International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 06 Issue: 06 | June - 2022 Impact Factor: 7.185 ISSN: 2582-3930

IOT BASED GUIDANCE AND MONITORING SYSTEM FOR VISUALLY IMPAIRED PERSONS

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ABSTRACT

The project aims to track the traffic of blind people and the elderly in other places. It is very affordable and, in this case, IoT based real time technology is the best way for this domain. GPS is used to locate people in emergencies. Wi-Fi (Internet of Things) is used for real-time monitoring and location monitoring on the server. This app protects your accelerometer sensor heart rate sensor and ultrasonic conductivity sensor. The main objective of this project is to provide best protection to the blind and elderly from dangerous situations and emergencies.

Keywords; Location Detection, Sensors, Sound Waves, IoT, GPS.

1.INTRODUCTION

People with visual impairments have great difficulty in carrying out their daily activities. Today society gives freedom to everyone to move in any situation. Blind people face physical socio - economic and psychological problems that deprive them of all their social rights. This document presents the concept of a model and a prototype system. The system aims to provide intelligent electronic devices that guide the blind. The system includes an ultrasonic sensor microcontroller water detection sensor battery Bluetooth device and connection cable. The system works when a blind person puts on his jacket and starts walking. The ultrasonic sensor sends a signal to the microcontroller as soon as there is an obstruction on the beam of the ultrasonic sensor. The microcontroller is connected to a Bluetooth device. The Bluetooth device then sends a voice message to the blind person's headset. Connecting a Bluetooth device to the system requires the help of an Android app installed on a blind person's mobile phone. The system operates on battery power. To prevent system damage due to lack of electricity supply. The system offers specialized technology that eliminates various shortcomings of previous work associated with this problem. In ancient times a cane or smart stick was used to guide the blind. But there is a drawback one of which is the difficulty of holding the stick. The blind driver went to lead them. It also has drawbacks. This system helps to eliminate all these defects.

2.LITERATURESURVEY

Woojin Chung. et al described the Navigation system architecture , the development of key navigational algorithms like map, path planning, and localization, and error handling. This paper offers several advantages:

1) maintaining a simple sensor-based navigation approach without modifying the environment.

2) Components related to intelligent navigation.

3) A framework to support the selection of multiple behavioral and disability management scenarios.[1]

B.S. Tjan, et al. illustrates the design and implementation of the low-pass Veretto reflective down digital sign system. Post tags with a specially designed design can be easily identified by Portable Digicam and System-Vision machines. The models performance tag identification system showed that it can withstand the real-world environment of a typical building. The main problem for the visually impaired in this survey is that blind cane sunglasses like other guides should be based on dog-trained dogs. Blind people need some help to stay safe when they go in or out of the house. Systems such as the Smart Wand Range Reminder System Pathfinder Real-Time Positioning System Ultrasound Electronic System have been used by the visually impaired in the past. The system is an electronic system based on the ATmega328P microcontroller or RMOT processing system such as acoustic signaling by computer vision algorithms that help transmit information instead of analyzing electronic polar-type touch stick signals. [2]

Nikita Sonkusale, et al, presented the concept of a model that provides electronic warfare assistance to the visually impaired. This white paper describes a system that helps visually impaired people find external barriers. This task is a step in coordinating technologies that help improve the quality of life for people with disabilities. This document describes the development of functional techniques using the resources available to guide the visually impaired. The system has sensors that detect the location of obstacles. The location of the obstacle must be indicated by the voice guidance system.[3]

A.Aladrén, et al. demonstrated a new NAVI system based on visual and range information. Instead of using multiple sensors choose a device that has the advantage of RGB-D cameras for consumer information and displays. The combination of in-depth information with unsatisfactory image intensity results in a strong expansion of the area-based segmentation. Our system has identified the key element of the structure as the background using the data series.[4]

Denis Tudor, et al. presented a new electronic system that uses the ATmega328P microcontroller with two ultrasonic sensors and a vibration motor to navigate the visually impaired. The HC-SR04 ultrasonic sensor is used to detect the distance. The HC-SR04 ultrasonic sensor transmits small ultrasonic pulses during standby and responds through the material.[5]

Kanchan M, et al. focused on the blind people who travel in unfamiliar areas focus on mobility loneliness without any assistance. This system includes a server-side zigzag transceiver for wireless communication an RFID reader from a microcontroller a zigzag transmitter and TTS to transmit information to the user. VIAS can be used by blind or visually impaired users in system application environments such as campuses, schools, colleges, hospitals, malls, buses etc.[6]

3. EXISTING SYSTEM

Existing systems are based on system critical requirements. The system uses ultrasonic or laser sensors to detect impaired vision in front of the eye by sending and receiving reflected waves that guide the visually impaired like a savvy dog. Intended to emit visually impaired sounds or vibrations after an obstacle was detected. Systems like Sound Viewer take pictures using a single camera or a mounted stereo camera to take pictures. Captured images are taken a step further and transformed into live listening or music. In such a system the frequency of the horn is related to the pixel orientation. Some systems such as Ultra Cane collect information through sensors and send suggestions to the user through vibrations and voice messages to aid in viewing the game. The downside of the above solutions is that they may not detect hidden obstacles but are extremely dangerous for visually impaired people as you descend the stairs. In an emergency the parents emergency key is activated and a message is sent to the GSM modem to activate the emergency alarm.

4. PROPOSED SYSTEM

The proposed system uses an ultrasonic sensor to detect the distance of an obstacle from the user. You can use this reference distance to check if the user can move. Ultrasonic sensors work based on sound. Sound waves are pre-transmitted by the sensor towards obstacles that can detect distance. The accelerometer detects the angular movement of a blind person in the event of a fall or an abnormal angle. Conductivity sensors measure the capacitance of a water sample. Our newspaper first detects the danger of the visually impaired issues an emergency alert first and then sends an emergency message.

BLOCK DIAGRAM

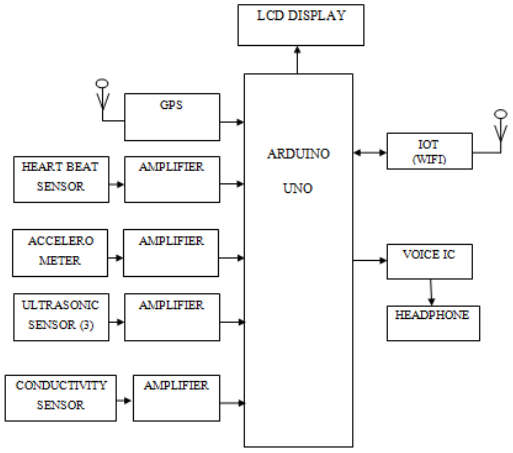
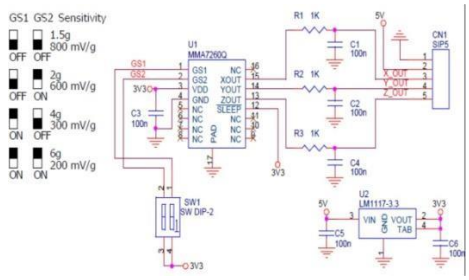


Fig 4.1 Block Diagram



5.SYSTEM REQUIREMENTS

HARDWARE DESCRIPTION

5.1 ACCELEROMETER

Accelerometer is a device used to detect acceleration. The 3-axis analog accelerator built into the system detects if the user has fallen. The sensor is mounted on the device so that the y-axis is always vertical when the user is standing. The accelerometer gives different outputs depending on the position of the axis. The larger the angle between the y-axis and the vertical axis the smaller the output value. It therefore detects the fall of the speaker which emits a unique sound and sends a

message to the microcontroller to generate an immediate notification to the caregiver.

Fig 5.1 Accelerometer

Acceleration can be created by changing the speed and direction. Accelerometer is designed to interface with a microcontroller like Arduino. There is a very small quiet breeze and occasional power cutting engine with air-conditioned voltage output. It has buttons with VCC pins a GND pins X pins Y needles Z pins and ST pins. The acceleration power range is around 3V to 5V. Acceleration measurements are about 4 4 × 1.45mm. The XY and Z clamps are used to provide input to the microcontroller by searching around the circuit.

Fig 5.1.1 Pin Diagram For Accelerometer.

5.2 ULTRASONIC SENSOR:

The proposed system has three sensors integrated. The horses two sensors are arranged horizontally to detect obstacles located at the front and back. The sensor sends a signal to the microcontroller if an obstruction is observed within 200 cm of the front and rear. The loudspeaker emits a single sound if the obstruction is within 20 cm. The microcontroller sends a message to the smartphone via the IoT module and notifies the user. Other ultrasonic sensors are adjusted at an angle and directed toward the ground. Calculate the initial threshold based on the undisputed ground clearance. A hump is on the ground and its distance value becomes much less than the value of the edge. So a rugged speaker is found on the ground to produce a unique sound and a message is sent to the microcontroller to generate a notification to the user. Ultrasonic sensors are widely used to develop a variety of assistive devices to provide a variety of services. It can calculate limit distances in tough and fast races. The range is usually 3 cm to 3 m and covers up to 15 degrees. Contains only 4 pins. The pin shown is the VCC GND trigger and echo. The VCC pin is used to activate the sensor. The maximum input voltage for a VCC screw is 5V. A valid GND connection. When the pin is high the sensor produces an ultrasonic pulse. The echo pin is activated when the heart stops beating and the sensor receives a signal. Measure the distance between the trigger pin and the echo pin. At this point the sound waves propagate and return to the sensor.This is used to measure the distance between the sensor and the obstacle.

Distance =(speedofsound×traveltime)/2.

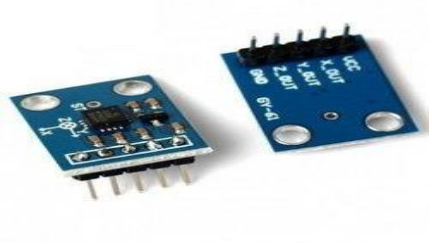


Fig 5.2 Ultrasonic Sensor

5.3 CONDUCTIVITY SENSOR:

Moisture sensor measures conductivity or resistivity. Fewer moisture results in high resistance. Extra moisture (water) results in less resistance. Low power consumption and high sensitivity. Operates on a low voltage of 5V. Operates on low contemporary <20mA.If the sensor detects more moisture a speaker produces a unique sound.

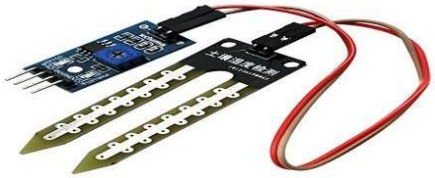


Fig 5.3 Conductivity Sensor

5.4 ARDUINO UNO:

Arduino/Genuino Uno is a microcontroller board based on the Atmega 328.It has 14digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, 16MHzquartz crystal, USB connection, a power jack, ICSP header and reset button. It contain severy thing needed to support the microcontroller is simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started out. Youcan tinker with your UNO without stressful too much about doing something wrong, within the worst-case scenario you can replace the chip for some dollars and begin over again.

Fig 5.4 Ardunio Uno

5.5 VOICE IC:

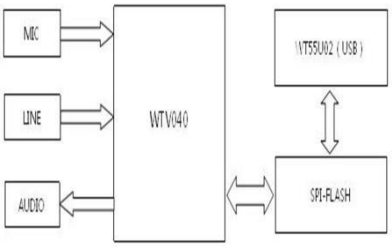


Fig 5.5 Voice IC

Upto7kindsof operating modes MP3 mode, one too key mode, parallel mode, one record one play key mode, Audio-book mode, two-wire serial mode, and three-wire serial mode

5.6 HEAD SET:

A headset, often known as a headphone, is a device that allows you to hear sound or music without disturbing others. These are the kind of headsets we used in our study to provide alert instructions or notifications to visually impaired people. If there are any barriers in the route, it emits a sound before the user reaches the object.

5.7 POWER SUPPLY:

The desired DC output level is generally taken from an AC voltage of 220V and linked to a transformer that reduces the AC voltage. A

complete wave rectified voltage is then presented by a diode rectifier, which is first filtered by a simple capacitor.

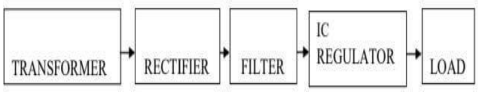


Fig 5.7 Power Supply.

To make a DC voltage, filter it out. The output of the DC voltage may be either wavy nor AC voltage fluctuations A regulator circuit removes the ripples and maintains the same DC value, even if the enter DC voltage varies or the load connected to the output dc voltage changes. This voltage regulation is provided by one of the most common voltage regulator IC devices on the market.

5.8 INTERNET OF THINGS (IOT):

The Internet of Things (IoT) is tangible tool, conveyance, domestic appliances, and other objects with built-in connections that allow electronic devices, software, sensors, actuators, and those to connect, collect, and share data. The IoT goes beyond standard devices such as desktops, laptops, smart phones, and tablets to extend the Internet connection to a variety of physical devices and everyday objects that are not traditionally dammed or Internet-enabled. These technology-embedded devices can communicate and interact over the Internet and can be remotely monitored and controlled. With the advent of self-driving cars, one branch of the IoT, i. H. The internet of vehicles is getting more priority day by day.

Fig 5.8 IoT Diagram

The explanation of the internet of things has emerged because of crossing of various technologies, practical analytics, machine learning, product detectors, and embedded systems. Conventional fields of embedded systems, wireless detector networks, control systems, robotization (including home and structur e robotization), and others each promote to facilitating the Internet of things.

Fig 5.8.1 WiFi Diagram

Wi-Fi devices like smart phones video game consoles and digital audio players get on to the Internet via wireless networks. Exposure of one or more entry points (interconnections) called

hotspots covers several rooms or an area as small as one square kilometre. Analysis in huge regions varies on the set of entry points with sufficient attention. Wi-Fi has been utilized effectively on wireless systems in London, UK. Wi-Fi offers Wi-Fi hotspot services in homes and private offices as well as in public places either for free or for exchange with users. Corporations and industries like landing strip, resorts and cafes frequently use open hotspots to attract or help customers. Some sites that offer essential services or support business on certain sites occasionally want to extend open Wi-Fi entry. More than 300 Wi-Fi (mini-Fi) circuits have been installed throughout the city since 2008. Since 2010 the Czech Republic has supported 1150 Wi-Fi Internet service providers.

5.9 HEART BEAT SENSOR:

A device that monitors the heart rate sensor relative to the users fingertips.

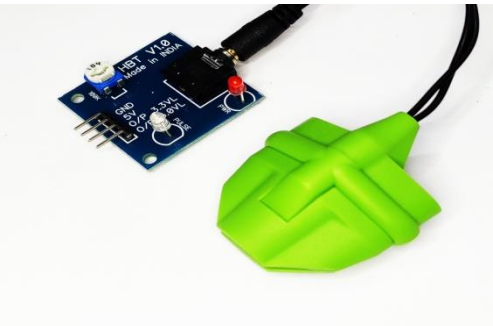


Fig 5.9 Heart Sensor

In particular a single elastic device with a heart rate sensor and three elastic bands was developed. The bar is designed to hold the users fingers. In one form of discovery band and base describe a U-shaped vertical intersection. In this case the support structure of the heartbeat sensor is cuneiform, and the wedge-shaped support structure is fixed at the base so that the cross-shaped area of the support structure in each strap and wedge is reduced in the same way. Agree. The fixed length of the base section. In another discovery method each binding defines a small node relative to the base. Therefore, these two signals cause more pressure on the sensor near the user's fingertips.

The device provides a device with a pulse sensor that maintains the accuracy associated with the user's finger. To control the pulse sensor on the device the pressure center between the bit sensor and the user is held by holding the center of pressure between the base part generated on the user's heartbeat sensor and the base finger and the middle finger. Finger distance from end user. A sheet of very soft material is formed based on the invention and three elastic bands are drawn over and above the base. Each bow forms part of the belt base and fits on the user handle.

5.10 GLOBAL POSITIONING SYSTEM (GPS):

The Global Positioning System (GPS) is the only complete system of Global Surveying Satellites (GSS). The GPS receiver system allows users to identify their location speed direction and time using satellites to accurately transmit at least twenty signals in orbit around Earth. Other similar systems are the Russian GLONASS (not completed since 2007) and the future European Galileo curriculum system.

GPS is officially called GPS by the United States State Defense Department (contrary to popular belief NAVSTAR is not the most maple but name only from Sir John Walsh when it comes to GPS

systems. It is). The satellites of the 50th Space Force are controlled by the United States Air Force. The system costs about $750 million a year to safeguard the research and development of senior military replacement.

After the crash of Korean Airlines Flight 007 in 1983 President Ronald Reagan ordered the system to be used for free for public welfare. Landscaping for commercial and scientific use. GPS also provides accurate time links for many applications including seismic surveys and network synchronization.

Current GPS has three main components. These are the Space Division (SS) and the Consumer Division GPS. GPS equipped cars today; Ambulances and police cars are common on the roads of developed countries. Also known as Automated Vehicle Positioning System (AVLS) Vehicle Tracking Information System (VTIS) Movable Asset Management System (MAMS) these systems provide useful tools for improving vehicle performance and usability.

5.11 SMART HOME

IoT kits are component of a larger home automation concept that may include lighting heating and air conditioning media and security systems.[28][29] Energy savings can include long-term benefits by automatically turning off lighting and electronics. Quick homes or computerized homes can be based on smart devices and programs or centers which regulate them. [30] For example utilizing the Apple Home-based Equipment producers can cope with their home stocks and fittings with iOS devices like the iPhone and Apple Watch. [31][32] This app can be provided for other apps like iOS or Siri. [33] This can be displayed on Lenovo Smart Home Essentials smartphones like the Apple Home or Siri app without the need for a Wi-Fi bridge.[33] The Smart Home Hub is also available as a standalone platform to connect a range of smart home products including the Amazon Echo Apple Home pod and the Samsung Smart Hub. [34]

5.12 MEDICAL AND HEALTHCARE

Medical IoT (also known as Health IoT) is an IoT application used to collect and analyze data for medical and health purposes for research and monitoring purposes. So-called smart healthcare has led to the creation of a digital healthcare system that combines available medical resources with healthcare. IoT devices can be used to enable remote health monitoring and emergency notification systems. These health monitoring devices can control special implants such as blood pressure monitors or advanced hearing aids from complex implants to complex devices. Some hospitals have introduced smart beds that can register when a patient is admitted to a hospital and when a patient is about to leave. Without the intervention of a nurse he or she can adjust to provide appropriate pressure and support for the patient. According to a 2015 report by Goldman Sachs medical IoT devices can save more than $ 300 billion in annual health care costs by increasing revenue and reducing costs in the United States.

Fig 5.12 Connection Diagram

In addition the use of mobile devices to support medical supervision has led to the development of the m-Health application which can be used to analyze transmit maintain health statistics including sensors and other biomedical acquisition systems from multiple sources.

6. SOFTWARE REQUIREMENTS

6.1 ARDUINO IDE

- Arduino IDE is a software for Arduino.
- It is a textbook editor like a tablet with various features.
- It is used to writing code, compiling the code to check if any errors are there and uploading the code to the Arduino.
- It is a cross-platform software which is available for every Operating System(OS) such as Windows, Linux, macOS.

Fig 6.1 Arduino Ide

7. RESULT

Fig 7.1 Final Result

This paper has helped people improve their standard of living and we have become materialists who forget how disabled people lead hard lives. It overcomes their obstacles. When the ultrasonic sensor detects an object in front the object in front sends a voice message to the blind person. When the ultrasonic sensor detects an object behind it sends the voice information of the object behind to the blind. When blindness is detected by an accelerometer before a fall. Heart sensor detect the person Heart rate and pulse rate**.** Gps navigation used to send the blind person location to their family**.**

8. CONCLUSION:

This project uses the built-in IoT-based visual protection system using the included Internet of Things. The advantage of using a fall detector is that the user does not have additional devices or sensors and reduces the cost of not purchasing additional devices. The system can track the location of the users fall incident. The system can send the time location and login details to previously created contacts via the Android app when the user is in the fall. The proposed design

system can send alerts communications and alerts to users using the built-in Android app.

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