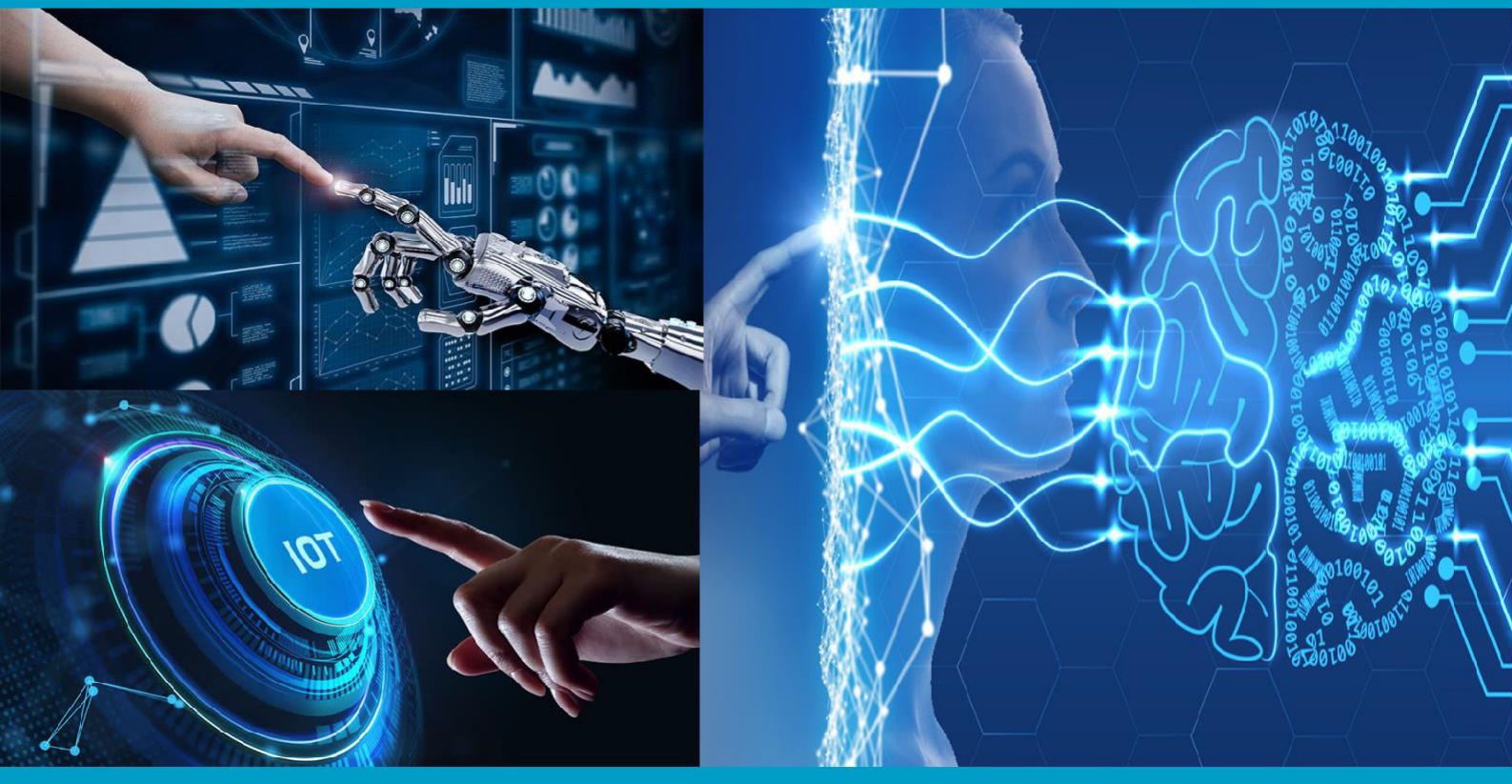
IJMRSETM

e-ISSN: 2395 - 7639



INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH

IN SCIENCE, ENGINEERING, TECHNOLOGY AND MANAGEMENT

Volume 10, Issue 4, April 2023

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 7.580

| ISSN: 2395-7639 | www.ijmrsetm.com | Impact Factor: 7.580| A Monthly Double-Blind Peer Reviewed Journal |

| Volume 10, Issue 4, April 2023 |

| DOI: 10.15680/IJMRSETM.2023.1004025 |

Ultrasonic Smart Glasses And Walking Aid For Blind People With Voice Guidance

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ABSTRACT: Visually impaired people often need assistance in day-to-day life for navigating through their residence and outside. Having human assistance is not possible all the time and so a solution to this problem is being researched for a long time. Well, here we develop a smart solution to this problem using ultrasonic smart glasses and a walking stick. The glasses are fitted with ultrasonic sensors which act as a virtual eye for blind people. A walking stick detects the direction of obstacles at ground level and glasses detect obstacles at head level. Whenever any obstacle is detected, a voice alert is produced about the obstacle and which direction to move thus guiding the blind person to walk safely. Also, a vibration is produced in the walking stick through which the direction of the obstacle can be detected. The main aim of this system is to permit blind persons to explore autonomously in the outside environment. Ordinary route navigational systems in the outdoor environment are expensive and their manufacturing is time-consuming.

KEYWORDS: Visually impaired,Ultrasonic,Obstacle,Walking stick

I.INTRODUCTION

Blindness or visual impairment is a condition that affects many people around the world. This condition leads to the loss of the valuable sense of vision. The need for assistive devices was and will be continuous. There is a wide range of navigation systems and tools existing for visually impaired individuals the blind person truly requires and identifying objects.

According to WHO, 30 million social classes are forever outwardly disabled and 285 billion social classes with vision weaknesses. If you notice them, you can consider it they can't need without the help of others. One needs to request that direction to arrive at their objective. They need to confront more battles in their day-by-day life. Utilizing this visually impaired stick, an individual can walk all the more unhesitatingly. This strolling stick is an option in contrast to the customary strolling stick. Here, Arduino UNO, ultrasonic sensor, IR sensor, voice playback module, LCD show, and voltage controller is utilized. Arduino is a microcontroller that can do every one of the estimations fastly and rapidly with incredible exactness. The ultrasonic sensor is utilized to distinguish the item toward the front of the individual by estimating the distance between the article and the stick. For left and right article recognition, IR Sensor is utilized which is exceptionally little in range. So, it detects a very close object. Using more ultrasonic sensors may create calculation problems. So, IR Sensor is Preferred. The voice playback module will help the visually impaired individual to arrive at the objective through the order or receiver.

Outwardly disabled individuals are individuals who think that it‟s hard to perceive the littlest detail with sound eyes. Those who have the visual acuteness of 6/60 or the horizontal range of the visual field with both eyes open have less than or equal to 20 degrees. These people are regarded as blind. A survey by WHO (World Health Organization) carried out in 2011 estimates that in the world, about 1% of the human population is visually impaired (about70 million people) furthermore, among them, about 10% are completely visually impaired (around 7 million individuals) and 90% (around 63 million individuals) with low vision. The primary issue with daze individuals is the way to explore their approach to any place they need to go. Such individuals need help from others with great vision. As described by WHO, 10% of the visually impaired have no functional eyesight at all to help them move around without assistance and safely. This investigation proposes another method for planning a shrewd stick to help outwardly disabled individuals that will give the route. The standard and old-fashioned courses that help individuals with visual shortcomings are the walking stick (similarly called white stick or stick) and guide canines which are depicted by various imperfections.

The force of vision is perhaps the main piece of human physiology. Our eyes are the way into our environmental elements. Lamentably, approx 285 million individuals are assessed to be outwardly weakened around the world, of which 39 million are visually impaired, as indicated by a report distributed by the World Health Organization (WHO). 82% of visually impaired individuals are of the age of 50 or more. Besides, 90% of outwardly impeded individuals

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have a place with the agricultural nations. The most punctual type of route device for the visually impaired has been a mobile stick. In any case, the downsides of utilizing it are the absence of fundamental abilities, Cost, and preparation period. With the advances in innovation, it has gotten conceivable to plan and foster mechanical arrangements that can assist an outwardly disabled individual with exploring uninhibitedly. Different examination works have been completed for growing such a keen visually impaired stick.

II.PROPOSED SYSTEM

The main objective is to provide talkative assistance to blind people. The system designed will detect an object or obstacle using ultrasonic sensors and gives audio instructions for guidance. An obstacle as close to the minimum distance can be detected by this module. A resolution of obstacle distance has been designed and achieved. It is very important to maintain efficient information while travelling with blind people. This system has been aimed at the design and development of a smart and intelligent blind stick which helps in navigation for visually impaired people. The navigator system designed will detect an object or obstacle using ultrasonic sensors and gives audio instructions for guidance. The signals from the ultrasound sensor are processed by a microcontroller in an Arduino board to identify sudden changes in the ground gradient and/or an obstacle in front. The algorithm developed gives suitable audio instruction depending on the duration of ultrasound travel. We developed this system to detect obstacles while travelling and give voice notifications to visually impaired people.

III.ULTRASONIC RANGING MODULE HC - SR04

Figure 1.Ultrasonic ranging module HC - SR04

Ultrasonic ranging module HC - SR04 provides 2cm - 400cm non-contact measurement function, and the ranging accuracy can reach to 3mm. The modules include ultrasonic transmitters, a receiver and a control circuit. The basic principle of work:

(1) Using IO trigger for at least 10us high-level signal,

(2) The Module automatically sends eight 40 kHz and detects whether there is a pulse signal back.

(3) If the signal is back, through a high level , the time of high output IO duration is the time from sending ultrasonic to returning.

Test distance = (high level time×velocity of sound (340M/S) / 2.

IV.JQ6500 VOICE SOUND MODULE

Figure 2.JQ6500 Voice Sound Module

JQ6500 Voice Sound Module is perfect for broadcasting a message on the speaker like a fire alarm, train, and bus alert systems, business hall prompts, equipment failure alarms, etc. It can decode the MP3, hard-coded MP3, or WMV format files into the audible voice format. It comes with 24 bits Digital-to-Analog Converter with a dynamic range of 90dB and supports 8 / 11.025 / 12/16 / 22.05 / 24/32 / 44.1 / 48 kHz sampling rate. The MP3 files can be controlled with buttons, or via a serial communications protocol.

DFPlayer Mini is a compact and inexpensive MP3 module that can be connected directly to the speaker. Module with battery power supply, speaker, and keypad can be used alone, or through the serial port control, as for Arduino UNO or any microcontroller with a serial port module. The module itself perfectly integrated hardware decodes MP3, WAV, and WMA's. While the software supports TF card drivers to support FAT16, and FAT32 file systems. Can be

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done by a simple serial command that plays the specified music, as well as how to play music and other functions, without tedious low-level, easy to use, stable and reliable.

V.VIBRATION MOTOR

Figure 3.Vibration motor

There are two basic types of vibration motors. An eccentric rotating mass vibration motor (ERM) uses a small unbalanced mass on a DC motor when it rotates it creates a force that translates to vibrations. A linear resonant actuator (LRA) contains a small internal mass attached to a spring, which creates a force when driven.

Our most popular form factor is the ERM or 'pager' motor. This is because there are lots of DC motors available in this cylindrical form, where the eccentric mass helps create an unbalanced force. They are also the most versatile - they can be mounted on PCBs, encapsulated, use a variety of power connections, and even be based on brushless motors. However, coin or 'pancake' motors use the same operating principle - but their eccentric mass is kept in their small circular body (which is where they get their names from). They are restricted in amplitude because of their size but have extremely low profiles (only a few mm!) which makes them popular in applications in which space is restricted.

VI.WORKING

When the power supply is on all its input sensors start working, and the ultrasonic sensor always calculates the distance to detect the objects or obstacles in front of the person present near them. If the distance is lesser than if the distance of the obstacles in the path is less than 1 metre then Arduino triggers the voice playback module and plays the corresponding voice command to alert the blind person to move in the corresponding direction. Then the signals are given, and the output is in the form of audio output saying “obstacle in the ground” or “obstacle near head”. The vibrator motor also alerts when the walking stick detects any obstacles. By moving the walking stick the blind person can be aware of the direction of the obstacle byanalyzing the vibration feedback from the vibrator motor.

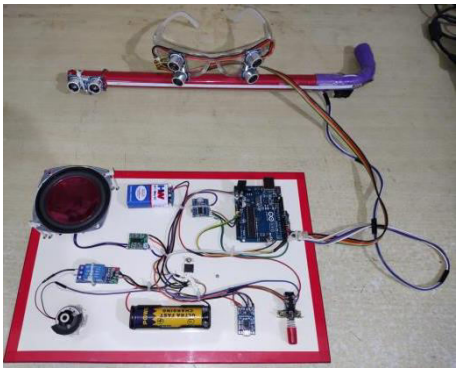

Figure4. Hardware setup of proposed work

VII.CONCLUSION

This smart stick builds a strong and confident platform for visually impaired people to be safer. The blind walking aid has been implemented into a prototype hardware model which can be utilized to direct the visually impaired. It leads to good results in detecting the obstacles lying ahead of the user in a range of 2 meters at the head level and also at the ground level. This system offers a low-cost, reliable, portable, low power consumption and robust solution for navigation with a short response time. This project ensures that this person can feel safe and secure when they use the blind stick. When they meet with a dangerous situation laid in their path, the vibration and voice guidance will help the people to travel in the correct direction. This is the effective measures and affordable to everyone. It intends to tackle the issues looked at by visually impaired individuals in their everyday life.

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