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BUS INDICATION EMBEDDED SYSTEM FOR BLIND PEOPLE USING RFID

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ABSTRACT - Blind people have unique requirements and services, such as public transportation, in order to exercise their rights and move freely and independently from one area to another. The system consists of an RFID reader, a microcontroller, a buzzer and an LCD display. The RFID reader is placed at the entrance of the bus, and each passenger is given an RFID tag to carry. When a passenger enters the bus, the RFID reader reads the tag and sends the information to the microcontroller. The microcontroller then checks if the passenger has boarded the correct bus, and if so, activates the buzzer to alert the passenger that they have boarded the correct bus. The microcontroller also displays the bus number and destination on the LCD display for the passenger's convenience. This study discusses bus indication for blind persons utilizing RFID for visually challenged people to make transportation easy without relying on others. The RFID reader is located 100 meters from the bus terminal. When the bus arrives at a certain bus station, the RFID Reader reads the RFID Tag that is affixed to the bus. If it is discovered and identified, it is Communicated to the blind individuals in the bus station as a voice command. Since each bus has a unique RFID tag to identify, and the blind persons were recognized by an IR sensor (Infrared Sensor), which is indicated by a red light.

Keywords - ARDUINOUNO, RFID, SPEAKER, ULTRASONIC SENSOR

1. INTRODUCTION

Travelling by bus can be a daunting experience for blind people as they have to rely on assistance from others to ensure they are boarding the correct bus. This can be a time-consuming process and may affect their independence. To address this issue, an embedded system using RFID technology can be implemented to provide bus indication for blind people. The system involves an RFID reader placed at the entrance of the bus and RFID tags given to each passenger. When a passenger enters the bus, the RFID reader reads the tag and sends the information to a microcontroller. The microcontroller then checks if the passenger has boarded the correct bus, and if so, activates a buzzer to alert the passenger. The system also displays the bus number and destination on an LCD display for the passenger's convenience. This system will greatly benefit blind people as they will be able to confidently board the correct bus without relying on assistance from others. It will improve their overall experience and independence while travelling. The following sections will discuss the system in detail and the components used to implement it. creating your proceedings manuscripts. Please follow them properly.

Nowadays, travel has become an important aspect of our life. A normal individual may effortlessly go from one location to another without the need for help. In the case of blind persons, getting from one location to another is difficult since they are primarily dependent on others because they cannot see. It is difficult for blind persons to get to any location in their city using local buses since information about the buses is broadcast on LCD screens at local bus stations. Furthermore, unlike normal individuals who travel alone, blind persons cannot read the bus number to identify the proper bus to board. For this difficulty, we may design a solution by leveraging Internet of Things (IoT) (IoT).IoT connects gadgets over the internet to behave intelligently and precisely. In the current context, IoT is growing globally, and everyone is using it in their everyday lives to save time and resources. We devised a solution that includes an announcement of the bus details at local bus stations as well as an LED light to alert the bus driver to the presence of blind individuals.

2. LITERATURE SURVEY

[1]The project idea is proposed to reduce the consequences of accidents in our daily lives and avoid collision between vehicles. There are various reasons for such adverse condition that results in death or disabilities.

[2] Multiple sensor nodes (SN) are deployed at different water levels that collect sensor data and transmit it to underwater vehicles (UV) using underwater visible light communication (UVLC). The UVLC system provides higher data rates at lower latency as compared to existing radio frequency (RF) and acoustic wave alternative for underwater communication (UWC).

[3] Now a day's shopping at big malls is a daily activity in metro cities. One can see huge rush at malls on holidays and on special discounts days. People purchase different items and put them in trolley & go to billing counter for payments.

[4] Smart homes are among the most interesting applications of Internet of Things that enhance the quality of human life and brings more comfort, savings, convenience and peace of mind. In this paper, we propose a smart home system that uses Li-Fi technology as medium of combination between all the connected devices and uses a video surveillance system based on Wireless Visual Sensor Network.

[5] The system with RFID tags will be placed in all the trolleys. All the products in the mall will be equipped with RFID tags. When a person puts any products in the trolley, its code will be detected and the price of those products will be stored in memory, its name and cost will be displayed on LCD and will be sent to billing Counter by wireless modules.

[6] This paper presents a 6-DOF pose estimation (PE) method and an indoor way finding system based on the method for the visually impaired. The PE method involves two graph SLAM processes to reduce the accumulative pose error of the device.

[7] Various obstacle avoidance (OA) methods with the monocular vision have been studied to assist visually impaired people. Recently, a method that effectively locates obstacles at a risk of collision using the shape variation of a grid, called deformable grid (DG), was introduced.

[8] To overcome the travelling difficulty for the visually impaired group, this paper presents a novel ETA (Electronic Travel Aids)-smart guiding device in the shape of a pair of eyeglasses for giving these people guidance efficiently and safely.

[9] Navigation assistance for visually impaired (NAVI) refers to systems that are able to assist or guide people with vision loss, ranging from partially sighted to totally blind, by means of sound commands. In this paper, a new system for NAVI is presented based on visual and range information.

[10] In this paper, we present a novel wearable RGBD camera Based navigation system for the visually impaired. The system is composed of a smart phone user interface, a glass-mounted RGBD camera device, a real-time navigation algorithm, and hepatic feedback system.

3.PROPOSED METHOD

The proposed bus indication embedded system for blind people using RFID technology consists of four main components: an RFID reader, an RFID tag, a microcontroller, and an output display. The system operates as follows:

The RFID reader is placed at the entrance of the bus. It consists of an antenna and a transceiver, which communicate with the RFID tag. When a passenger enters the bus, the RFID reader reads the tag and sends the information to the microcontroller. Each passenger is given an RFID tag to carry. The tag contains a unique identification number that is read by the RFID reader. The microcontroller is the brain of the system. It receives the information from the RFID reader and processes it to determine if the passenger has boarded the correct bus. If the passenger has boarded the correct bus, the microcontroller activates a buzzer to alert the passenger. The microcontroller also displays the bus number and destination on an LCD display for the passenger's convenience. The output display is an LCD display that shows the bus number and destination. It is connected to the microcontroller and displays the information for the passenger.

4.SOFTWARE DESCRIPTION

4.1 ARDUINO IDE

Writing, compiling, and uploading code to an Arduino board are all done using a software program called the Arduino Integrated Development Environment (IDE). It may be used with Windows, macOS, and Linux and is an open-source platform. The C/C++ programming language is supported by the Arduino IDE, which offers a straightforward programming interface. It has a code editor with tools that make writing code simpler and quicker, such syntax highlighting, auto-indentation, and code completion. The IDE also comes with a compiler, which converts the editor's code into machine code that the Arduino board can understand. With the IDE's built-in uploader tool, the code may be uploaded to the board after it has been compiled. This program main concept is

Setup ()

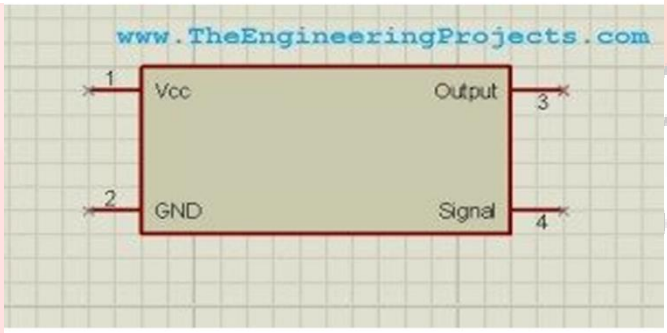
Loop ()

"setup()" is the first. Everything you enter in this function will only ever be used once by the Arduino when the application first launches. The second is called "loop()". Once the setup() function of the Arduino has completed, it will enter the loop() method and run the code there repeatedly until you reset it or turn off the power

Fig.1.Setup image

4.2.PROTEUS

Electronic circuit design, simulation, and testing are all done using the software program Proteus. For the design and modeling of electrical circuits, a well-known software package created by Labcenter Electronics Ltd. is extensively used in business, academia, and by hobbyists. A user-friendly interface for developing and testing electrical circuits is offered by Proteus. It has a schematic capture tool that enables users to create circuit diagrams using symbols for electronic parts like transistors, resistors, and capacitors. Moreover, it offers a library of ready-made parts that may be used to quickly construct circuits. The capacity of Proteus to mimic the behavior of electrical circuits prior to their actual construction is one of its primary advantages. This helps designers save time and money by enabling them to test and debug their circuits before committing to a physical implementation. With the help of Proteus' Virtual Instrumentation (VI) capability, users may create and test virtual oscilloscopes, logic analyzers, and waveform generators. Using this function to test and troubleshoot digital circuits may be especially helpful. Together with these capabilities, Proteus allows co-simulation with other software tools, such as the Arduino IDE, enabling users to model the behavior of Arduino-based circuits and test them in a virtual setting.



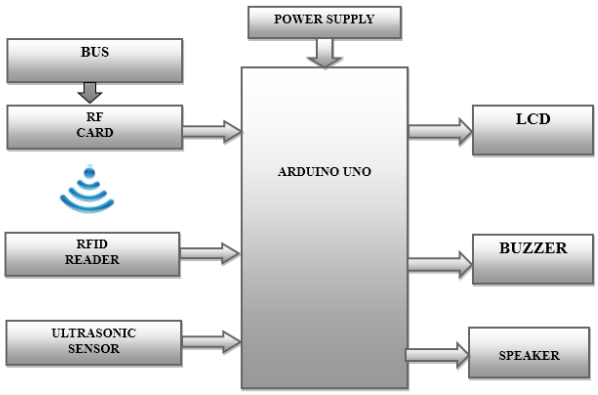


Fig.2.Hardware Block Diagram

4.3 HARDWARE EXPLANATION

We created a method for blind individuals that would allow them to simply go from one location to another. We will affix an RFID tag on the bus that holds the bus's information, and we will install the RFID reader 100 meters distant from the bus stop. As the bus goes by the RFID reader, the tag is read and the tag number is serially sent to the Arduino UNO. The tag number will then be checked against the specific data associated with that tag number. The speech module will provide bus information via a speaker located at the bus stop. The ultrasonic identifies the item and alerts the user through a buzzer. As the blind persons arrived at the bus stop, we implemented this initiative.

4.3.1 MODULE LIST:

- Power supply
- Arduino Uno
- RFID tag
- RFID reader
- Ultrasonic sensor
- LCD
- Buzzer
- Speaker

4.3.2 POWER SUPPLY:

An electronic device called a power supply transforms electrical power from one form to another so that it may be used to power other electronic devices. For electronic equipment like computers, TVs, and other appliances, power supplies are used to transform AC electricity from a wall socket into DC power. The most popular kind of power supply is a linear power supply, which transforms AC power into a lower voltage DC output using a transformer. Although linear power sources are straightforward, dependable, and reasonably priced, they are often big and inefficient. Linear power supplies can be replaced by switching power supplies since they are more effective. In order to change AC power into DC power, they employ a switching regulator. Although switching power supplies are more compact and lightweight than linear power supply, their manufacturing can be more difficult and expensive. Moreover, power suppliers can be divided into regulated and uncontrolled groups. Unregulated power supplies provide a voltage that fluctuates with changes in input voltage or load, whereas regulated power supplies maintain a constant output voltage independent of fluctuations in input voltage or load. Many consumer and industrial items, such as computers, TVs, audio equipment, and many more, all have power supply. For a particular equipment to function correctly and securely, selecting the appropriate power source is crucial.

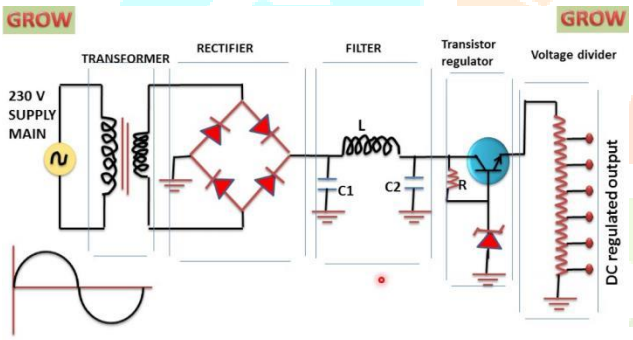


Fig.3.Power Supply

4.3.3 AURDINO UNO:

Fig .4.Aurdino UNO

Popular microcontroller boards like the Arduino Uno are frequently used for DIY projects and prototyping. It is compatible with the Arduino software and programming language and is built on the Atmel ATmega328P microcontroller. Many input and output pins on the Arduino Uno board may be utilized to connect to sensors, actuators, and other electrical parts. These pins contain PWM (Pulse Width Modulation) pins, analog input pins, and digital input/output pins. Moreover, the Arduino Uno board contains a USB connector that may be used to interface with other devices and for programming purposes. Either an external power source or the USB connection can be used to power the board. The C/C++ foundation of the Arduino programming language makes it simple to understand and utilize. The bootloader in the Arduino software enables the uploading of code to the board through the USB connection and contains a code editor, compiler, and

bootloader. For both experts and amateur electronics enthusiasts, the Arduino Uno provides a flexible and reasonably priced platform. Several other projects, such as robots, home automation, environmental monitoring, and many more, can use it.

4.3.4 RFID TAG:

Fig.5.RFID Tag

An object, product, or commodity can have a small electronic device called an RFID tag (Radio-Frequency Identification tag) inserted in it or connected to it in order to monitor and identify it. RFID tags connect by radio waves with RFID readers or antennas, enabling identification and tracking without the necessity for line-of-sight visibility or direct touch. RFID tags are made up of an antenna that sends and receives radio signals as well as a microchip that saves data. They can be run on a battery or by the electricity gathered from the radio waves the RFID reader transmits.

RFID tags come in a variety of sizes and designs and fall into one of two categories: active or passive. Active RFID tags can connect with readers over a greater distance and have their own power source. Without a power source of their own, passive RFID tags rely on the radio waves from the reader to send data. They are smaller and less costly than active tags but have a lesser range. Inventory management, supply chain management, asset monitoring, access control, and transportation are just a few of the many uses for RFID tags. By offering real-time tracking and monitoring of products and assets, they may assist organizations in increasing efficiency, decreasing costs, and enhancing security**.**

4.3.5 RFID READER:

Fig.6.RFID Reader

Radio waves are used by an RFID reader (Radio-Frequency Identification reader) to connect with RFID tags and obtain data from them. An antenna that generates radio waves and a transceiver that recognizes and decodes the data sent by the RFID tag make up RFID readers. RFID readers exist in a variety of shapes and sizes, from portable gadgets to stationary installations. Fixed readers and portable readers are the two primary categories that they fall under. Handheld readers are small, transportable devices that may be used to scan RFID tags up close. Fixed readers can be used to scan RFID tags as they pass by and are installed in specified locations, such as a doorway or a conveyor belt.

RFID readers may also be divided into low-frequency (LF), high-frequency (HF), and ultra-high-frequency (UHF) readers based on their frequency range. Regarding range, reading speed, and data transfer rate, each frequency range has benefits and restrictions of its own. Applications for RFID scanners include transportation, access control, asset tracking, and inventory management. By offering real-time tracking and monitoring of products and assets, they may assist organizations in increasing efficiency, decreasing costs, and enhancing security.

4.3.6 ULTRA SONIC SENSOR:

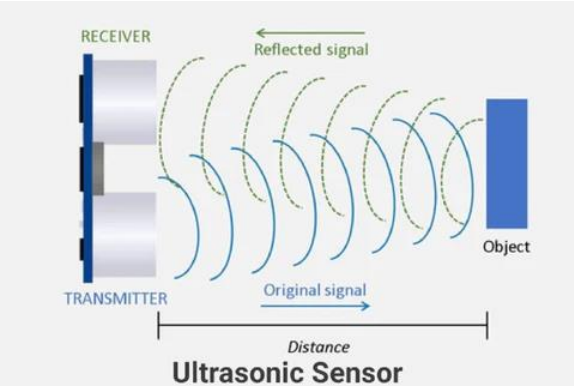


Fig.7.Ultrasonic Reader

A gadget called an ultrasonic sensor employs sound waves at a frequency above the range of human hearing to find objects or gauge distances. In order to measure the time it takes for high-frequency sound waves to bounce back after impacting an item, ultrasonic sensors first produce the sound waves from a transducer. The distance to the item may be calculated using this time delay. Robotics, distance measuring, obstacle identification, and liquid level monitoring are just a few of the uses for ultrasonic sensors. They are especially helpful in settings where other kinds of sensors, such optical or infrared ones, would not be accurate because of dust, smoke, or other atmospheric factors.

Single-element sensors and array sensors are the two categories into which ultrasonic sensors fall. Whereas array sensors utilize numerous transducers to produce and receive sound waves from various angles, single-element sensors only use one transducer to transmit and receive sound waves. Compared to single-element sensors, array sensors can deliver more precise readings and detect objects from a broader variety of angles. The operating frequency of ultrasonic sensors, which may range from a few kilohertz to several megahertz, can also be used to classify them. Higher frequency sensors often have a shorter range but are more sensitive and capable of providing more accurate results.

4.3.7 LCD:

Liquid Crystal Display is referred to as LCD. It is a kind of flat panel display that generates pictures using liquid crystals. A liquid crystal solution is sandwiched between two sheets of polarizing material, one of the several layers of material that make up an LCD display. An electric current may be used to alter the liquid crystal material used in LCD displays. This allows the crystals to realign themselves and either block or let light through. As a result, pictures or text are produced that may be seen on the screen. From small screens on mobile devices to big displays used for digital signage or television screens, LCD displays are available in a range of sizes and resolutions.

They are frequently seen in gadgets like televisions, digital watches, computer displays, and calculators. LCD screens have the benefit of using less power than other display types, such as CRT (Cathode Ray Tube) displays. They are a popular option for portable devices since they are more compact and lightweight than CRT displays. However, there are several restrictions on LCD screens. As the liquid crystals might take some time to turn on and off, they are less effective at showing rapidly changing pictures. Also, they have a narrow field of vision, which means that if the picture is seen at an angle, the quality may suffer.

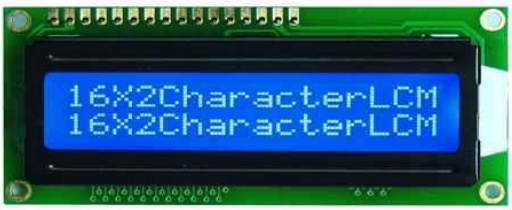


Fig.8.LCD

4.3.8 BUZZER:

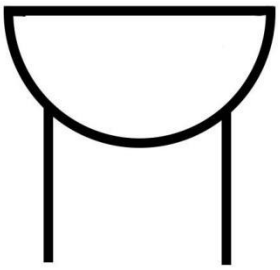


Fig.9.Buzzer

An electrical gadget called a buzzer emits a loud sound, either continuously or sometimes, when it is turned on. It frequently appears in a variety of devices, including alarms, doorbells, gaming consoles, and musical instruments. An electromechanical transducer that transforms electrical energy into sound waves makes up a conventional buzzer. The transducer vibrates quickly in response to an electrical current, creating an audible tone in the form of a sound wave. Buzzer gadgets can generate a variety of noises, such as continuous, intermittent, or multi-tone sounds, and can be driven by either AC or DC electricity. Moreover, they may be made to emit noises with various frequencies and volumes.

In addition to being in a variety of sizes and configurations, including surface-mount and through-hole packages, buzzer devices may also be controlled in a variety of ways, including via buttons, switches, and microcontrollers.

4.3.9 SPEAKER:

Fig.9.Speaker

An electroacoustic device known as a speaker transforms electrical impulses into sound waves. It comprises of a cone-shaped diaphragm or driver, which vibrates in response to an electrical input, creating sound waves audible to the human ear. Depending on the purpose and usage for which they are designed, speakers come in a variety of sizes, shapes, and designs. They are often used in audio systems, including as automobile audio systems, portable speakers, home theater systems, and headphones. The size of the driver, the materials used to make the driver and enclosure, and the layout of the crossover network, which divides and distributes the necessary frequencies to the many drivers in a multi-way speaker system, all affect how loud a speaker will sound. Frequency response, sensitivity, and power handling capabilities are used to categorize speakers. Although sensitivity relates to how loud a speaker can emit sound at a specific input power, frequency response refers to the range of frequencies that a speaker can reproduce. The highest amount of power that a speaker can withstand without breaking down is referred to as power handling capability.

5.CONCLUSION:

There are an estimated 40 to 45 million blind people worldwide; particular services need be provided to them in order for them to live like others do. In this study, we developed an RFID-based bus detecting system for blind people. The proposed system is simple to use and benefits all passengers, not just those who are blind. The system's two subsystems are the bus subsystem and the station subsystem. The bus subsystem alerts all passengers of the forthcoming stops on the bus route. Additionally, the number of blind people who use the bus as well as their destinations will be communicated to the bus driver. The announcement will be made by the station's subsystem.

This study is primarily concerned with making it easier for blind individuals to board buses. Our key premise was that every blind person may go to anywhere at any time. The "BUS INDICATION SYSTEM USING RASPBERRY PI AND RFID" is designed to provide bus information to blind persons. It activates when the RFID reader identifies the RFID tag and serially communicates the tag id to the Arduino UNO board. It validates the tag id and provides it in array format to the Raspberry Pi. The bus information on the Raspberry Pi is turned into speech using the Speak package, and a voice announcement is made via a speaker at the bus stop. The top right led light at the bus stop will turn on when an Infrared sensor detects the presence of blind persons, alerting the driver of their presence.

5.1 ADVANTAGES

- Improved accessibility
- Real-time information
- Easy to use
- Cost-effective
- Scalability
- Privacy

5.2 DISADVANTAGES

- Dependence on technology
- Limited coverage
- Technical issues
- Privacy concerns
- Cost
- Lack of awareness

5.3 APPLICATION

Bus stop signage: RFID tags can be embedded in bus stop signs to provide real-time information about the arrival and departure times of buses. Blind people can simply wave their RFID tag near the reader to access this information.

- Mobile applications: Mobile applications can be developed that use RFID technology to provide real-time bus indication information to blind people. Users can receive alerts about bus arrival times, departures, and other relevant information.
- Wearable devices: RFID tags can be integrated into wearable devices such as smartwatches or bracelets to provide real-time bus indication information to blind people. Public transportation cards: Public transportation cards such as smart cards or contactless payment cards can be integrated with RFID technology to provide real-time bus indication information to blind people when they tap their card at the bus stop.
- Audio announcements: Audio announcements can be used in conjunction with RFID technology to provide real-time bus indication information to blind people. When they tap their RFID tag at the bus stop, a voice message can be played informing them of the bus's arrival and departure times.

5.4 FUTURE WORDS

- Integration with other technologies: The system can be integrated with other technologies such as GPS or Bluetooth to provide more accurate and reliable bus indication information.
- Multi-lingual support: The system can be designed to support multiple languages, making it more accessible for non-native speakers and tourists.
- Customization options: Users can have the option to customize the type and frequency of bus indication information they receive based on their individual needs and preferences.
- Enhanced security and privacy: The system can be designed with enhanced security and privacy features to prevent unauthorized access to the system or data breaches.
- Real-time feedback: The system can provide real-time feedback to the transportation network operators, enabling them to make adjustments to the system based on user feedback.
- Expansion to other transportation modes: The system can be expanded to other transportation modes such as trains or subways, providing blind people with access to real-time transportation information across various modes of transportation.

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