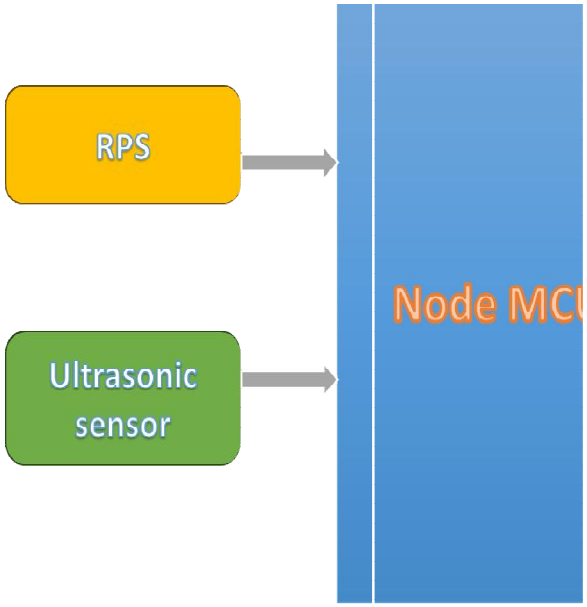

Fig 1 Block daigram

II. INTERNET OF THINGS(IoT)

The Internet of Things (IoT) refers to the network of interconnected devices that communicate and share data with each other over the internet. These devices can range from everyday household items to industrial machinery.The term "Internet of Things" has come to describe a number of technologies and research disciplines that enable the Internet to reach out into the real world of physical objects. The Internet of Things, also called The Internet of Objects, refers to a wireless network between objects. From any time, any place connectivity for anyone, we will now have connectivity for anything

IoT involves embedding sensors, software, and other technologies into physical objects, allowing them to collect and exchange data. This connectivity enables devices to be monitored and controlled remotely, creating a smarter and more automated world.

III. SMART BLIND STICK

Blindness is a state of lack of visual perception due to physiological or neurological factors. Imagine that you are walking in an unfamiliar place. One has to ask for guidance to get to the destination. But what if the person is visually impaired. A person must completely depend on other people to get to the destination. In general, we note that the white cane is the best friend of visually impaired people. But oftentimes that stick isn't helpful. The Blind Stick is developed using many hardware and software aplications. An individual with a disability is a member of society and has the same rights and responsibilities as people.

But blind people face a large number of problems that are difficult to solve. Blind people are members of society, and their diversity in the world and social situations has been restricted. Blind people's disadvantages should not be seen as an excuse to shorten their lives; rather, they should be used as motivation to persevere. As a result, anyone with visual impairments requires assistance in the form of replacements for their eye function, specifically the visual function. In addition to the normal touch sticks, the blind often needs a switch for their sense of sight so that the ultrasonic and sound sensors can be used. This smart stick will warn blind people about obstacles using the audio jack headphones, allowing the blind person to avoid an object in front of them.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 12, April 2025
Impact Factor: 7.67

IV. EXISTING SYSTEM

In existing system blind people used white cane and dogs became a well-known attribute to blind person's navigation. Blind people have big problem when they walk on the street or stairs using white cane. later efforts have been made to improve the cane by adding remote sensor. Existing smart blind stick systems, such as DrishTi, Smart Cane, WeWalk, and Stick, provide various features to assist visually impaired individuals. These devices typically include ultrasonic sensors for obstacle detection, GPS for navigation, and Bluetooth connectivity to smartphones. Some systems also integrate voice assistants for hands-free control and alert users to hazards such as stairs, holes, or other obstacles. While these systems offer significant assistance, there is still room for improvement in terms of accuracy, range, and user experience.

White cane:

The most popular mobility hand held aid. It is usually foldable and adjustable to the height of the user. A blind person using swing-like movements, “scan” the path in front in approx.

Guidance of Dog:

A specially trained dog assisting the blind in obstacle avoidance, but usually not aiding in way finding (unless travelling a familiar path), e.g. the dog is trained to stop before obstacles, reacts to commands on walking directions

V. PROPOSED SYSTEM

The ultrasonic sensor functions like human eyes in the suggested scheme. The ultrasonic sensor sends ultrasonic waves and the waves repulse back. The sensor detects the barrier and the distance between the blind individual and the barriers as a result of this procedure and sends data to the microcontroller. The sound-based ultrasonic sensors operate. The sound waves are transmitted forward from the sensors to the obstacle which, with a resolution of 0.3 cm, can feel the distance up to 12 feet. The sensors are put in five places to cover the highest possible sides with minimal sensor use. The sensors are left, right, centre left, centre left and centre left.

VI. HARDWARE EMPLOYED

An IoT-based smart blind stick is a innovative device that assists visually impaired individuals. Equipped with sensors, it detects obstacles and provides haptic, audible, and visual feedback. Microcontrollers process the sensor data, enabling the device to respond accordingly. With Wi-Fi, Bluetooth, and cellular connectivity, the device can connect to the internet and provide real-time navigation assistance. Powered by batteries, solar panels, or power banks, the smart blind stick is a reliable and efficient tool for enhancing mobility and independence**.**

Sensors: Ultrasonic, accelerometer, GPS, temperature, humidity, and light sensors detect obstacles, track location, and monitor environment.

Actuators: Vibration motor, buzzer, and LED indicators provide haptic, audible, and visual feedback.

Microcontrollers: Arduino, Raspberry Pi, or ESP32/ESP8266 boards process sensor data and control actuators.

Communication Modules: Wi-Fi, Bluetooth, and GSM/GPRS modules enable internet connectivity, device-to-device communication, and cellular connectivity.

Power Supply: Batteries, power banks, and solar panels provide power to the device.

Other Components: Breadboard, jumper wires, switches, buttons, and enclosure materials support prototyping, user interaction, and device housing.

VII. RESULTS AND DISCUSSIONS

The IoT-based smart blind stick successfully demonstrated its ability to assist visually impaired individuals by integrating advanced features such as obstacle detection, GPS navigation, and emergency alert systems. Ultrasonic sensors efficiently detected obstacles within a range of 2-3 meters, providing timely feedback through vibrations and audio alerts. The GPS module enabled real-time location tracking, while IoT connectivity allowed caregivers to receive alerts via a smartphone app in case of emergencies. The system proved to be cost-effective, portable, and user-friendly,

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 12, April 2025
Impact Factor: 7.67

showing potential for improving mobility and safety for the visually impaired. Future enhancements could include machine learning for advanced object recognition and voice control for greater accessibility.

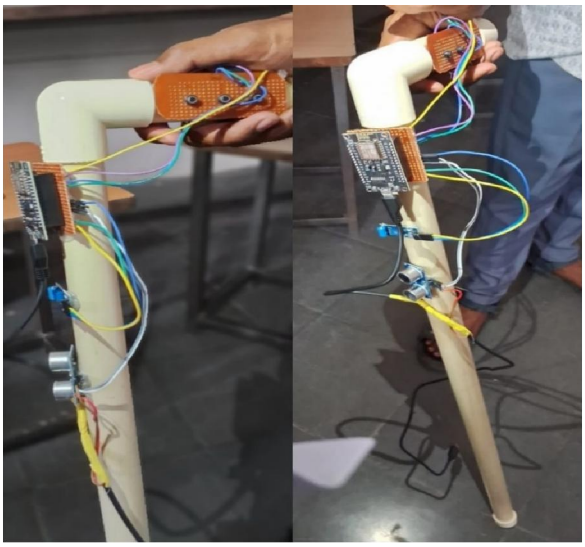

Figure 1: Output of IoT based Smart Blind Stick

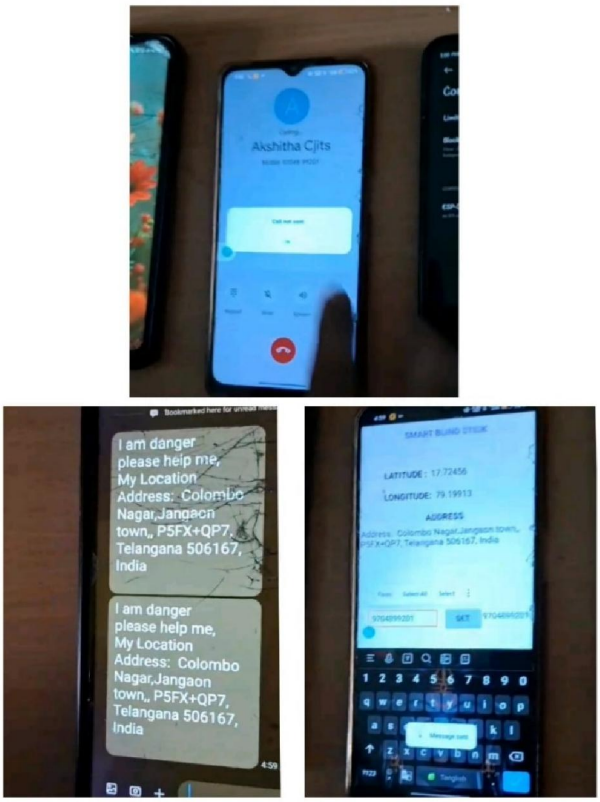

Figure 2: Using Mobile App Sending Message & Call to mobile when person is in danger

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 12, April 2025
Impact Factor: 7.67

VII. CONCLUSION

The IoT-based smart blind stick has revolutionized assistive technology for the visually impaired, enhancing mobility, independence, and safety. With its sensor-integrated, GPS-enabled, and wireless communication features, it detects obstacles, provides navigation assistance, and alerts users to potential hazards. This innovative device has shown significant potential in improving the quality of life for the visually impaired, offering a new level of autonomy and confidence. The smart blind stick is a groundbreaking innovation that has transformed the lives of visually impaired individuals. By seamlessly integrating cutting-edge technologies such as sensors, GPS, and connectivity features, the smart blind stick provides unparalleled assistance and empowerment to its users.

The device's ability to detect obstacles, provide real-time feedback, and offer navigation assistance has significantly enhanced the mobility and independence of visually impaired individuals. The smart blind stick has also reduced the risk of accidents and injuries, thereby promoting a safer and more confident navigation experience.

Furthermore, the smart blind stick has also enabled visually impaired individuals to participate more fully in their communities, pursue education and employment opportunities, and live more independently. The device has also facilitated greater social interaction and connectivity.

REFERENCES

[1]. "Smart Blind Stick with IoT and Sensor Technology" by S. S. Rao et al., published in the International Journal of Advanced Research in Computer Science and Software Engineering (2017)

[2]. "IoT-Based Intelligent Blind Stick for Visually Impaired People" by A. K. Singh et al., published in the Journal of Intelligent Information Systems (2020)

[3]. "Smart Cane with IoT and Sensor Technology for Visually Impaired People" by J. Liu et al., published in the IEEE Internet of Things Journal (2019)

[4]. "IoT-Based Smart Blind Stick with Obstacle Detection and Navigation" by M. A. Hassan et al., published in the Journal of Sensors and Sensor Systems (2020)

[5]. "Design and Development of IoT-Based Smart Blind Stick for Visually Impaired People" by S. K. Singh et al., published in the International Journal of Engineering and Advanced Technology (2019)