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RESEARCH ARTICLE

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AN INTELLIGENT ASSISTANT SYSTEM FOR VISUALLY IMPAIRED USING RFID TECHNOLOGY

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ABSTRACT
In this modern era, to find a reliable system for visually impaired and increase the independence towards the society to give a specified destination which would help to the visually impaired. There are many assertive ways are available for visually impaired, which is a very common tool for visually disabled person throughout the world that gives a common way to find the path. The technology used in my system is: RF transmitter and RF receiver, ultrasonic sensor, RFID reader, IR sensor. The system used to detect the name of the place by RF transmitter and RF receiver at particular user required distance. The reader used in this system is embedded into the mobile and shoes to avoid dependency on travel. The RFID reader reads the tag at the particular user path that can detect and send the information to visually impaired. The ultrasonic sensor is to detect the unexpected obstacle nearby the people. IR Sensor detect the information about unexpected people enter into the particular room.

Keywords: Wireless RF links, Ultrasonic Sensor, Microcontroller, RFID Tag, reader, IR sensor.

INTRODUCTION

The visually impaired person faces more trouble to move one place to another place. Mobility of visually impaired people is to restrict by their incapability to recognize their surroundings. Difficulty is to detect unexpected obstacle and name of the unknown place and things. So my proposed system is to give a reliable system to find an obstacle and to sense the unexpected person enter into the room. Is to become an independent in their daily life and to reduce the dependency of other physical bodies.

The navigation assistant technology using Wireless RF links and RFID reader is to read the name of the particular tag data and by using RF links to get the information about the particular name of the room or place. This navigation system is to give a better and effective reliable system for visually impaired. Now the issues is to diagnosed and detected when the visually impaired people enter into the building and the people is not familiar with the environment they may miss the path often. in such cases they seek for other person help, they are pretend to dependent.

Hence the intelligent system is too effective, easier and in reliable system using Wireless RF links and RFID technology for visually impaired.

LITERATURE SURVEY

There is various research works carried out in the present scenario for navigation to visually impaired. Saleh Alghamdi [1] the aim of this system is to give a guide sighted people at unfamiliar indoor environments using combinations of QR-code and active RFID.

It is designed particularly to aid blind people with low vision to reach their destination using RFID technology by itself give them useful navigation information via smart phone. The range of the distance is depend on user need and gives only shortest path then extracted four or five way point tags to reach the destination which was represents entrance of department.

A.M. Kassim [2] RFID technology to support the visually disabled people more efficiently in outdoor activities. The system is based upon RFID wireless technology and voice system which assembled to help the visually impaired to find the surrounding landmark via verbal notification.

RFID integrated white can is designed and evaluation the range of RFID tag which can be detected.

Juan J. Pomarico-Franquiz [3] Grid navigation spaces nested with the radio frequency identification (RFID) tags are promising for industrial and other needs, because each tag can deliver information about a local two-dimensional or three-dimensional surrounding. FIR filter is demonstrated based on extensive simulations in a comparison to EKF under real working conditions. The information's about a local relief delivered to a vehicle with uncertain co-ordinates may provoke bad consequences.

Bharath Kumar M R [4] the navigation assistant technology using RFID Tag Grid minimizes the dependency.

The RFID reader match with the specified ID and voice signal is generated.

Wireless RF links is placed in the Bluetooth device for voice guidance. The proximity sensing unit is an auxiliary unit is added as a solution to detect an obstacle in the user's path. Difficulty in detecting the hazards and obstacle.

EXISTING SYSTEM

One of the technical challenges for the modern society to detect and find a solution for visually impaired to increase security and service motto. The prototype as a way of finding a solution to the visually impaired and navigation assistant technology using RFID tag grid minimizes the dependency.

The reader is embedded into the mobile and shoes to avoid dependency on travel. The RFID reader read the Tag ID and voice signal is generated. Wireless RF links is placed in the Bluetooth device for voice guidance.

The Ultrasonic sensor is to sense and detect the unmapped obstacle in the user path. Basically it consists of ultrasonic sensor unit interfaced with microcontroller to a vibrator that would be when the obstacle is detected. This system is technically and economically feasible and gives greatest benefit to the visually impaired.

DRAWBACKS OF EXISTING WORK

This method consists of following drawback:

1. Difficulty to detect the hazard and obstacle.
2. Limitations to find accuracy rate of information.
3. Not used additional technology.
4. Not find to get information about any interruption into the particular room.

PROPOSED SYSTEM

The main aim of the proposed system is to give a reliable and proximity sensing for visually impaired.

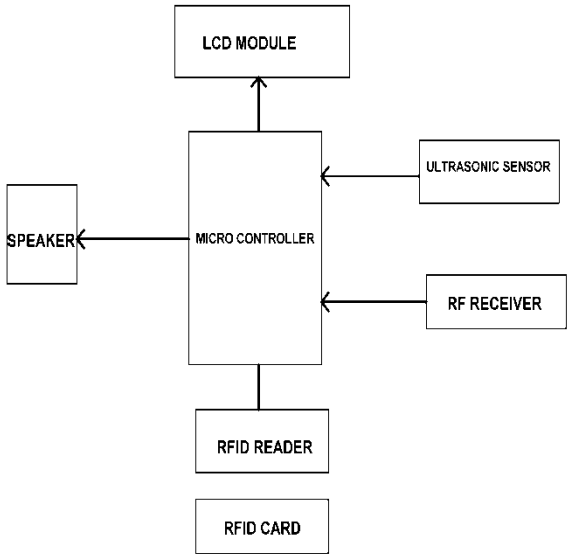
In additional to develop the security systems to detect the intruder enter into the particular room by using IR sensor.

Then it is to transmit using RF technology as Wireless RF links.

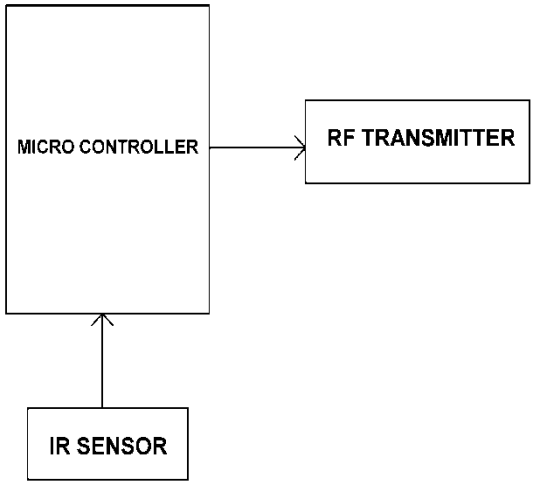
Wireless RF links contains transmitter and receiver to receive the information about the name of the place and infrared sensor is fixed with it.

BLOCK DIAGRAM:

BLOCK-1



BLOCK-2



COMPONENTS REQUIRED

MICROCONTROLLER: Microcontroller differs from a microprocessor in many ways. First and the most important is its functionality. In order for a microprocessor to be used, other components such as memory, or components for receiving and sending data must be added to it. In short that microprocessor is the very heart of the computer. On the other hand, microcontroller is designed to be all of that in one.

No other external components are needed for its application because all necessary peripherals are already built into it. Thus, we save the time and space needed to construct devices .this chapter deals with the study of microcontrollers.

The Intel 8051contains two separate buses for the program and data. It is based on an 8 bit central processing unit with an 8 bit accumulator and another 8 bit register as main processing blocks.AT89C51 is supported with on-chip peripheral functions like I/O ports, Timers/Counters, serial communication port.

The AT89C51 is a low-power, high-performance CMOS 8-bit microcomputer with 4K bytes of Flash programmable and erasable read only memory (PEROM). The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard MCS-51 instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89C51 is a powerful microcomputer which provides a highly-flexible and cost-effective solution to many embedded control applications.

The AT89C51 provides the following standard features: 4K bytes of flash, 128 bytes of RAM, 32 I/O lines, two 16-bit timer/counters, a five vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator and clock circuitry. In addition, the AT89C51 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port and interrupt system to continue functioning. The

Power-down Mode saves the RAM contents but freezes the oscillator disabling all other chip functions until the next hardware reset.

INFRARED RAY: Object detecting sensor is the one which detects an object, in consideration with this project it is concerned with the intruder. The Object detecting sensor used here is IR (Infrared Ray) sensor.

- Infrared Ray Emitter – TIL31
- Infrared Ray Detector – TIL81

TIL 31 is an emitter which emits Infrared rays and TIL 81 is a detector which detects the infra-red rays emitted by the emitter. It produces a pulse whenever the infra-red ray is cut by any hindrance.

In our project it serves for detecting the person who illegally enters into the secured location. Since the IR sensors detects in a straight line, to get accuracy we go for combination of two or three IR sensors. The data sheet of TIL 31 and TIL 81 are attached.

RF TRANSMITTER MODULE TX433N: The transmitter module (TX433N) interfaced to the microcontroller through the encoder IC HT12E. It modulates the digital data coming from the encoder IC into RF radio frequency signal by ASK modulation technique and transmits via RF out antenna pin1, When the command send from the µC, the encoder encodes the address and data bits upon getting transmission enable signal from the µC and send serially to the transmitter module Din pin2, the transmitter module converts the digital signal into RF signal and transmits via wireless media. The wireless transmitter module can be used to transmit data at up to 3 KHz from any standard CMOS/TTL source. The module is very simple to operate and offers low current consumption (typ. 11mA). Data can be supplied directly from a microprocessor or encoding device, thus keeping the component count down and ensuring a low hardware cost.

In this module TX1-433.92MHz is used to transmit the data from the protected area. It receives the data from the controller and transmits the data at the frequency of 433.92MHz. The module is very simple to operate, requiring only two connections. The module is also very efficient, using only 2.3mA which means that it may be driven directly from an encoder I/C or microcontroller.

The output impedance has been designed to give optimum performance when coupled with a small antenna such as a tuned loop or short whip. The modules are compatible with the AM Receiver modules.

RFID – RADIO FREQUENCY IDENTIFICATION: RFID stands for radio frequency identification. It is an automatic identification technology to identify objects by using invisible radio waves. Instead of optically scanning bar codes on a label, RFID uses radio waves to capture data from tags. One of the key characteristics of RFID is that it does not require the tag to be seen to read the data stored in it. This means that the tag can be placed either inside or outside. To accomplish this, 2 components are essential: reader and a tag.

3.1.2 BASIC ELEMENTS OF RFID

1. Tag
2. Readers

TAG:

A tag, also called as transponder, is made of a micro-chip with a coiledantenna. The tag can be programmed with unique information about the object and hence can be used to identify it. RFID tags can be encased in hardened plastic coatings making them extremely durable.

RFID tags can store large amounts of data. High end RFID tags can store up to 1 megabyte of data. Some RFID tags supports read/write operations, enabling real time information updates as the tagged item moves from one location to another.

TYPES OF RFID TAGS:

1. PASSIVE
2. ACTIVE

PASSIVE: Passive RFID tags have no internal power supply. The minute electrical current induced in the antenna by the incoming radio frequency signal provides just enough power for the CMOS integrated circuit in the tag to power up and transmit a response. Most passive tags signal by backscatteringthe carrier signal from the reader. This means that the antenna has to be designed to both collect power from the incoming signal and also to transmit the outbound backscatter signal. The response of a passive RFID tag is not necessarily just an ID number; the tag chip can contain non-volatile EEPROM for storing data.

LCD Display

LCD interfacing: Frequently, an 8051 program must interact with the outside world using input and output devices that communicate directly with a human being. One of the most common devices attached to an 8051 is an LCD display. Some of the most common LCDs connected to the 8051 are 16x2 and 20x2 displays. This means 16 characters per line

by 2 lines and 20 characters per line by 2 lines, respectively. Fortunately, a very popular standard exists which allows us to communicate with the vast majority of LCDs regardless of their manufacturer. The standard is referred to as HD44780U, which refers to the controller chip which receives data from an external source (in this case, the 8051) and communicates directly with the LCD.

44780 BACKGROUND

The 44780 standard requires 3 control lines as well as either 4 or 8 I/O lines for the data bus. The user may select whether the LCD is to operate with a 4-bit data bus or an 8-bit data bus. If a 4-bit data bus is used the LCD will require a total of 7 data lines (3 control lines plus the 4 lines for the data bus). If an 8-bit data bus is used the LCD will require a total of 11 data lines (3 control lines plus the 8 lines for the data bus).

The three control lines are referred to as **EN**, **RS**, and **RW**.

The **EN** line is called "Enable." This control line is used to tell the LCD that you are sending it data. To send data to the LCD, your program should make sure this line is low (0) and then set the other two control lines and/or put data on the data bus. When the other lines are completely ready, bring **EN** high (1) and wait for the minimum amount of time required by the LCD datasheet (this varies from LCD to LCD), and end by bringing it low (0) again. The **RS** line is the "Register Select" line. When RS is low (0), the data is to be treated as a command or special instruction (such as clear screen, position cursor, etc.).

When RS is high (1), the data being sent is text data which should be displayed on thescreen. For example, to display the letter "T" on the screen you would set RS high.

The **RW** line is the "Read/Write" control line. When RW is low (0), the information on the data bus is being written to the LCD. When RW is high (1), the program is effectively querying (or reading) the LCD. Only one instruction ("Get LCD status") is a read command. All others are write commands--so RW will almost always be low.

Finally, the data bus consists of 4 or 8 lines (depending on the mode of operation selected by the user). In the case of an 8-bit data bus, the lines are referred to as DB0, DB1, DB2, DB3, DB4, DB5, DB6, and DB7.

CONCLUTION AND FUTURE SCOPE: The system reduces the dependency for visually impaired use of Wireless RF links an RFID reader is to detect the particular information ID to user. It is the reliable system to visually impaired. This system is more helpful and requires lesser implementation of time. It could be applied to huge unfamiliar places like museums; people tend to get guidance. Each tag is separately programmed to rely-time information and lesser implementation of time. In future work is to find all dimension sensor is to detect and to give the information to longest distance.

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