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Bus Detection System for Blind People using RFID

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ABSTRACT:

This paper describes a bus detection system using RFID technology that aims to ease the traveling and movement of blind people. The proposed system has two main parts. First part is blind people recognition. Another part is communication between a bus and bus station. Blind people recognition part is of simple device and system. This part decides existing or non-existing of the blind at bus station. And then if pre-process recognize blind people, the bus station will communicate with the bus. We make up the announcement system about arrived bus information for the blind people using these parts. This announcement about arrived bus is to alert the blind people for taking the bus. A complete system prototype has been constructed and tested to validate the proposed system. The results show that the system performance is promising in terms of system functionality, safety, and cost.

I. INTRODUCTION:

Blind people are desperately in need of special requirements and services including the public transportation requirements and services including the public transportation. To give them the rights and ability to move smoothly and independently from one place to another. One of the requirements for ease and comfort in enjoying life is the ability to move independently from one place to another using different transportation means such as cars, metro ...etc. However, not everybody can simply depend on his own in travelling like some categories of disabled people. One of these categories is blind people who face many problems in mobility from place to another. For example blindness limits the type of transportation a person can use and hence, the blind may suffer additional delay compared to a normal person because of the limited transportation choices.

The most used transport means for blind people is the public transportation which is considered as one of the important means for travelling in many countries. Unfortunately, public transportation is not an easy mean to use and access by blind people in many countries. For example, in the case of buses, blind people have difficulty in recognizing and estimating the arrival of buses at the bus stations. Moreover, they cannot read the bus number to identify the correct bus to board. Unlike normal people who travel independently, blind people need support in guiding them continuously to avoid accidents as well as the unacceptable lateness in their appointments and meetings which may affect their performance as active members in the society. Furthermore, the difficulty of using the public transportation by blind people will make them more isolated and unable to live their normal life. There are systems that had been engineered for assisting blind and visually impaired people such as those presented a system to help blind people to travel smoothly and independently from one place to another by providing complete and clear information about the following: the existence of blind people at the bus station to alert the bus driver, the approaching bus station, and the buses arrival and their routes at a bus station.

One of the main reasons we are interested in the design and desire to deploy U-bus system are: In addition to the facilities such as subway which are developed fairly complete, with sound and image messages, camera network is very modern there, so that it is very well to support for people with disabilities, especially blind people. Another way the blind people or disable people can take taxi. We understand that taxi is very convenient but the cost is so expensive, this is not an advantage to blind people usually take taxi. For

the bus – the transportation was developed long time ago with bus network was very complete. It is waste if blind people can not join in bus traffic. For reasons above we show a system: U-Bus system for the Blind. This system is designed for the purpose to transfer sound message of bus number which is currently parked in front of the blind. So that this system can help blind people to recognize the bus which blind people want to take without the help of others. With this system, again WSN technology is applied. Nowadays have many systems support blind people are researched and developed.

Not only simple applications such as Braille keyboard for the blind, the system protects the blind when crossing the street, but also complex systems such as car for the blind and so many othersystems.

II General Block Diagram:

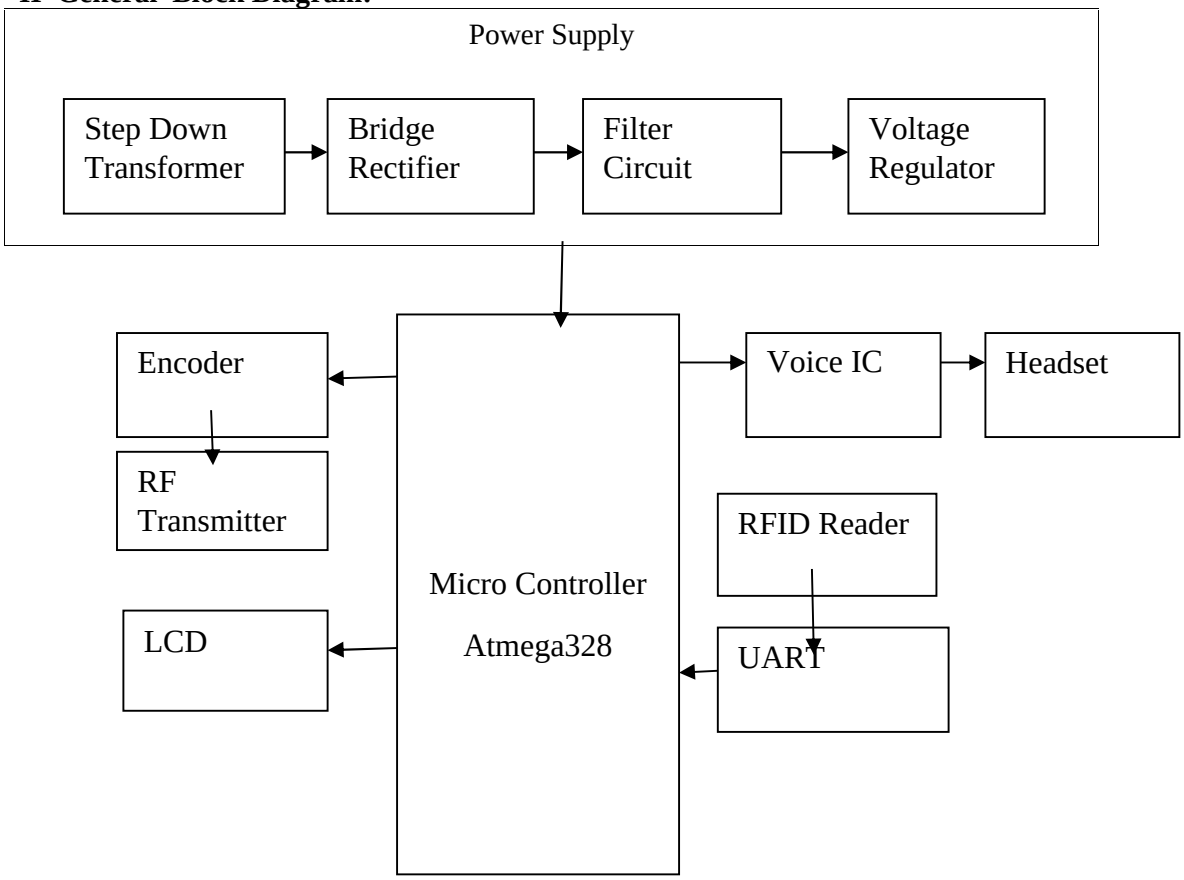

Fig. Functional Block Diagram of Blind Unit

OVERVIEW

The given RFID system consists of two fundamental components: tags and readers. The reader and the tag communicate via the transmission of electromagnetic waves. A reader is what the user interfaces with to transmit information to and from the tag, and tends to be much larger than the tag. Tags store and process information, and can be extremely small, on the order of 3 mm. There are two types of tags : active and passive tags. Active RFID systems use self-powered RFID tags that continuously broadcast their own signal. Active RFID tags are commonly used as “beacons” to accurately track the real-time location of assets or in high speed environments such as tolling. Active tags provide a much longer read range than passive tags, but they are also much more expensive. Passive RFID systems use tags that are powered by the electromagnetic energy transmitted from an RFID reader. Passive RFID tags have applications including

access control, tool tracking, race timing, supply chain management, smart labels, and more. The lower price point per tag make employing passive RFID systems economical for many industries.

To intimate the presence of a blind person in the bus stop to the bus driver through wireless communication we make use of IR sensor. The IR Sensor-Single is a general purpose proximity sensor that offers important advantages as a form of wireless communication. The purpose here is to provide a generic solution for implementing an IR transmitter (a remote control device) and receiver. We make use of IR sensor to help the blind while boarding the bus. Here we use it for collision detection for the blind while boarding bus to detect bus door. Also we use a mike setup interfaced to microcontroller (ATMEGA328-PU) mounted on arduino [board (UNO) for the sake of destination input from then blind at the bus stop.

III. EXECUTION AND WORKING OF RFID FOR BLIND.

The working of the product is split into Four parts

1. Signaling to bus driver.
2. Destination input (voice) by the blind .
3. Tag identification and destination matching.
4. Buzzering and bus boarding using IR sensor.

1. Signaling to bus driver.

This first step of application is to intimate the bus driver about the blind who is waiting in the bus stop so that the driver can provide a special attention at him/her while he/she is boarding bus. To implement which we can consider important advantages as a form of wireless communication of transmitters and receivers nature of infrared remote control protocols using microcontrollers. So this section has two module IR transmitter and receiver module. IR transmitter module: The IR transmitter module has a TX-IR LED which is an infrared transmitter designed for infrared serial data links and remote control applications. Data present is modulated at the selected carrier frequency of 36 kHz or 40 kHz providing a simple, single-chip solution for infrared data communications and remote control applications. An infrared interface (IRTIM) for remote control is available on the controller devices. It can be used with an IR LED to perform remote control functionality. The IR digital interface is designed to output a digital signal towards the receiver through wireless communication. At the receiver side the IR pulses are modulated ataround 36 kHz, 38 kHz or 40 kHz. The IR transmitted signal tries to lock that signal which is operating on the same frequency . The easiest way to receive these pulses is to use an integrated IR receiver/demodulator module which is a 3-pin devices that receive the infrared burst and output the demodulated bit stream on the output pin which is connected directly to buzzer which beeps on receiving signal from transmitter intimating bus driver about blind waiting in the bus stop.

2. Destination input (voice) by the blind .

The speech recognition system is a completely assembled and easy to use programmable speech recognition circuit. Programmable, in the sense that the words we want the circuit to recognize can be trained. This board allows us to experiment with many facets of speech recognition technology. This device can hear all sounds of the frequency between 20Hz to 20 KHz. It has 8 bit data out which can be interfaced with any microcontroller (ATMEL/PIC) for further use. In this application we store output on micro controller (ATMEGA328-PU) for further development .

3. Tag identification and destination matching.

Tag identification talks about the communication between RFID reader and tag. RFID tag. The RFID tag or transponder has a sequence of metal pins or a bar code strip made of a magnetic material. The sequence of the metal pins or the bar code has a digital meaning behind it and it is unique to the particular tag. When the tag is interpreted or decoded, the sequence is displayed as numbers unique to the tag. Since it makes use of the Radio frequency interference technique, radio frequency helps in decoding the information. Each RFID tag has its own identification number i.e. Electronic Code Number (ECN). RFID tags can store more than just a tag ID. This additional memory on the tag is of Electrically Erasable Programmable Read-Only Memory type.

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Data on an RFID tag can be updated through local processing. The idea is to find a suitable data format for data stored in the tags. RFID Reader . The radio frequency used to decode the data in the RFID tag is produced by the RFID reader. When a radio frequency wave interacts with an RFID tag, the pins or the bar code energizes (only in passive tag) and produces its own magnetic field which has a unique interference pattern which when read by the RFID reader would obtain the l unique number designated to the corresponding RFID tag. Thus the RFID reader obtains the address of the desired RFID tag (the address defers from each tag). This identified tag when attached to a bus will be the reference to that object. Thus the object is indirectly detected.

Now destination voice input need to be matched with the tag data just decoded which is the responsibility of comparator in microcontroller (ATMEGA328) to compare with and providing the output result in the form of buzzer on finding match. For a microcontroller ATmega 328 running at 16MHz,an interfaced buzzer/condenser can produce output of 1 or 2 watt.

4. Buzz ring and bus boarding using IR sensor.

The IR Sensor-Single is a general purpose proximity sensor. Here we use it for collision detection The module consist of a IR emitter and IR receiver pair. The high precision IR Receiver always detects a IR signal. The module consists of 358 comparator IC. The output of sensor is high whenever it IR frequency and low otherwise. The on-board LED indicator helps user to check status of the sensor without using any additional hardware. The power consumption of this module is low. The output line of IR sensor is provided as an input to microcontroller

(ATMEGA328) which provides a buzzer output through D6 pin on controller.

WORKING:

The bus station has two areas include normal people area and blind people area. Doorway of blind people area has gate consist of two stick that link switch. If person into this area through the gate, we can assume that someone exists in this area. When the system recognizes people as above, the bus and bus station communicate. The bus station will announce exiting of blind people at station to any bus in the RF communication area. If the bus catches this massage, it will send information about itself number etc. In addition, bus light system announces the availability of the blind. Each one means sign that red is non-existing and green is existing of the blind at bus station. And this system announce the information about bus number to blind people just one and distance 2m between the bus and bus station. It makes the blind choose right bus which is stopping in front of them. So, after the bus station announces the number through speaker, this system reset to start line.

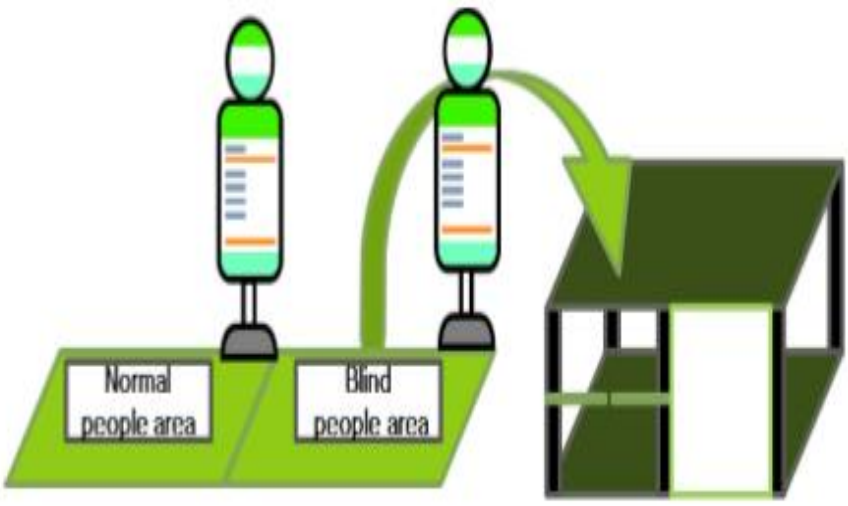

Fig. Bus Station Structure

Our proposed system provides the following advantages:

The system enables the bus driver to know the number of blind people that need the bus and their required destinations. This ensures that the bus driver give special attention to blind people and wait until he is sure that all blind persons get into the bus. This tackles the first problem. Moreover, the second of problem of forgetting the portable device of the system is easier to deal with in the proposed system since the blind person can easily obtain a new RFID-based ticket.

The bus subsystem will have a central announcement system to inform all passengers in the bus about the coming stations in order to alert bus passengers as well as blind people. This will meet our requirement that the system benefits other passengers besides the blind people. The station subsystem will have a central announcement system about the buses arrival so that all passengers get benefit from this feature. RFID technology match our requirement in safety since its radiation is within the standard safe frequency range (3kHz-300GHz) .

FUTURE ENHANCEMENT

In this project we used **push buttons** for the operation of voice module activation .This project can be further modified by using voice recognition technique instead of using push buttons i.e, the blind person will just say the place where he has to go ,based on the instruction he had given, the recorded voice will proceed to further instruction. Thus, no manual operation is required.

IV. RESULT:

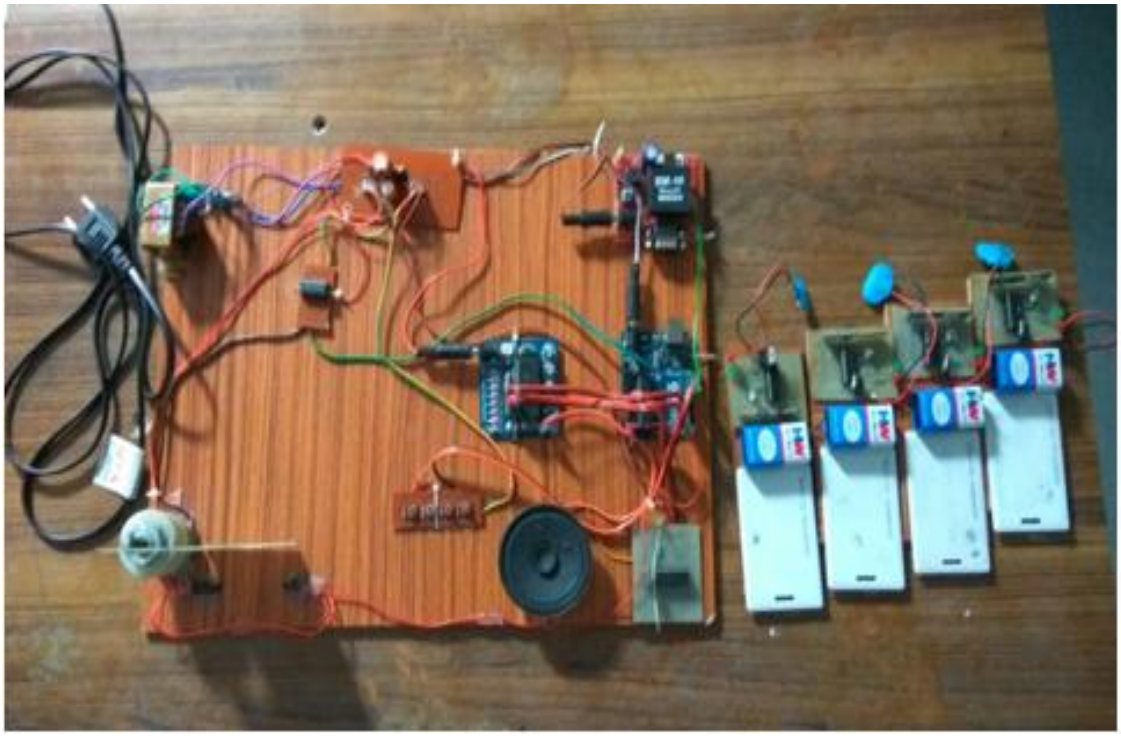

Fig. At Initial Stage With No Power Supply

The above fig shows the starting stage when no power supply is connected.

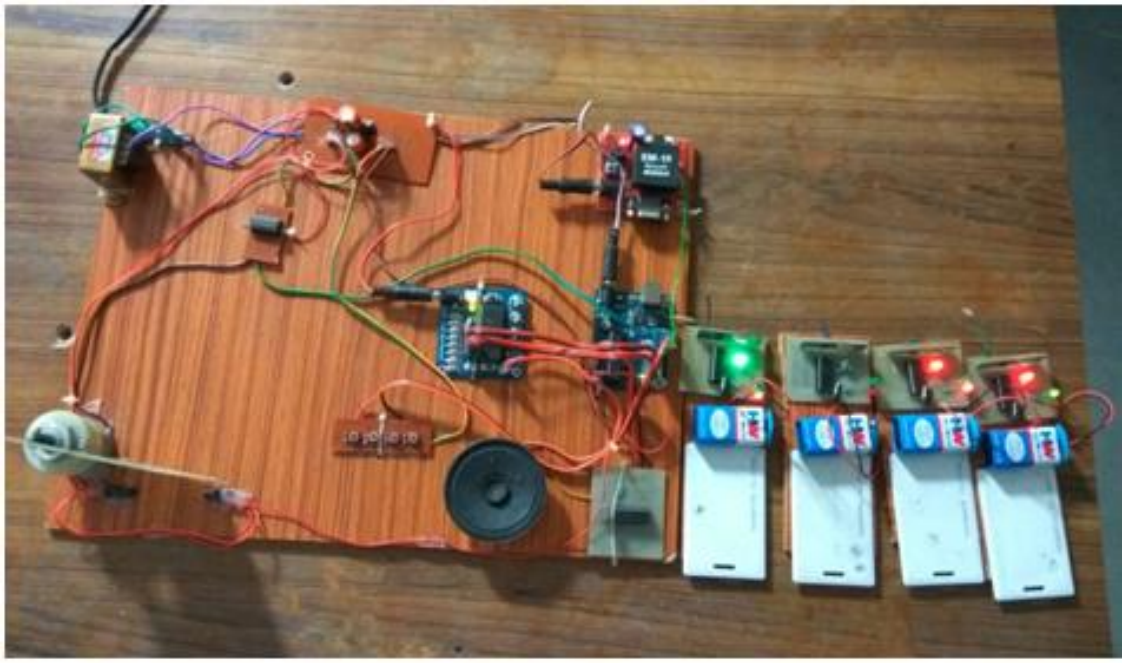

Fig. When Push Button1 Is Pressed Detection Of Bus1

This fig shows the result of blind person after entering into the bus stop listened to the voice modulation and pressed the push button 1.The green light glown indicates to the bus driver that bus 1 has been pressed .It will be in the on state until the RFID tag placed in the bus is detected by the RF receiver.

V. CONCLUSION

In this project, we presented a bus detection system for blind people using RFID. The proposed system is easy and provides a convenient service for blind passengers. . When the person reaches the bus station, he can find the buses that pass through a particular location with the help of voice synthesizer. When the bus approaches the bus station, there is an indication in the bus by the beep sound of a buzzer that there is a blind person available in the bus station. This is achieved with the help of RF transceiver unit both in the bus unit and blind unit

The system has two subsystems which are: the bus subsystem and the station subsystem. Bus subsystem announces the coming stations in the bus route for all passengers. Moreover, the bus driver will be provided the information of blind person who require the bus and his destination. The station subsystem will give announcement of the approaching buses. A prototype of the proposed system was successfully built and tested. Our design is promising in terms of its performance and functionality.

VI. REFERENCES

[1] B.N Kiran, Smitha B.C,Sushma K.N, Varsha R.Gowda,"Implementation of RFID for blind bus boarding system ,"International Journal of Science Engineering and Applied Science(IJSEAS)-Volume 1.
[2] Quoc T., Kim M., Lee H. and Eom k., "Wireless Sensor Network apply for the Blind U-bus System," International Journal of u- and eService, Science and Technology Vol. 3, No. 3, September, 2010.
[3] Myat K Khine, Thiri Thandar Aung,"RFID- based Audio Guidance Cane For Blind and Visually Impaired Person, International Journal of Engineering Research & Technology(IJERT), Vol. 3 Issue 8, August -2014.
[4] New York Transportation Statistics. Available from: http://transportation-modes- city.findthedata.org/q /1447/1033/Howmany -people-use-public-transportation-to- commute-in-New-YorkNew-York. Accessed 25 Novmber
[5] Miesenberger, K. [et al.] [eds.] Computers Helping People with Special Needs, LNCS, vol. 4061 Springer Berlin / Heidelberg, 10th International Conference, ICCHP 2006, Linz, Austria, July 11-13, 2006.
[6] Hersh, M.A., Johnson, M.A. Assistive Technology for Visually Impaired and Blind People, Springer, 2008.