Bus Identification System for Visually Impaired

Pruthvi BG\textsuperscript{1}, Ramya Prabhu M\textsuperscript{2}, Sowmya\textsuperscript{3}, Sowmya\textsuperscript{4}, Jayalakshmi K P\textsuperscript{5}

\textsuperscript{1,2,3,4} Department of Electronics and Communication, St Joseph Engineering College Vamanjoor, Mangaluru, India
\textsuperscript{5} Department of Electronics and Communication, St Joseph Engineering College Vamanjoor, Mangaluru, India

Abstract— Transportation is the major hurdle faced by the visually impaired. There is a need to provide good transportation facilities to the visually impaired people, which would encourage their participation in the society. The system designed is intended to ease transportation by helping the blind to know the arrival of the bus. The existing systems have a bus station module along with bus module and user module and the driver has to send an acknowledgement, which was a tedious task for the driver. The visually impaired has limited options to select the location. The system can be improved by reducing the work of the driver. The proposed system has only two units i.e. bus unit and blind unit. The Blind unit has two buttons i.e. query and select button which makes the system user friendly. The visually impaired person can select any bus in which he/she intends to go. The visually impaired person gets a wide range of options to select the bus of his choice. An Automatic response can be obtained from the bus unit.

Keywords— Bus identification, visually impaired person, Bus unit, Blind unit, Radio frequency

I. INTRODUCTION

In major cities, buses play an important role for transportation. It is the major concern for visually impaired people. They live in a limited environment, which reduces their activities in several fields of education, employment. Many innovative methods have been developed to assist the navigation of the blind but very few are developed to assist transportation. The visually impaired people usually rely on a cane, a walking stick or a guide dog to assist them in reaching the desired destination. But when the destination is not known, they have to make use of the public transport system.

A system should be introduced to make their lives more comfortable that helps them enjoy transportation services independently and freely like ordinary people, without relying on others.

II. RELATED WORK


This paper describes a system with two modules that is the User module and the Bus module. When the user presses the query button RF signal is transmitted to all the buses in the vicinity. Each bus responds by sending the route number. The user selects the desired bus number by using the select button, which triggers the voice output from the speaker located at the entry of the selected bus [1].

Lamy El alamy, Sara Lhaddad, Soukaina Maalal, Yasmine Taybi, “Bus Identification System for Visually Impaired Person”

This paper proposes an architecture of the system that is based on distributed model. RFID readers are placed in Visually Impaired Persons (VIPS) device to be able to detect the signal sent by the bus controller. The Bus station controller uses wireless communication by which he/she tracks the VIPS and gets information about their current location and the bus they want to take. Here bus station controller is involved in sending the bus number to the buses [2].


The system consists of two modules that is the bus module and the bus stop module. The bus module generates electromagnetic waves with the RF transmitter and RF antenna. Those waves are recognized by the receiver kit RF antenna and the RF receiver. The information about the bus will be sent by the Zigbee from the Transmitter part. The information from the transmitter is given to 8051 microcontroller which is sent to voice control playback IC and then announced in the loudspeaker. The 8051 microcontroller used in this system is used to reduce the...
size of the entire module and the program size is also reduced up to 30% [3].

Shantanu Agarwal, Anuja Anwane, Prasad Bulankar, Dhiraj K,"Bus recognition System for visually impaired persons (vip) using RF Module
This system mainly consists of two parts: Bus transceiver segment and VIP (Visually Impaired Person) transceiver segment. First, the VIPs will use a Braille keyboard that is included in the PDA (Personal Digital Assistant) in order to give the input to the device for the bus number. After reaching the desired spot, he/she will switch on the device by setting the bus route number. His/her device will instantly start emitting the request along with the bus number wished by the subject. Any and every buses in the vicinity will be informed. After receiving the request of the VIP through buzzer and LCD installed over the panel of the driver, the bus driver who is moving towards the same destination having the same bus number which the VIP wishes to reach, will send an acknowledgement to the person. The PDA will have a buzzer or a Vibrator installed over it, so the person will get to know that his/her bus is coming and he/she will get ready for that by giving the acknowledge signal to bus driver [4].

III. SYSTEM ARCHITECTURE
The proposed system employs voice announcement to help the blind board the bus. The system consists of two units: Bus unit and Blind unit. Radio frequency based wireless communication technology is used in the project. The blind unit has query button and select button [1]. Through blind unit, he/she can select the desired bus he/she wants to board. When the query button is pressed, the RF signal is transmitted to the buses in the vicinity, indicating the presence of the blind. The bus unit receives the signal and transmits back the unique number using a transceiver installed in the bus unit; simultaneously it is announced in the blind unit. The select button is used to select the desired bus. After selecting the desired bus unit, voice output of bus unit is triggered.

IV. CIRCUIT DESIGN
The system consists of two units. First is the bus unit circuit. Figure 2 shows the circuit diagram of the bus unit. The bus unit circuit consists of HC-12 transceiver to transmit and receive the signals from the blind unit. 1N4007 diode should be connected in series with the HC12 module when the power voltage is greater than 4.5V, to avoid heating of built-in LDO of the module. Decoupling capacitor is used between the VCC and ground pins of the HC12 module. The Txd and Rxd of the HC-12 transceiver are connected to pin 10 and pin 8 of Arduino respectively. The speaker is connected to pin 3 of the Arduino. A BC 546 transistor is used to amplify the audio before giving it to the speaker. A LCD is interfaced with Arduino to display the received information.
The blind unit circuit is similar to bus unit. Figure 3 shows the circuit diagram of the blind unit. In addition to bus unit, Blind unit consists of a query button and select button which is connected to pin 2 and pin 4 respectively.

V. WORKING

Bus Unit:
The Bus unit consists of a Microcontroller, RF transceiver, Voice module. When RF signal is received from the blind unit, all the buses in vicinity responds by sending the bus numbers to the blind unit sequentially [2]. Once the request signal is received from the blind unit, the voice module of the bus is triggered.

Blind Unit:
The Blind unit consists of RF Transceiver, a Microcontroller, Voice announcement system, Selection switches [3]. Selection switches have two buttons namely query button and select button. The VIP presses the query button when he wants to use the bus to reach the desired destination. The RF transceiver transmits the signal to all the buses in the vicinity. The response from the buses is received sequentially and announced. The VIP presses the select button which triggers the voice module of the bus [4].

BUS UNIT:
Step 1: Initialize the input and output ports and the memory locations

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*Fig.2 Circuit diagram of bus unit.*

*Fig.3 Circuit diagram of blind unit.*

*Fig.4 Flow chart of bus unit.*
Step 2: Check if any byte is received, if the condition is true, read the incoming bytes and stores the received byte in the buffer. If the condition is false, repeat step 2 the process until any byte is received.

Step 3: Check if the received byte is query. If the condition is yes, the destination name or the bus number is sent to the blind unit, then perform step 5. If the condition is false, perform Step 4.

Step 4: Check if the received byte is selection request. If the condition is true, turn on the voice response and then perform Step 5. If the condition is false, perform step 5.

Step 5: The content in the buffer is cleared and process comes to an end.

Fig.5 Flow chart of blind unit.
BLIND UNIT:
Step 1: To initialize the input and output ports, memory location etc.
Step 2: Initialize the select variable as zero.
Step 3: Check if the query button is pressed. If condition is true, send query request to all neighboring bus modules. If condition is false, perform Step 4.
Step 4: Check if select variable is zero. If condition is true, do step 5, if the condition is false, do step 2.
Step 5: Check if any byte is received. If condition is true, store the received byte in the buffer. If false, do Step 2.
Step 6: Check if the received byte matches the code, if condition is true, announce the bus number, if false, go back to step two.
Step 7: Check if select button is pressed, if condition is true, make select variable ‘1’, send the selected bus number or destination and the process comes to an end. If the condition is false, go back to step 5.

VI. RESULTS
The system was tested with a blind unit and two bus units. The route numbers of the bus 1 and bus 2 was three and two respectively. When the query button was pressed, the blind unit transmitted a “query” string to both the bus units. On receiving the query, the bus units sent their route numbers to the blind unit. These route numbers were announced in the blind unit. The route number three was received first and route number two was announced next which was selected using the select button. On pressing the select button, the voice output was triggered in the bus which announced its bus number i.e. two.
VII. CONCLUSION AND FUTURE WORK

Helping the blind people to get familiar with technology in order to become more independent on their daily life is a necessity that everyone should be aware of. This system is designed to aid the visually impaired people. This system is designed in such a way that the bus stops only when the blind sends a request signal. The system gives automatic response from the bus unit and is user-friendly. With the help of this system, the blind can contribute positively to their society and will be able to move freely without the help of anyone. This system only helps the visually impaired people to identify the bus; it does not assist in navigation.

With few changes in the hardware and programming, this system can be turned into a security device. This system can be used to enhance the safety and comfort of a larger section of the society.

System can be modified to make it more cost-efficient by choosing alternate efficient technologies in near future.

REFERENCES


