International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 08 Issue: 04 | April - 2024 SJIF Rating: 8.448 ISSN: 2582-3930

VIBRATIONAL FEEDBACK WALKING STICK FOR VISUALLY IMPAIRED PEOPLE

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Abstract -Observing and describing the world through our eyes is an aspect of existence. Individuals who are blind or visually impaired encounter challenges, in their routines, such as difficulty recognizing objects or people around them. This project aims to develop a real time system that assists these individuals by utilizing a microcontroller to interpret data from sensors and provide feedback through coin vibration motors. By incorporating this technology into a cane, the blind can navigate independently reducing their dependence on others and enhancing their quality of life. The project involves using sensors to detect obstacles with the sensor transmitting this information to the microcontroller for processing. The microcontroller analyses the data to determine proximity, to obstacles and triggers a signal to activate the vibration motor when an obstacle is detected nearby.

***Key Words*:** visually impaired, microcontroller, coin vibration motors, cane, obstacles.

1.INTRODUCTION

According to World Health Organization (WHO) in 2012, out of the 7 billion population, there were over 285 million people are visually impaired and 39 million were blind. Blind people face the problem in daily life. They can't even walk without any aid. Traditional tools like white cane and guide dogs do solve the problems completely. They cannot perceive enough knowledge to avoid all the obstacles. They are not able to search and pickup any objects they want to get. The main objective is that, our proposed device with advanced embedded technology which will give the blind person an imaginary vision rather than being dependent on others. This project is designed keeping the view of visually impaired people, with this tool they can travel to their destination without the need of others. In our effort, we concentrate on creating new technology that will enable the visually impaired to interact with the outside world, particularly with places like banks, hospitals, post offices, and other public services. Therefore, the initiative intends to play a unique role in the industry by offering the visually impaired or blind as much information as possible, enabling them to travel comfortably. This project seeks to develop a programme to assist persons with disabilities. In this programmed we will be using Arduino UNO and ultrasonic sensor that would play the key role in this project.

2.MATERIAL AND METHODS

2.1. METHODOLOGY

we have to ''ON'' the switch for power supply to the Arduino kit, ultrasonic sensor and Vibrational coin motor. Ultrasonic sensor will send the trigger pulse and wait for 10micro seconds to end the trigger pulse after it. It will wait for the rising edge of the echo, if it doesn't then it reset from the beginning. If the rising edge of echo is detected then it starts counting till the falling edge of echo. If it doesn't, then it reset from the beginning and again Ultrasonic sensor will send the trigger pulse and wait for 10micro seconds to end the trigger pulse after it until the counter closes. Then it closes the counter and starts to calculate the distance using the counter values. It will process the distance by using

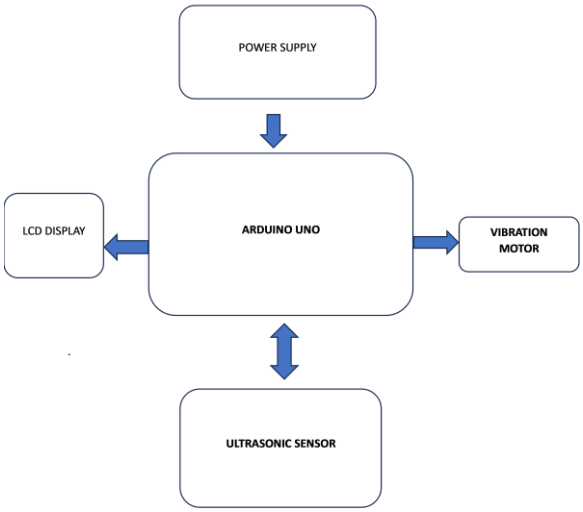
Distance = time x speed of sound / 2

Time taken from pulse send from trigger to pulse received back to echo, which multiplied with speed of sound (343 m/s) and divided by two. Divided two is done for travelling pulse from ultrasonic sensor to object/obstacle and pulse echoes from object/obstacle to the sensor. It processes the distance measurement using this method and the result is set to detect the object in 60 cm and 30 cm. If the object is detected in range of 60 cm, then the single coin vibrational motor, becomes active and the object becomes more closer in the range of 30cm then both coin vibration motor becomes active.

2.2. MODELING AND ANALYSIS

The Arduino UNO is an open-source microcontroller board based the Microchip ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE via a type B USB cable. It can be powered by the USB cable or by an external 9-volt battery, though it accepts voltages between 7 and 20 volts. And also designed through Arduino IDE for detecting object/obstacle using ultrasonic sensor which is in the range of 30 cm and 60 cm, it can be visualized by the LED display. coin vibrational motor is connected with Arduino UNO and trigger is send to it when the object/obstacle in the range of

60 cm is single, if the object/obstacle in the range of 30 cm then both the vibrational motor becomes active as feedback.



BLOCK DIAGRAM-1

3. RESULT AND DISCUSSION

Arduino based navigation systems for the visually impaired use sensors, software, and positioning technologies to detect obstacles, provide feedback, and improve mobility and independence for individuals with visual impairments. They no longer need to depend on old techniques like white cane and guide dog. With the advancement in technology and our dependency on it, this project would be proved to be high in demand in the recent future. The test results prove that this system is more reliable than any other existing system, however, some more improvements can make it even more faithful and accurate. Also, the cost of this project is optimum and proves to be the best aid for blind people, and it will help them to be independent of their instincts and other people.

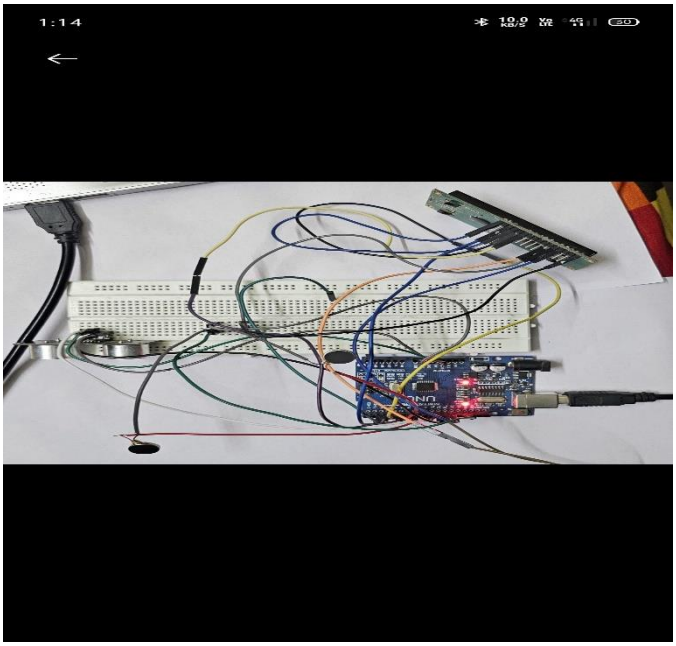


Fig-1 real time result

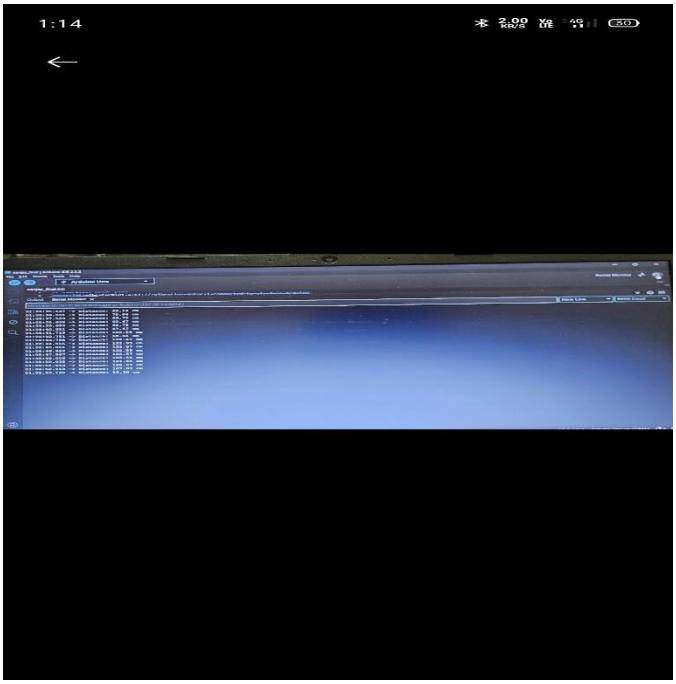


Fig-2 distance shown in display

4. CONCLUSIONS

The Smart Stick for Visually impaired has been prepared which can be used to guide the visually impaired. Its aim to solve the problems faced by the blind people in their daily life. The system also takes measure to ensure their safety. Smart walking stick helps all the visually impaired people in the world to make them easier to walk around everywhere they want and increases their safety. The Smart Stick acts as a basic platform for the visually help impaired to navigate safely both indoor and outdoor. It is effective and affordable. In a developing country like India, there is a need for a cost-effective solution so that most of the people can have an effective product. It plans to tackle the issues looked at by the visually impaired individuals in their everyday life. This system also takes action to ensure their security. This work will help every one of the visually impaired individuals in the world to make it simpler to walk wherever they need. Also, this project is a low-cost smart walking stick. The stick is convenient as it can be carried as a walking stick. It helps the visually challenged person to move comfortably from one place to another.

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