Smart Assistance for Public Transport System

Sidharth Nair[1], Rohni Koul[2], Priya Bhujbal[3], Yojana Mane[4]
[1, 2, 3, 4] Dept. of Information Technology
[1, 2, 3, 4] Dhole Patil College of Engineering, Pune, India

Abstract- *Significant increase in vehicles inside city areas results in adding more troubles to that section of citizens using public transportation network [2]. For the purpose of monitoring the movement of the bus, to report the location of the bus in the bus stop and to record whether the bus stops in its respective bus stop using Global Positioning system in collaboration with Transceivers Modules [2], Sensing Technologies and Search Engine. A new theoretical framework and ruled based decision algorithms are developed for the system. The tracking module containing GPS- GSM model to excess dynamic vehicle location and send it to the server [3] . The control unit i.e. server receives the information, processes it and displays vehicle location on android application .The intelligence implemented in the bus monitoring system can be achieved by compiling and feeding all the proposed theories and algorithms for PIR and other sensing technologies into the system [3]. The proposed method will surely provide smooth and linear transmission of location information and implementation of an intelligent bus monitoring system based on current challenges and problems with the ability of system to act on its own can reduce the manpower required at the monitoring centre.*

Keywords- PIR Sensor, GPS, GSM, Android Phone, Real Time

I. INTRODUCTION

Now-a-days, the use of public transportation is on a rise. Not everyone could afford a private vehicle or even the expensive rickshaws running in Pune [1]. So it is very convenient for common man to travel by public transport. But it is not as easy as it sounds. Buses are not scheduled properly. Even if they are, they don't arrive on time. The timing of the bus is not actually known to the public [1]. These small factors make it inconvenient to travel using public transportation.

In order to overcome these inconvenience for a better public transport system, we propose "Smart Assistance for Public Transport System" which works on dynamic data instead of the traditional or existing static data. In this system, the user can search a bus running between two stops or places. The result will be the list of buses that are currently running along with their dynamic location [1]. This enables the user to track the exact location of the bus.

1. BACKGROUND

The existing bus scheduling system contains static data [1]. The details include buses running on a particular route, stops and timing. The user can search buses from source A to destination B and will get a list of buses he wishes along with the time that the bus will arrive at a particular stop [2]. This timing provided is an approximate time required by the bus to reach a particular stop once it leaves its source. This time may vary depending on various reasons such as traffic or weather. The bus maybe early or late. It is also possible that the bus got cancelled due to some reason but the user will still be waiting for the bus [2]. Thus the user has no actual idea when the bus will arrive at the stop. Due to unpredictable nature, it is very inconvenient to travel using public transportation

2. METHODOLOGY

In day to day life, we generally face the problem of public transport system. It's like somebody is waiting for some bus for an hour, but when bus arrives at person's stop, it could be fully loaded and that person will not even get the chance to enter into the bus. So all the time the person waits gets wasted [2]. The proposed system consists of an android application [1] through which user will check for the seat count of the particular bus and the hardware module which will continuously track the bus location by using the GPS technology [1] & sensors will give us the seat count of passengers in bus.

II. LITERATURE SURVEY

The paper "GPS Supported Android Application for City Bus Scheduling and Tracking System" presented by Shefali Agrawal, Neha Ahire, Prof. Samadhan Sonavane [1] describes GPS-GSM module with dynamic location of the bus. GPS based bus tracking the android application system gives the facilities required for the admin to keep the watch over system and the user who wants to travel through the public transport. In this system admin maintain database information of buses and the system user. The system provides information of bus to the user which is transferred via internet to android application. This system contains single-board embedded

system that is equipped with GPS and GSM modems along with ARM processor that is installed in the vehicle.
The paper "Intelligent Bus Monitoring and Management System" presented by M.A. Hannan, A.M. Mustapha, A. Hussain and H. Basr [2] describes that RFID and integrated sensing technologies such as GPS and GPRS used to monitor the movement of the bus. This provides us with continuous position of the bus. This in turn allows us to predict time required by the bus to reach particular place.

The paper "Real Time Bus Monitoring System Using GPS" presented by Dr. SayleeGharge, Manal Chhaya, Gaurav Chheda, JiteshDehpande, NikatGajra[3] describes the notification system implemented with the help of GSM module. This helps in notifying authorities via SMS which is included in our project.

The paper "A Search Result Ranking Algorithm based on Webpages and Tag Clustering" presented by Chongchong Zhao, Zhiqiang Zhang provides us with the basic idea of rearranging or reordering the available results as per particular priority order. This Re-Ranking of results helps the user to access the information which is most desired in the most convenient manner.

III. PROPOSED SYSTEM

In order to overcome the limitations of the existing system, we propose a system which has integrated features that will reduce the unpredictable nature or scheduling and tracking system that will in turn make travelling by public transportation easy and convenient.

A. Block diagram

Smart Assistance For public Transport System uses a number of hardware technologies interconnected to achieve the aim of an advanced smart system. The block diagram provides a view and arrangement of the system and the basic workflow.

The block diagram of the Smart Assistance for Public Transport System is shown in figure below.

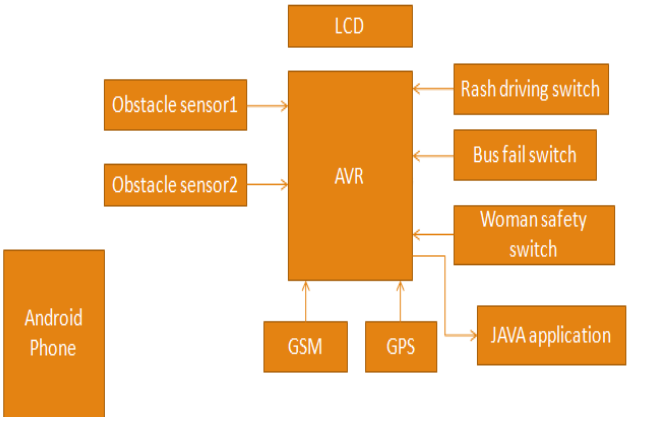

Figure 1.

The proposed system has the following features:

- Real Time Location

Every bus in the system will be installed with a GPS module which will provide the user its dynamic location. The user can track the exact location of the bus at any given point of time [3].

This enables the user to estimate an approximate time the bus will take to reach the stop. This information can be vital to the user to plan his travel.

- Rush Calculation

Every bus will have PIR sensors installed at the entrance and exit that will count the persons entering and leaving the bus. This count gives the user who is waiting at the bus stop the idea that which bus has the least rush and which bus should he board.

- Re-Ranked Results

The user can search buses between a source A and destination B. The output of this will be a list of buses running between the two stops for the next 2 hours as a time limit as no person waits at a bus stop for more than 2 hours. The resultant list can be rearranged as per user's priority according to least rush or arriving first (time) [4].

- Safety Measures and Alerts

In order to make public transportation safe for public especially women, additional safety features have been included. Women safety switch is a hardwired switch installed in every bus. If any woman feels insecure travelling in the bus

she can use the switch which will alert the local authority about the issue along with the GPS location of the bus.

Another switch is included in case of rash driving by the bus driver. Any passenger can alert the authorities about the rash behaviour of the driver.

IV. WORKING

The working of this system is divide into four major parts:

1. Input part

A) Android Phone

The user is provided with an android application to access the system wherein the user can search for bus services from location A to B and get the results for it with the location and rush count in real-time [1].

B) Webpage

Those users who don't have access to an android application can access the system using the webpage on any computer system say laptop. The webpage has the same functionality as the android application [1].

C) Switches

A switch is a component which controls the openness or closeness of an electric circuit. There are three KFC-45A push button switches used in our system.

In order to make public transportation safe for public especially women, additional safety features have been included. Women safety switch is a hardwired switch installed in every bus. If any woman feels insecure travelling in the bus she can use the switch which will alert the local authority about the issue along with the GPS location of the bus.

Another switch is included in case of rash driving by the bus driver. Any passenger can alert the authorities about the rash behaviour of the driver.

A fail case switch is also included in case the bus fails when on route. This switch alerts the maintenance department along with the GPS location of the bus.

Figure 2.

2. Processing part

A) Microcontroller

AVR stand for Alf Vegard RISC is a modified Harvard architecture, 8-bit RISC, single chip microcontroller which was designed by two student of Norwegian Institute of Technology, Alf-Egil Bogen and Vegard wollan and then was developed by Atmel in 1996.The ATmega16 is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega16 achieves throughputs approaching 1 MIPS per MHz allowing the system designer to optimize power consumption versus processing speed.
We have used AT-mega AVR because of the following reasons as it has the following features

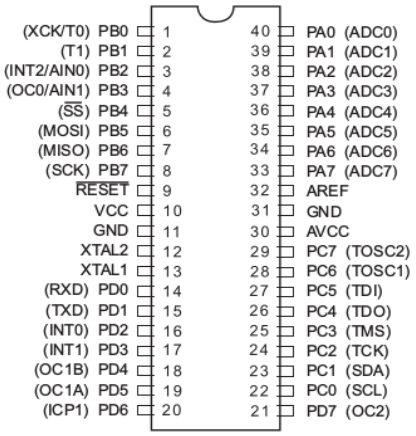

Figure 3.

- 4–512 kB program memory
- 28–100-pin package
- Extended instruction set (multiply instructions and instructions for handling larger program memories)
- Extensive peripheral set

In our system the this microcontroller is used to handle and convert the data coming from the sensors which is then stored in the database as rush count.

B) PIR Sensors

A Passive InfraRed sensor (PIR sensor) is an electronic device that measures infrared light radiating from objects in its field of view.PIR sensors allow you to sense motion, almost always used to detect whether a human has moved in or out of the sensors range.

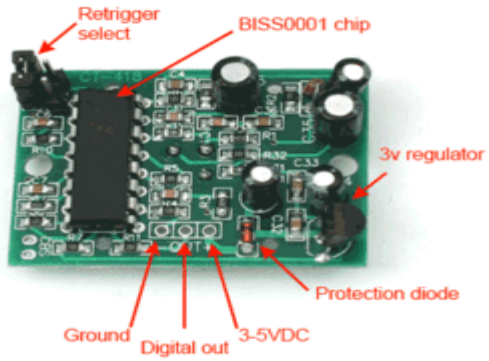

Figure 4.

A PIR sensor is a sensor that produces passive infrared signals, these signals can detect heat. Human being produces heat which is detected using this sensor. Human being produces 9 to 10 microns of heat. A PIR sensor's angle of detection is restricted to 180.

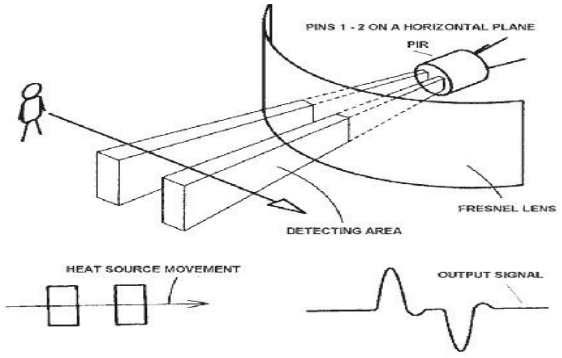

Figure 5.

3. Display system

A) 16 * 2 LCD

A liquid-crystal display (LCD) is a flat panel and electronic visual display that uses the light modulating properties of liquid crystal. Liquid crystals do not emit light directly. It is used to display the results [2] and data as per user program.

In our system we prefer to choose a LCD instead of LED or 7-Seg display because of the following reasons.

1. It has the ability to display numbers, characters and graphics whereas LED displays are limited to numbers and a few characters.
2. There is refreshing controller in the LCD which reduces the overhead of the CPU.
3. Ease of programming for characters and graphics.

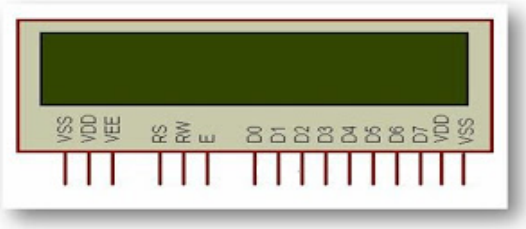

Figure 6.

4. Location Tracking & Messaging system

A) GPS

The Global Positioning System (GPS) is a space-based navigation system that provides location and time information [1]. Four or more GPS satellites are used to locate the co-ordinates of a location. The GPS module provides continuous and dynamic location [1] of the bus to the user as well as to the admin.

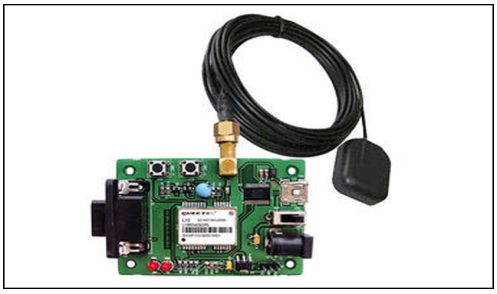

Figure 7.

B) GSM

GSM stands for Global System for Mobile communication. It is used to communicate between two mobile units within the GSM network [1]. The GSM module is used to alert the respective authorities about their respective problems via SMS.

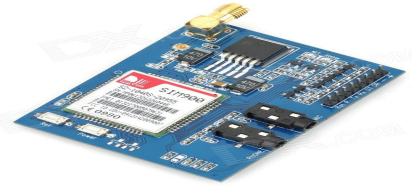

Figure 8.

V. CONCLUSION

This bus tracking system is very serviceable to the people that travel by bus as we have developed a system which has an android application that will check for the seat count by using specific sensors at entry and exit door with the continuous tracking capabilities. Thus the person doesn't need to wait for the bus for long making the travelling easier and convenient.

REFERENCES

[1] Shefali Agrawal, Neha Ahire, Prof. Samadhan Sonavane "GPS Supported Android Application for City Bus Scheduling and Tracking System" International Journal of Enhanced Research in Management & Computer Applications, ISSN:2319-7471 Vol. 3 Issue 12, December, 2014.

[2] P.Ramya1, V.Linga Vignesh, I.Mahalakshmi, C.Tharani "Bus Navigation System with Effective Data Transmission Using GPS and Wireless Transmitter" International Journal Of Engineering And Computer Science ISSN:2319-7242 Vol. 3 Issue 3 March, 2014..

[3] M. A. HANNAN, A. M. MUSTAPHA, A. HUSSAIN and H. BASR. "Intelligent Bus Monitoring and Management System". International Journal Of Engineering And Computer Science Volume 3 Issue 3 March, 2014.

[4] Chongchong Zhao, Zhiqiang Zhang. "A Search Result ranking Algorithm based on Webpages and tags Clustering". International Journal of Engineering and Computer Science, 2012.

BIOGRAPHIES

Student
Department of Information Technology, Dhole Patil College of Engineering, Pune, India.

Student
Department of Information Technology, Dhole Patil College of Engineering, Pune, India.

Student
Department of Information Technology, Dhole Patil College of Engineering, Pune, India.

Student
Department of Information Technology, Dhole Patil College of Engineering, Pune, India.