ULTRASONIC BLIND STICK USING GPS TRACKING

M. Sumaya , H. Lakshmi Prashanthi, G. Sushmitha, M. Subbamma, C. Chandra Kiran Reddy

UG Students, Department of Electronics & Communication Engineering, Sai Rajeswari Institute of Technology, Proddatur, Andhra Pradesh – 516360

H. Raghunath Rao M. Tech, Assistant Professor, Department of Electronics & Communication Engineering, Sai Rajeswari Institute of Technology, Proddatur, Andhra Pradesh – 516360
Email: sumayamallela@gmail.com, santhiharivaram@gmail.com, galisushmithaa1914@gmail.com, msubbamma135@gmail.com, cheepatichandrakiran@gmail.com, raghunathhanchate@gmail.com

Abstract-

We have come up with a special stick called the Blind Stick to help people who can't see well move around more easily. Our new version of the Blind Stick uses fancy technology to make it even better. It has sensors that can detect obstacles, like walls or objects in front of you, and it can even tell if it's dark or if there's water on the ground. When it finds an obstacle, it tells you by making a noise and vibrating, so you know to be careful. And if you forget where you put your stick, don't worry! We added a special remote control that makes the stick beep so you can find it easily. Our goal is to help visually impaired people move around more safely by detecting obstacles and finding their stick when it's lost.

Additionally, our stick features a clever remote-control system that allows you to locate it if you misplace it. Simply press the button on the remote, and the stick will emit a sound, making it easy to find. With the help of modern technology and thoughtful design, our Blind Stick aims to improve the mobility and independence of visually impaired individuals, ensuring safer navigation and peace of mind.

I. INTRODUCTION

Introducing our special stick for people who can't see well, called the Blind Stick! It's like a superhero stick because it can help you move around safely. Our stick has special sensors that can find things in your way, like walls or objects. When it finds something, it tells you by making a noise and vibrating, so you know to be careful. And if you ever forget where you put your stick, don't worry! We made it so you can find it easily with a special remote control. With the Blind Stick, we're making it easier for people who can't see well to move around and stay safe.

II. PROBLEM STATEMENT

Visually impaired individuals face significant challenges in navigating their surroundings safely and independently. Traditional mobility aids, such as white canes, offer limited assistance and fail to provide real-time feedback on potential obstacles. Additionally, the common issue of misplacing these aids further complicates the mobility of visually impaired individuals. There is a critical need for an innovative solution that addresses these challenges by providing reliable obstacle detection and easy retrieval of mobility aids. This solution should utilize advanced technology to enhance the mobility and safety of visually impaired individuals, empowering them to navigate their environment with confidence and independence.

III – METHODOLOGY

The methodology encompasses the iterative development of an advanced blind stick, beginning with requirements elicitation through user feedback and needs assessment. Following this, suitable hardware components, such as ultrasonic sensors and microcontrollers, are selected, and a comprehensive system architecture is designed to integrate obstacle detection and stick retrieval functionalities. Ultrasonic sensors are calibrated for accurate obstacle detection, while the microcontroller is programmed to process sensor data and activate auditory and tactile feedback mechanisms when obstacles are detected within close proximity. Additionally, a wireless remote locator is configured to trigger the stick's buzzer when misplaced. Thorough testing and user feedback iterations are conducted to validate the system's effectiveness and usability, culminating in documentation and deployment to empower visually impaired individuals with improved navigation and stick management capabilities.

IV. COMPONENTS USED

A. ARDUINO UNO

Arduino Uno is like a tiny computer that you can use to make all sorts of cool things. It's small and easy to use, and it has lots of little pins that you can connect wires and sensors to. You can tell it what to do by writing simple instructions on your

computer and then uploading them to the Arduino Uno. Once you've done that, it can do things like turn on lights, make sounds, or even move motors. It's great for people who want to learn about electronics and programming because it's really beginner-friendly, but it's also powerful enough for more advanced projects too.

To make Uno do something, you write a program on your computer using a special software called the Arduino IDE. It's like giving instructions to Uno on what to do. Then, you plug Uno into your computer with a USB cable and upload your program onto it. Once it's uploaded, Uno runs the program and does whatever you told it to do.

To make Uno do something, you write a program on your computer using a special software called the Arduino IDE.

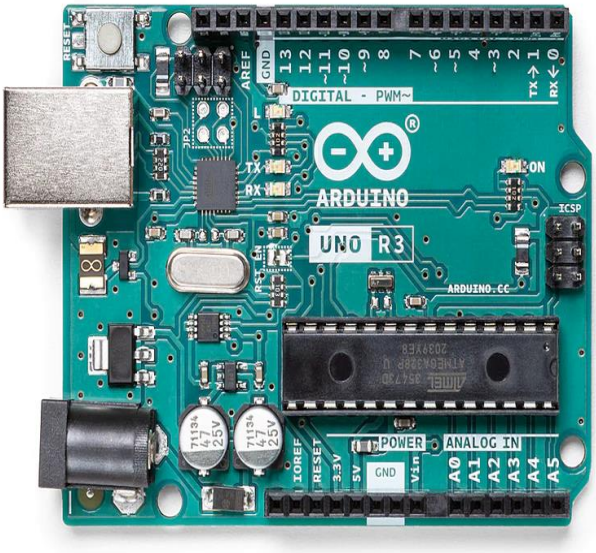

Figure 1: ARDUINO UNO

B. IR SENSOR

An infrared (IR) sensor is a device that detects infrared radiation emitted or reflected by objects in its vicinity. These sensors are commonly used in various applications, including motion detection, proximity sensing, and object detection. IR sensors typically consist of an emitter and a receiver. The emitter emits infrared light, which bounces off objects and is then detected by the receiver. The receiver measures the intensity of the reflected or emitted infrared light and converts it into an electrical signal, indicating the presence or absence of an object. IR sensors are valued for their ability to work in various lighting conditions and environments, making them suitable for both indoor and outdoor applications. They are utilized in a wide range of devices, from security systems and automatic doors to robotics and home appliances, enhancing automation and convenience in everyday life.

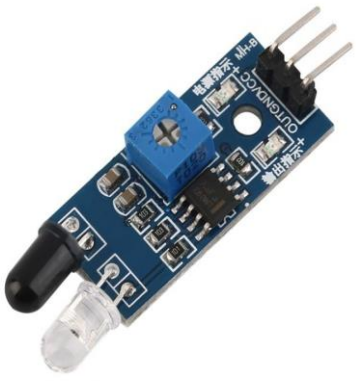

Fig 2: IR Sensor

B. FIRE SENSOR

A fire sensor, also known as a smoke detector or fire alarm, is a crucial safety device designed to detect the presence of smoke, fire, or elevated temperatures. These sensors utilize various technologies, including ionization, photoelectric, or heat detection, to identify potential fire hazards. Upon detection of smoke or heat, the fire sensor triggers an alarm, alerting occupants of the building to the potential danger.

Figure 3: Fire Sensor

D. ULTRASONIC SENSOR:

An ultrasonic sensor is a device that emits high-frequency sound waves and measures the time it takes for the waves to bounce back after hitting an object. These sensors are commonly used for distance measurement, object detection, and navigation in various applications, including robotics, automotive systems, and industrial automation.

Figure 4: Ultrasonic Sensor

E. GSM MODULE

A GSM (Global System for Mobile Communications) module is a compact device that enables communication between electronic devices and mobile networks. It facilitates sending and receiving text messages, making phone calls, and accessing data services via cellular networks. GSM modules are commonly integrated into IoT (Internet of Things) devices, security systems, and remote monitoring systems to enable remote communication and control capabilities.

Figure 5: GSM Module

F. GPS MODULE

A GPS (Global Positioning System) module is a compact device that receives signals from satellites to determine precise geographical location, velocity, and time information. These modules utilize triangulation methods to calculate coordinates and provide accurate positioning data in real-time. GPS modules are widely used in navigation systems, vehicle tracking devices, and location-based services to enable accurate positioning and route guidance.

Figure 6: GPS Module

G. BUZZER

A buzzer is an electronic signalling device that produces an audible sound when an electrical current passes through it. It typically consists of a housing, an electromagnetic coil, and a vibrating diaphragm or piezoelectric element. Buzzers are commonly used in alarm systems, timers, and notification devices to alert users of events or emergencies with distinctive sounds.

Figure 7: Buzzer

H. VIBRATIONAL MOTORS

Vibrational motors, also known as vibration motors or vibro-motors, are compact devices that generate mechanical vibrations when an electrical signal is applied. These motors typically consist of an off-centred weight attached to a motor shaft, causing the device to vibrate when activated. Vibrational motors are commonly used in haptic feedback systems, mobile phones, and wearable devices to provide tactile feedback or vibration alerts to users.

I. PANIC BUTTON

IoT panic buttons are sensor-based wearables that send an SOS message to designated staff when pressed. They can be configured to send alerts to nursing stations, security personnel, or a preset list of notification devices.

Figure 9: Panic Button

V. Block Diagram

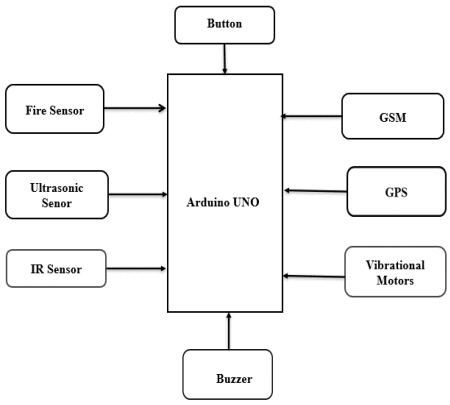

Figure 9: Block Diagram

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Prashanthi, G. Sushmitha, M. Subbamma, C. Chandra Kiran Reddy,

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Figure 8: Vibrational Motors

CONCLUSION

In conclusion, the proposed advanced blind stick presents a significant advancement in aiding visually impaired individuals to navigate with greater ease and safety. By integrating ultrasonic sensors, light and water sensing capabilities, and a wireless remote, this innovative device offers comprehensive obstacle detection and stick location assistance. The use of Arduino UNO as the main controller facilitates efficient processing of sensor data, enabling timely alerts through buzzer sounds and vibration feedback when obstacles are detected. This technology not only enhances the independence and mobility of visually impaired individuals but also demonstrates the potential for advanced solutions to address specific challenges in accessibility and navigation

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