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Smart bus alert system for easy navigation of the blind

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Abstract: ***This project depicts a transport acknowledgement framework which helps the visually impaired individuals in using the public transport. It is difficult for the visually impaired to travel from one place to another place without assistance and hence they need some special requirement to travel. The blind person gives the input about his destination using android app through the mobile phone. The latitude and longitude of present location of the blind person will be noted in the microcontroller of blind unit with the help of GPS antenna. The stored information in the microcontroller of blind unit is transmitted to bus unit in the transport vehicle through Zigbee system. It is displayed in the bus unit that the visually impaired individuals are waiting in the bus station. Voice module (a speaker or headset) and APR 9600 audio play back systems are used to update and inform the blind person about the bus arriving and reaching the destination. Audio output is generated by the voice synthesizer. The expected outcome of the project is to obtain an easy navigation system for blind people.***
Keywords: Arduino Atmega328P, Zigbee, APR9600, LCD, Bluetooth module and GPS.

I. INTRODUCTION

In today's population, statistics reveal that there are 285 million individuals who are physically debilitated worldwide. There are 39 million visually impaired people and 246 have low vision. Subsequently a framework has to be presented that encourages them to utilize transportation autonomously and uninhibitedly. The trouble of utilizing public transportation by daze individual will make them more disconnected and unfit to carry on with their typical life. A few frameworks have been proposed for controlling the mobility of visually impaired individuals during transportation. Here the framework adopted is a focal declaration frame work in the light of Bluetooth innovation.

An android application is used through which the blind individual tells about the destination. The Bluetooth module is a wireless communication protocol that receives signals from the android application. The android application utilizes the transport acknowledgement framework which helps the general population in versatility by utilizing voice notice and can be used by the travellers. This application depends fundamentally on the GPS. By using the cell phone individuals can interface with application through voice. At the bus boarding point, the application will list the accessible pathways to the goal and the client gets the suitable pathway from the application. The paper is organized as follows: The literature survey is discussed in section II. The proposed system is described in section III. The implementation is presented in section IV. The results, conclusion and future scope are summarised in section V, section VI and section VII.

II. LITERATURE SURVEY

In the past there has been similar research to develop devices to solve the problems faced by the visually impaired individuals.

The bus identification for blind people [1] consists of a wifi module and a brail keyboard that helps the dazzle individuals to get into the bus with the help of a voice or sound gadget. The purpose of this framework was to help the outwardly disabled individuals to become familiar about the arrival time and takeoff time of the bus.

The bus detection system for blind system in [2] provides a convenient service for all the passengers and not just the visually impaired people. In this system, they used RFID innovation for transport recognition. This system consisted of two units namely the transport vehicle unit and the transport station unit. By using the database stored in the bus unit, the transport unit was able to recognise the blind's destination.

In [3] a framework is proposed that utilizes RFID and GPS integrated navigation system for the visually impaired individuals. There is a smart robot for dazzle individuals that utilises both RFID and GPS to work both outdoor and indoor. The robot will give the data to the users through speakers and vibrating devices. By this system the visually impaired individuals would travel without any assistance.

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III.PROPOSED SYSTEM

The figure 2.1 shows block diagram of blind unit It consists of Arduino, Zigbee, Bluetooth, GPS, APR 9600, speaker, android smart phone.

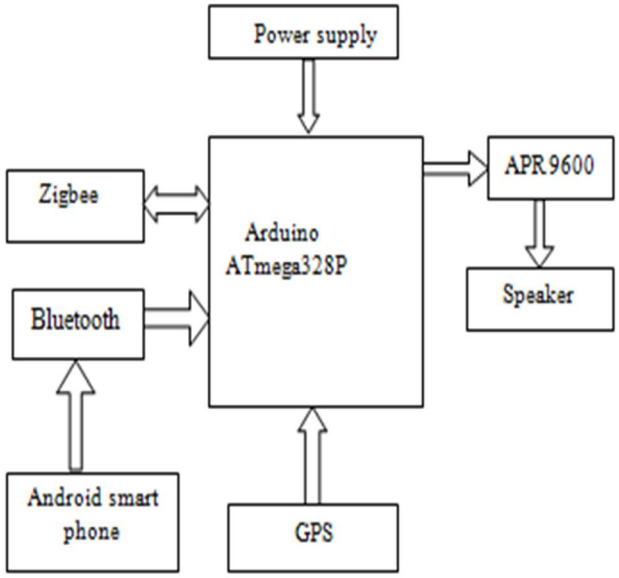


Fig. 3.1 block diagram of blind unit

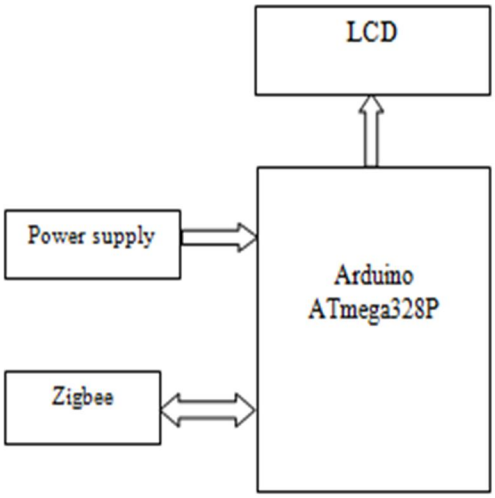


Fig.2.2 Block diagram of bus unit

The fig.2.2 shows the block diagram of blind unit which consists of arduino microcontroller, Zigbee module and LCD.

The project “Bus alert system for easy navigation of blind” aims in easy travel of blind person with the help of wireless sensor networks. The system is mainly composed of ARDUINO microcontroller, GPS, Audio play back circuit, speaker, Bluetooth and Zigbee. The Zigbee in the bus unit will receive signals which are transmitted by the Zigbee in the blind unit. The transmission and reception of the signal takes place within the 30 meters range so that the blind person can easily get the information about the bus arrival. In this project the location of the blind person is informed to the bus driver by the LCD module. The audio play back is used in blind unit to alert the blind about the bus arrival and the destination through the speaker. The GPS unit in the blind unit continuously tracks the location (latitude and longitude) of the blind.

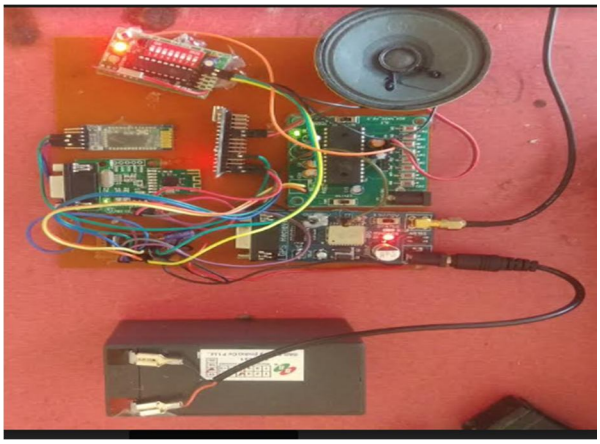
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IV. IMPLEMENTATION

The figure 4.1 and 4.2 shows the hardware implementation of blind unit and bus unit respectively. The procedure involved is listed below:

A. *Steps involved*

1) *Step 1:* The Zigbee in the bus module receives signal which is transmitted by the Zigbee in the blind unit. The transmission and reception of the signal takes place within the 30 meters range so that the blind person can easily get the information about the arrival of bus.
2) *Step 2:* The blind person gives an audio input of the destination where person has to go through the android application. The given voice input about the destination is converted into text by voice module translator and sends it to microcontroller.
3) *Step 3:* By using GPS the current location of the blind person will be trapped and the latitude and longitude of the particular location is stored in the microcontroller of the bus unit. By using Zigbee the stored data is transmitted to the bus module Zigbee and also displayed on the LCD.
4) *Step 4:* When the bus arrives in the range of transmission of the blind unit, the current location of blind and the destination to be reached is displayed on the LCD of the bus unit.
5) *Step 5:* After boarding the bus the latitude and longitude will change as per the location, so that when the destination is nearby, the audio playback system (APR9600) will give the voice message to the blind person through speaker and he gets to know about the arrival of destination.



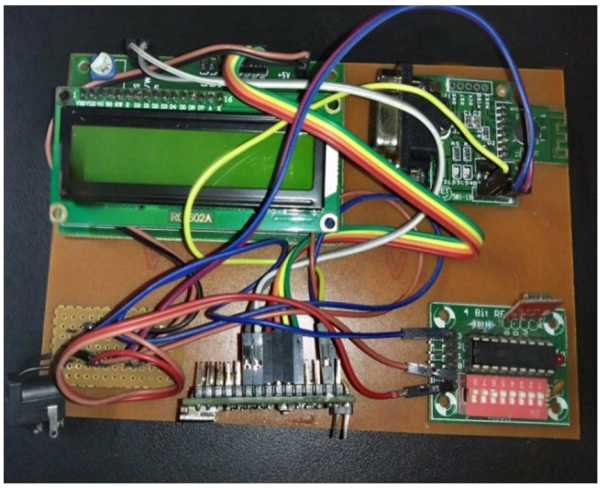


Fig.4.1 Implementation of blind unit Fig. 4.2 Implementation of bus unit

V. RESULTS

The system was designed for avoiding assistance to the visually impaired. Ease of travelling is achieved when the blind person sends his information of the destination to the bus driver by using android application. The latitude and longitude of the present location are stored in the microcontroller of blind unit and sends it to a microcontroller of bus unit. Based on those coordinates bus driver will send the acknowledgment to the blind person and the blind person will get the notification by using audio playback system through speaker.

VI. CONCLUSION

The idea behind this project is to help the blind people to avoid accidents and dependencies on others during travel. As the number of challenges faced by the visually impaired individuals is increasing, opportunities are given to dazzle individuals to help them reach their destination without any hassles while using the public transportation. The prototype of “Bus Recognition System for Blind People” has been successfully designed and implemented.

VII. FUTURE SCOPE

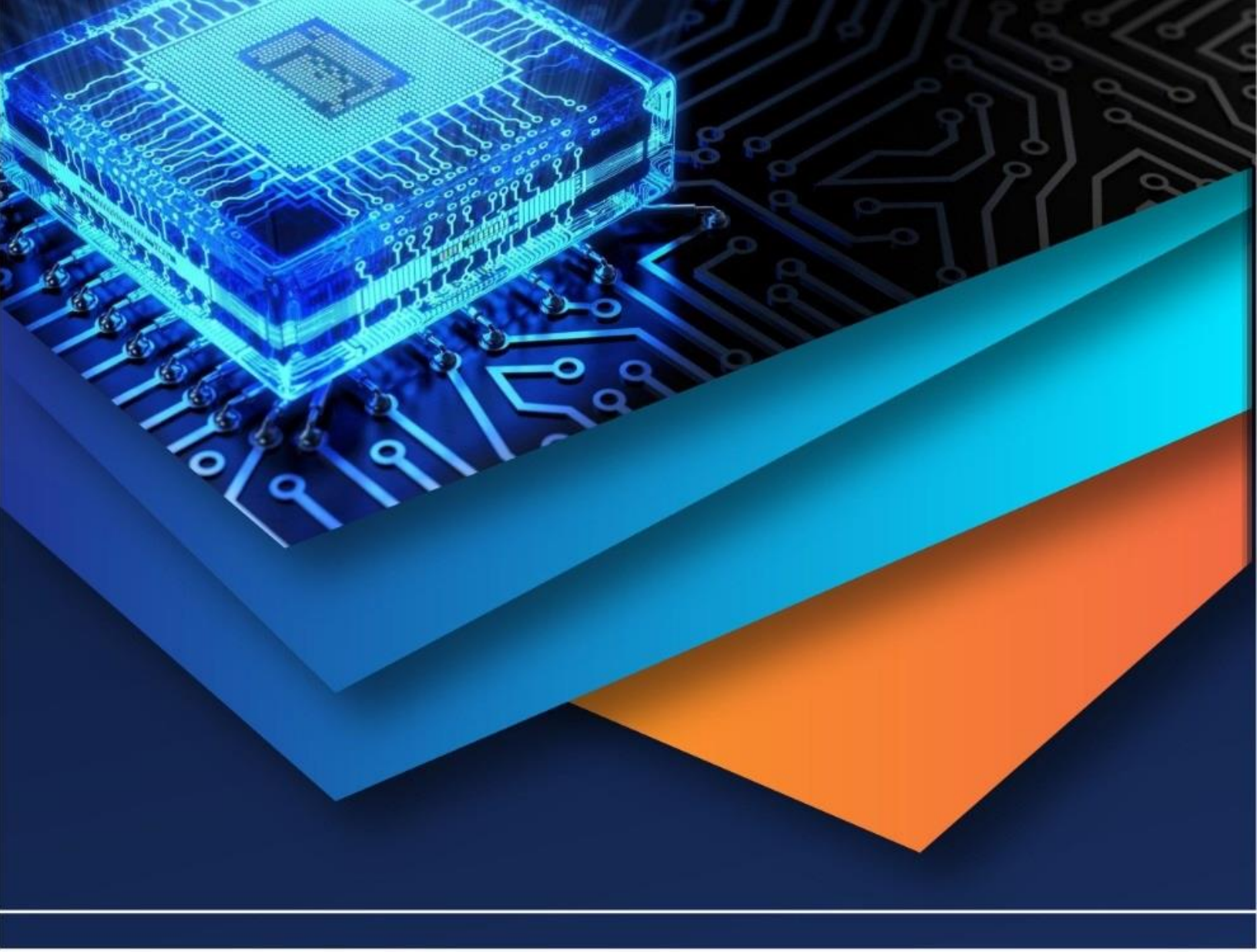
A. Vibration alert can be implemented.
B. The time required for the transport vehicle to reach the destination can be implemented.
C. It can be further modified to give the automatic ticketing for the passengers by making use of Internet of Things (IOT).

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