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Third Eye for Blind Persons

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Abstract: *Vision is a precious gift, but many people suffer from vision impairment. According to the World Health Organization (WHO), 2.2 billion people have some form of visual disability. These individuals often face challenges in daily life, especially in moving around safely. The Third Eye for the Blind is a wearable device designed to help visually impaired individuals navigate independently. It uses ultrasonic sensors to detect nearby objects and obstacles. When an object is detected, the device alerts the user with beeping sounds or vibrations. The closer the object, the stronger the vibration and the faster the beep.*

Keywords: Vision Impairment, Third eye for blinds, Wearable device, Ultrasonic sensors, Obstacles detection, Safe navigation

I. INTRODUCTION

The "Third Eye for Blind" is a wearable device designed to help visually impaired people move around safely and independently. Blind individuals face many challenges in daily life and often rely on white canes or guide dogs, which have limitations like cost and efficiency. This project offers a better alternative by using ultrasonic sensors and a microcontroller to detect obstacles and alert the user through vibrations or a buzzer. The device, worn as a band or glove, is affordable, easy to use, and does not require special training. It helps blind individuals navigate both indoor and outdoor environments with confidence, reducing their dependence on others. The goal is to make their lives easier by providing a reliable, low-cost, and effective mobility aid.

II. LITERATURE SURVEY

In recent years, many innovations and devices have been developed to help visually impaired people move independently. However, some of these solutions still have limitations and restrictions.

D. Dakopoulos and N.G. Bourbakis conducted a study on wearable devices that help blind people avoid obstacles. Their research compared different mobile obstacle detection systems to inform both researchers and users about the capabilities of these technologies. The study categorized these systems based on their features and performance, providing both numerical data (quantitative) and descriptive analysis (qualitative) to evaluate their effectiveness.

M.A. Ungar S proposed methods to help blind people navigate in cities. However, his approach did not consider those who cannot afford expensive equipment. The "Third Eye for Blind" solves this problem by providing a more affordable solution for visually impaired individuals.

Ms. Pooja Sharma found that some devices can detect objects but have limitations in detecting angles and distances. The "Third Eye for Blind" improves this by offering a wider detection angle, which can be adjusted based on the sensor's range.

Hugo Fernandes and João Barroso developed a system called "Blind Guide," which uses ultrasonic sensors to help blind people detect obstacles. This system provides an alternative to white canes and guide dogs by using a network of sensors that create sound-based alerts. The sensors can be built into clothing, allowing blind individuals to navigate without relying on a cane or a guide dog Various tools help the visually impaired, like white canes, laser canes, smart canes, and guide dogs, but they have limitations. Remote guidance systems are also hard to use. The "Third Eye for Blind" provides a more efficient and affordable solution.

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III. PROPOSED SYSTEM

Third eye for blind persons

Objective: The objective of the "Third Eye for the Blind" project is to create a portable, wearable device that helps visually impaired people move independently. The device uses ultrasonic waves to detect nearby obstacles, alerting the user with buzz sounds or vibrations. It is designed to be cost-effective, easy to use, and capable of detecting obstacles even while the person is in motion, using a motion PIR sensor.

The proposed system deals with the cheaper and effective obstacle detection with a wide range of coverage. The device includes the following components:

- Arduino UNO
- Ultrasonic sensor
- Buzzer
- LED
- Power bank

1.ARDUINO UNO : Arduino is a small, affordable computer that helps detect and control things in the real world. It works by using sensors to read things like light or touch and then performs actions like turning on a light or activating a motor. Arduino is an open-source platform, meaning anyone can use it, and it uses simple hardware and software. It operates on 5V, making it easy to use in many projects.

Fig. 1. Diagram of ATmega2560

2.The ultrasonic sensor has three main parts: a transmitter, a receiver, and sometimes a transceiver. The transmitter turns electrical signals into sound waves, while the receiver converts those sound waves back into electrical signals. The transceiver can do both tasks (sending and receiving sound waves). The sensor also has crystal oscillators that help stabilize the sensor's operation.

Fig.2.Diagram of Ultrasonic sensor

3.The piezo buzzer is a sound-producing device that utilizes the piezoelectric effect to generate noise. It converts electrical energy into mechanical vibrations, creating sound. Piezo buzzers are widely used for signaling purposes in

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systems such as car reverse alarms and braking systems. This technology is based on the discovery of piezoelectricity by Jacques and Pierre Curie in 1998, where certain materials produce an electrical charge when subjected to pressure

Fig. 3.Diagram of Piezo buzzer

4.Passive Infrared (PIR) sensors are designed to detect infrared radiation emitted by humans or animals. These sensors work by measuring changes in the infrared light in their range. PIR sensors are popular due to their low power consumption, affordability, and long lifespan. They are commonly used in security systems, motion detection lighting, and automatic doors. PIR sensors are also referred to as Pyroelectric or IR motion sensors because of their ability to detect infrared motion.

Fig. 4. Diagram of PIR sensor

IV. SOFTWARE REQUIREMENTS

1.ARDUINO SOFTWARE

The Arduino is the most used programming software perform the above-mentioned operation. Using some program in the software we can do every operation.

2.GSM MODULE:

A GSM GPRS module connects a microcontroller to a mobile network, enabling wireless communication. GSM stands for Global System for Mobile Communication, and GPRS stands for General Packet Radio Service. These modules are commonly used in embedded systems for tasks that require wireless connectivity.

The power supply for this system typically needs a voltage of 7V to 12V, and the current for the 3.3V pin is 50mA. It also has 32 KB of flash memory.

Fig.5.. Diagram of GSM MODULE

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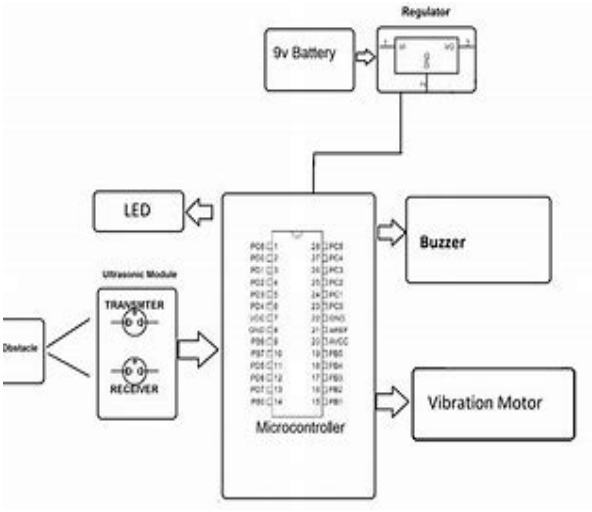

V. FUTURE SCOPE

The wearable technology for blinds resolves the existing technical problems. Nowadays, there are many instruments and intelligent devices for visually impaired people for navigation. Still, most of them have specific issues with carrying, and the major drawbacks are those that need a lot of training to use. One of the main peculiarities of this innovation is that it is affordable for everyone. There are nosuch devices available in the market that can be worn like cloth and have such a low cost and simplicity. When used ona large scale, with improvements in the prototype, it will drastically benefit the community.

The prototype device has the following features:

➢ It is a wearable technology for blinds.

➢ It uses ultrasonic waves to detect obstacles.

➢ It notifies the blocks/obstacle by vibrations and a buzzer sound.

VI. RESULTS

As people focus more on material comforts, we often overlook the struggles of those with disabilities, especially the blind. Eyes play a crucial role in understanding the world, and without vision, navigating daily life becomes extremely difficult.

This project aims to help visually impaired individuals overcome obstacles using a smart wearable device. It uses ultrasonic sensors and an Arduino board to detect obstacles and alert the user through sound or vibration signals.With this device, blind individuals can move safely and independently in any environment, making daily activities much easier.

VII. CONCLUSION

The Third Eye for the Blind is a wearable device designed to help visually impaired people move independently and with confidence. This device uses ultrasonic waves to detect nearby obstacles and alerts the user through buzz sounds or vibrations.

By wearing this band or cloth-based device, blind individuals can walk freely without depending on others. The system is affordable, easy to use, and portable, making it a practical solution for everyday life. It helps detect objects in all directions, improving safety and mobility for visually impaired people**.**

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