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Wireless Technology in Bus Alert System - A Fortune for Visually Challenged Populace.

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ABSTRACT

Out of 6.7 billion people in the world 161 million people face the problem of proper vision. Depending upon their specific vision level, this visually challenged person faces many obstacles which stop them from building their career. The facility for education and other needs has been provided to blind module which can be recognized by the Zigbee in the bus and another module provided to the blind people by various organizations. But still the blind faces certain complex problems when the blind walked in road and travel to long distance especially by public transport like bus. A Zigbee transceiver using microphones the input about the destination has been provided by the blind which is recognized by the voice recognition system. The microcontroller analyzes the input given by the blind and generates the bus numbers in accordance to the location provided. The voice synthesizer LMIC converts these bus numbers into audio output. The number of the bus is announced to the blind with help of loud speakers, the transceiver receives the bus number from the Zigbee transceiver. GPS-634R, interfaced with controller and voice synthesizer announces when the final destination is reached thereby helping the blind in taking the right bus. The motto of this paper is also to provide a self standing transport for the elder people.

Keywords: Zigbee, navigation, visually challenged, bus alert.

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INTRODUCTION

It is found that more than 200 million people across the world face numerous challenges in their day to day life because of their improper vision or for the reason of being illiterate. The increasing traffic and the huge population in these days make it burdensome for these people to travel from one place to other. Watch dogs and walking canes do not really help if the problem is in regard with traffic or if the person wants to travel to far distances in some public transport systems.

The prime goal of this paper is to help the blind, old, illiterate people and also the pedestrians with the help of Wireless Sensor Networks (called WSN). Diverse modules such as the ARM7 based microcontroller LPC2148, Zigbee, voice synthesizer, speech recognition system and GPS module are present in both the passenger unit and the bus unit. The Zigbee module present in both of the units helps the visually challenged passenger to find the appropriate bus. The GPS module and the Speech recognizer which are used to trace the region and to find the location given by the passenger are controlled by the microcontroller. If the location is matched, a notification to get down at the destination has been given by the voice synthesizer to the visually challenged passenger through the earphones that are connected for the passenger unit.

The number of the bus is announced through headphones provided to the blind. When the Zigbee transceiver module present in the transport system transmits, number of the bus to the transceiver available with the blind. Thus the blind gets into the desired bus and as soon as it reaches the final location it will be announced. Zigbee is known as a low power spinoff for Wi-Fi. It is regarded as a specification for small and low power radios according to IEEE802.15.4-2003.

The specification is undertaken and it is approved by the Zigbee alliance in Dec 2004. Zigbee Alliance is referred to a group of 300 companies which includes playback capability for about 40 to 60 seconds. The devices will support random as well as the sequential accesses for a number of multiple messages. The Sample rates can be directly selected by the user which gives an opportunity to the designers in industry majors such as Philips, Atmel, Mitsubishi Electric, Epson, Texas Instruments etc. The LMIC device will offer true voice recording through a single chip, non-volatile storage and order to exhibit their designing to special quality and time needs for storage. The system design is made easy to understand by output amplifier, the amplifier for microphone and Automatic gain control (AGC) circuits. For many customer and factory applications, manufacturing of toys and in case of portable voice recorders, the above mentioned system is regarded as a perfect device for usage.

EXISTING SYSTEMS:

- Walking canes, sighted guides, guided dogs are majorly used for the purpose of navigation for blind. The sighted guides were extremely effective, and provide relaxation whereas it limits the freedom for the visually challenged people. Walking canes and Guide dogs are extremely independent in the case of navigation but they were restricted to unknown surroundings.
- RFID is considered as expensive and feasible whereas it is appropriate for only indoor exchange of information. It only furnishes single way communication and very small distance of recognition.
- A device along with an enlarged walking stick, spectacles and also distinguishable objects that are marked with sema code or information matrix tags which are used for external transport for blind people. In case if an individual require climbing the bus then he walks along the footpath and his web camera is regarded as fairy poor. The Tag recognition which is present in gloominess or in poor lighting situations may cause a difficulty. One more complication is that camera or the camcorder requires a image, and hence if the tag is kept out of sight by hiding it back of an individual or any other object then the camera or camcorder is not able to detect it.
- A blind system provided with the voice modules, the voice identification system that is used for identification of the bus which the blind requires to take. In case of the bus system, monitoring will completely depend upon the driver that is regarded as a less alert system, mostly it is manually operated and of cost effective.

PROPOSED SYSTEM:

A wireless sensor network is proposed with Zigbee for the blind recognition with the bus and implanted system to transmit number of the desired bus for the blind via microphones and finally the GPS is used for indication of destination.

- The Automatic operation
- The Safety concerns for blinds
- Quick monitor continuously
- The High alert system

BASIC BLOCK DIAGRAM

In this paper, a Zigbee is used for transmission and also another Zigbee is used for receiving the data regarding buses in which the blind people required to travel. The ARM controller is used to control all peripherals that are connected to it and then processes the information and it is sent for the head phones. The Bus that contains the Zigbee will transmit the data of its number and bus stopping's continuously. The Zigbee present at blind people will receive the data continuously and that data will be processed by ARM controller and then it is converted to voice and sent to the head phones. With the help of these head phones the blind people will know the bus number and their respected bus stations. The operation of Portable Passenger bus alert system can be divided for the purpose of easy navigation of blind people into two sections are i. Bus unit

ii. Blind unit.

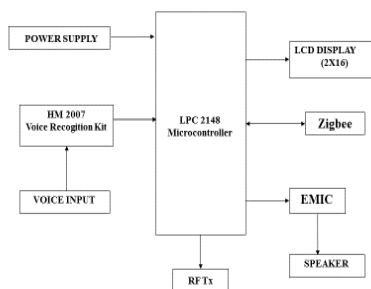


Fig 2.1 Basic blocks of Bus unit

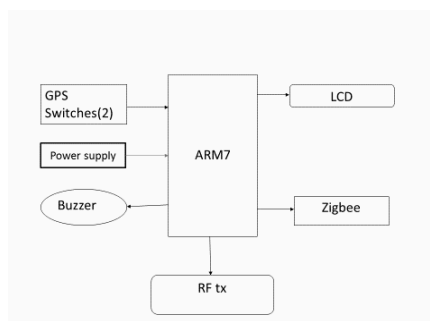


Fig 2.2. Basic blocks of Blind unit



VOICE RECOGNITION MODULE

The accent recognition system is absolutely amassed and flexible to make use of programmable accent acknowledging circuit. Programmable, in the sense the words (or vocal utterances) are trained so that the system acknowledge. This panel provides an opportunity to conduct experiment with lots of features of accent acknowledging technology. The panel receives 8 bit data and will be merged with any microcontroller for additional advancement as shown in the figure 5.2. Some of the merging applications are used to control home appliances, robotics movements, Accent Assisted technologies and text translation, and many others.

FEATURES OF PROPOSED SYSTEM

- Inbuilt voice identification circuit
- Can be directly accessed by the user
- Provides each a time span of 2 seconds for up to 20 word vocabulary
- Acquire the input data from various languages
- Retention of onboard non-volatile memory.
- Ability to store the voice identification data even after switching off.
- External circuits and other appliances can be controlled

System Utilisation

The HM2007 chip is programmed and the data is conveyed to it with the help of keypad and digital display. Keypad is made with 12 NO transitory switches. The moment the circuit is switched on the digital display shows '00', the red LED indicates READY and the circuit holds up for an instruction.

Training Recognition

Initially push '1', then press TRAIN to setup the system in training state, for the given command '1'. Certainly desired destination into the near LED of microphone. The system accepts the uttered voice input by twinkling the LED off and then resting on. The uttered word is now recognised as the '01' word. If the LED did not flash, start it over by giving "1" and then press the "TRAIN" Button key.

The process of training new words in the circuit can be extended by pressing "2" and then TRAIN to teach the subsequent word and so on. The system will receive and identify maximum 20 words; if you require 12 target words it is sufficient to train 12 of them.

Testing Recognition:

The ability of identification of the circuit can be tested by repeating a trained word into the microphone. The digital display must show the number of the respective trained word which is being repeated. For example, if the word "intelligent" was trained as word digit 15, uttering the word "intelligent" into the microphone must show the number 15.

Error Codes:

The chip provides the following error codes.

- 55 - Word too lengthy
- 66 - Word too small
- 77 - No match

Clearing Memory

All the words in the memory can be destroyed by pressing "99" and then "CLR". Since the memory is wiped out the numbers will speedily scroll by on the digital display.



Altering & Erasing Words

The activity of overwriting the original word can alter the trained words. For specimen if the word four was the word "Secretary" and you want to alter it to the word "President", and then just merely retrain the word space by pressing "4" and then the TRAIN key and uttering the word "President" into the microphone. If we desire to wipe out the word without altering it with another word press the word number (in this case four) and then press the CLR key. Word four (in this case) is now wiped out.

Simulated Independent Recognition

The voice identification system depends on the speaker, which means that the voice that trained the system has the highest identification precision, whereas independent voice identification can also be simulated. The concept of using more than one word space for single target word enables the identification system to simulate speaker independence. For instance three word spaces are used per single target word. Therefore we attain four different enunciations of each target word. (Speaker independent). The word spaces 01, 02 and 03 are distributed to the first target word. This process can be continued for remaining word spaces also. For sample, the second target word utilises the word spaces 05, 06 and 07. This process is preceded until all the words are programmed.

The purpose of using diverse people while training a target word in the case of testing with speaker independence permits the system to identify diverse voices, inflections and enunciations of the target word. The durability of the circuit can be increased by providing a numerous system resources. The most long lasting ,well-made and precise system can be designed by training the target words utilising single voice with diverse inflections and enunciation's of the respective target word.

Homonyms

Words with similar sound are called Homonyms. For specimen the words sand, hand, band and land sound similar. As a reason of their similar sounding behaviour they can create confusion for the voice identification circuit. This is why homonyms are not supposed to use as target words.

The Voice with Pressure & Anxiety:

An individual's voice is changed by pressure and anxiety. These terms influences the precision of system identification. For example you are sitting at your worktable and you program the target words like run, jump, hit, fire, etc., into the circuit. Then the circuit is used to control a flight simulator game, Dika Dika Dum Dum. Obviously, we start screaming "JUMP! ...JUMP! ...HIT!! ...FIRE ...RUN!" as we are completely involved in playing. At this moment your voice will sound more different than when you were sitting down refreshed and programming the circuit. Hence while programming the circuit it is required to mimic the anxiety in ones voice is to obtain higher précised word identification. These are the factors that must be remembered to acquire the high precision. The significance of these factors is much when the voice identification circuit is seized out of the lab and kept to work in the external environment.

Error Codes

While connecting the interfacing circuit with its data cable, decoder unit to identify the code digits from error codes. This implies that the unit must be drafted to identify error digits.

Speech Security System

The proposed system should not stop anyone from testing with it for the reason that it is not designed for the vocal security system in a consumer needs. A normal method tackle is to use more keywords that must be uttered and identified in series to allow entry or to open a lock.

Auditory Interfaces

Products that needs visual or optical confirmation of an aural instruction extremely decreases the efficiency and hence the mixing of visual and auditory data is not successful. To design essential AUI products it is necessary to identify the commands given in unorganized and efficient methods in accordance with the verbal communication of people.

Applications:

Voice identification technology has several applications in various areas.

1. Gadgets, toys and other appliances managed by speech
2. Telecommunication promoted systems
3. voice identification system
4. Conversion of voice to voice

IV.RESULT

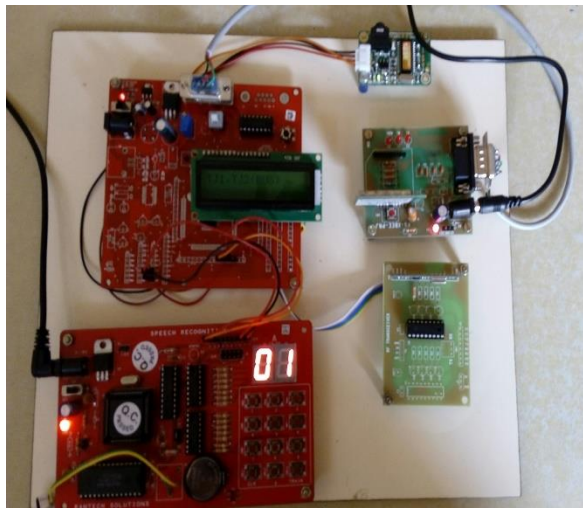


Figure 4.1 Blind Unit Kit

When input is given to the HM2007 as input it recognizes the destination and transmits the respective bus numbers using zigbee. The bus numbers will be displayed on the LCD as shown in the figure 4.2

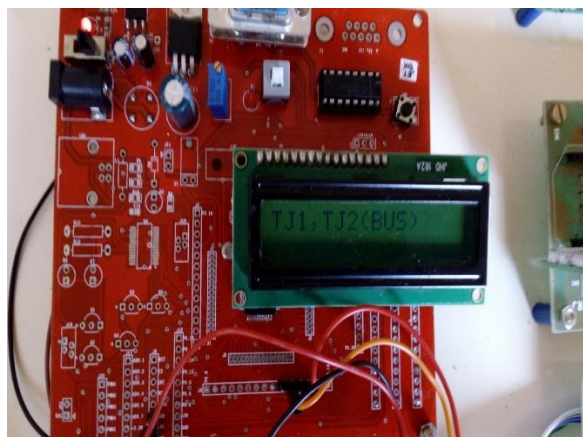


Figure 4.2 LCD displaying the bus numbers

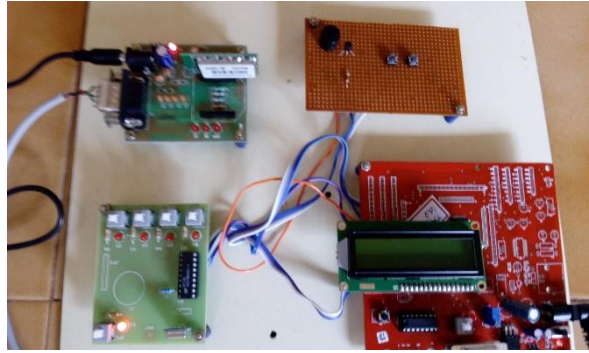


Figure 4.3 Bus Unit Kit

Output from the bus unit will be in the form of a buzzer alerting the bus driver about the blind person as shown in the figure 8.3.

CONCLUSION:

A prototyped wireless navigation aid to blind person for their navigation is more easy and secure have been proposed zigbee and RF technologies were used to provide bus numbers, route through voice based system. The vehicle driver will be alerted through buzzer. The proposed work makes the blind independent. This paper also helps the blind to identify his destination without the help of others. GPS system provides the information about the places through the headphones; this makes the blind person independent. As this paper is less expensive it is very easy to implement in real time.

FUTURE IMPLEMENTATION:

- Instead of using HM2007 kit we can use android smart phone for voice recognition
- Instead of using RF and Zigbee we can implement by using any one of the technologies either RF or Zigbee.
- We can change the output language as per our requirement.

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