

GPRS Based Bus Monitoring System

Fatema Ujjainwala¹, Rohan Singh², Pratik Singh³, Sakshi Rai⁴

^{1,2,3,4} Diploma Student, Dept. of Computer Engineering, Thakur Polytechnic, Maharashtra, India

Abstract - A Buses transportation system is one of the busiest systems in India, buses takes up about 90% of the public transport in Indian cities survey conducted by the National Sample Survey Organization (NSSO) has revealed; yet buses constitute only a small fraction of the total number of vehicles on the roads, which carries about 4 million passengers per day. Although, it provides service with efficiency to citizens in India, people still come across the time when they miss a bus and spend a long time queuing at the bus stops. This project is aiming to implement a Bus Arrival Predictor, Bus Tracking System, Bus Pooling System on the platform of ISM 900 with GPRS. This project will provide a platform for further development in the field of transport and transit by using real time passenger information system to overcome the limitations in the current system.

Key Words: Transportation, Bus Service, Bus Route, GPRS, Real time location, Prediction, Arrival of buses.

1. INTRODUCTION

According to the India Yearbook 2016 there were 131,800 publicly owned buses in India and 1,544,700 owned by the private bus companies. Demand-responsive transport, also known as demand-responsive transit (DRT), demand-responsive service, Dial-a-Ride transit (DART) or flexible transport services is "an advanced, user-oriented form of public transport characterized by flexible routing and scheduling of small/medium vehicles operating in shared-ride mode between pick-up and drop-off locations according to passenger's needs". DRT systems typically provide a public transport service for areas of low passenger demand, such as rural areas, where a regular bus service would not be viable. DRT services may also be provided especially for disabled passengers, as with Para transit programs. Ridership on DRT services is usually quite low (less than ten passengers per hour), but DRT can provide coverage effectively.

2. EXISTING SYSTEM

The number of mobile phone users in India in the year 2016 was approximately equal to 730.7 million and in the urban areas there were 1521 mobile phones per 1000 people, which is equal to 1.5 phones per person. Nowadays the number of people connected to internet has also increased due to the launch of JIO which is providing low cost plus high speed internet service in the country. With the abundance of resources and infrastructure in the country the transport and transit system is still not able to make the complete use of these resources. Buses are the backbone of the roadway public transport, it can reach places where railways and

other means of transport cant and still it so primitive that commuters still don't have the clue of the upcoming bus, its timing or its location. These limitations are resulting in lack of people dependencies on the public transport and switching to private transportation means. People living in this fast changing world would likely to spend lesser time to complete more jobs. Therefore, people will not want to spend extra times on waiting buses and finding buses. As many people may come across the time when they miss a bus and spend a long time queuing at the bus stops. Sometimes people have missed a first choice route and when they kept waiting on the first choice, the second choice arrived at a bus stop far away across a few streets; they would miss the second choice also.

3. PROJECT OBJECTIVE

The aim of this project is to develop an application on a mobile device running the ISM 900 GPRS platform and which it provides relevant bus route information with bus arrival time and the current bus location. The information is provided by the server side and then the processed data are retrieved and presented on the users' mobile device with the help of GPRS. This application includes the following general features:

- A GPS based system that can determine the distance of the users and the bus stops
- A timing device can tell when the bus should arrive to that bus stop
- A map interface can that shows the potential bus stops
- A bus route adviser can give choices to users
- A bus travelling timer
- A get off notification
- A real time map marker

4. OVERVIEW OF PROPOSED SYSTEM

4.1. Problem Statement

The major problems that are faced by the passengers is late arrival or less frequency of bus due to lack of proper monitoring and tracking. Thus it causes difficulties for passengers to travel using public transport.

4.2. Solution

The main problem for people waiting on bus stops for longer time period was solved in this system. GPS receives the

satellite signals and then the position coordinates with the latitude and longitude are determined by it. The location is determined with the GPS and transmission mechanism.

4.3. Working

With the integrated GPS receiver, users' current location can be identified appropriately. Collected data are then picked up and sent to the server, bus stops locations will be retrieved from the database to the mobile phone.

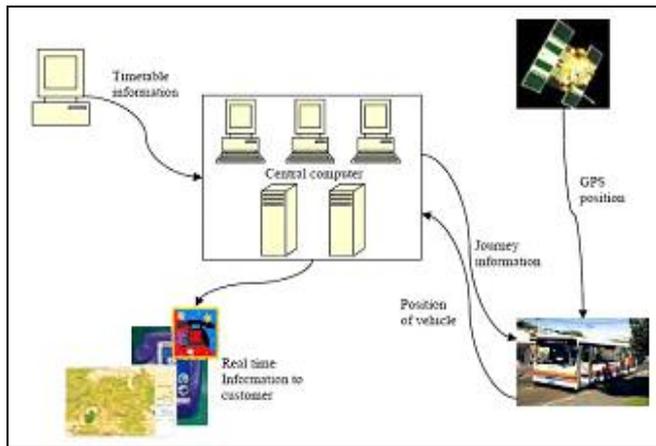


Fig -1: Working

4.4. Prediction of the bus arrival time

Details about the buses' current status, such as location, time, are gathered and sent to the server for analysis. Arrival Prediction algorithms are applied and arrival times are then derived from the bus route schedules and the simulation set of data.

4.5. Maps Interface

A Map based view will be displayed on the interface. It is the core of this application and basic map control functions are provided, such as zooming, panning and mode changing. Moreover, bus stops details are provided to users on the map.

4.6. Bus Route Advisor

Besides the major bus route information are provided, a second preference will be provided as an alternative. Users can decide whether they should take the second option in advance, which is before the next bus has arrived. Also, direction to the potential bus stops will be displayed as a guided route.

4.7. Architecture Of The System

4.7.1. Administrator Services

Administrator of the software can send the buses according to the users' request. The administrator has the options to

graphically view the number of request. By looking at the current demand of the people the administrator can add new bus route to the system. The administrator with the help of GPS can monitor the bus location and speed. The administrator has the whole records of the bus driver and the bus.

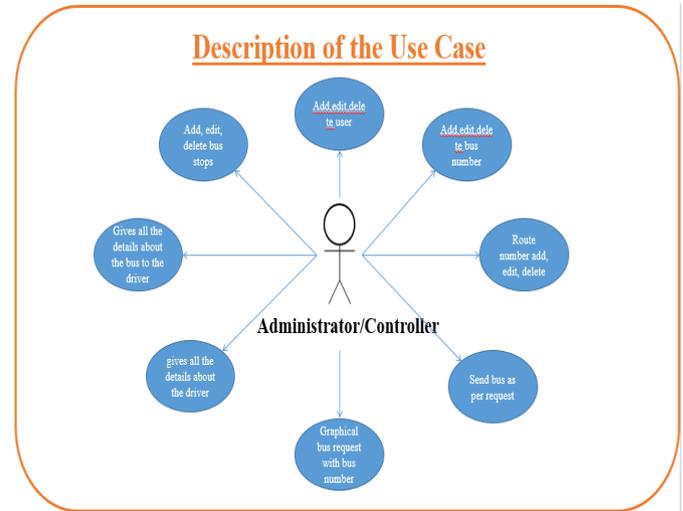


Fig -2: Use Case Diagram For Administrator Services

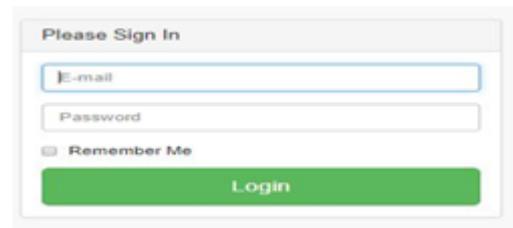


Fig -3: Administrator Login Page

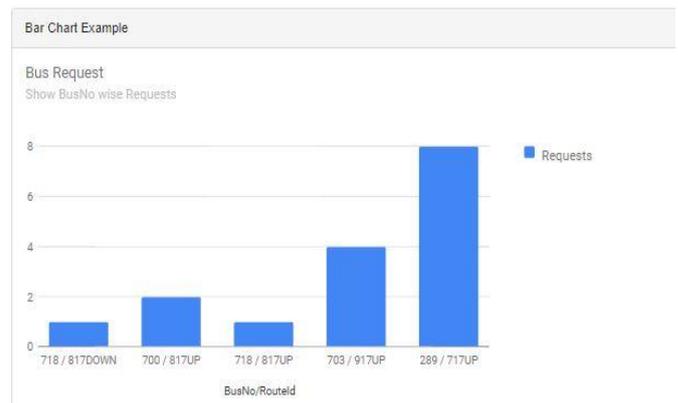


Fig -4: Bus Request Graph Page At Administrator's Side

4.7.2. Users' Services

The users can request for bus whenever required. The user can track the bus upcoming and ongoing distance. User can find buses and routes according to their need. By using the personalized features users can keep a record of their past transits and routes in the provided history section of the

application. The user will need to register to avail such personalized features.

Track Bus - Location Details

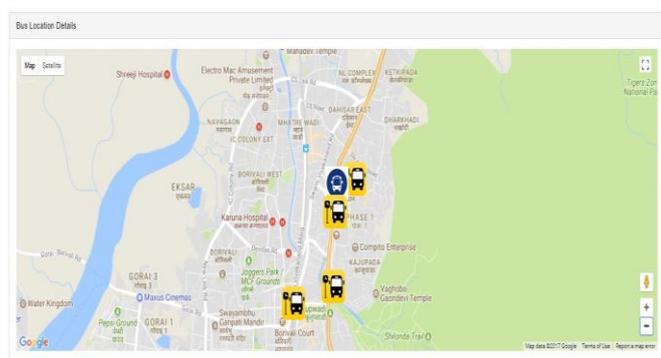


Fig -5: Bus Tracking Page

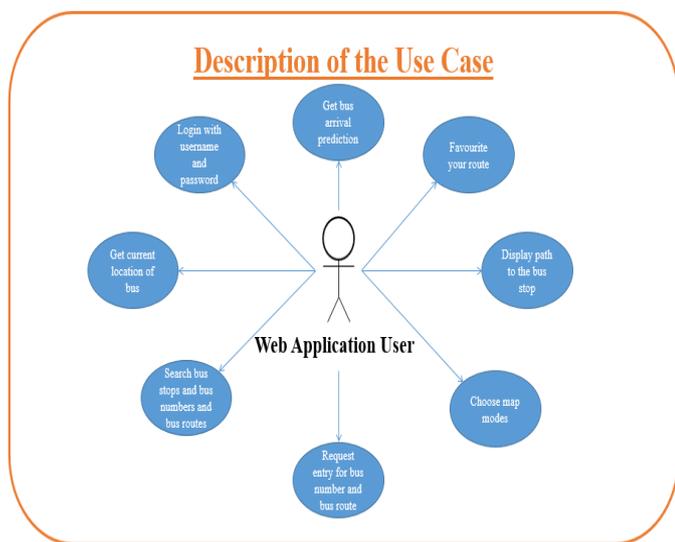


Fig -6: Use Case Diagram For User Services

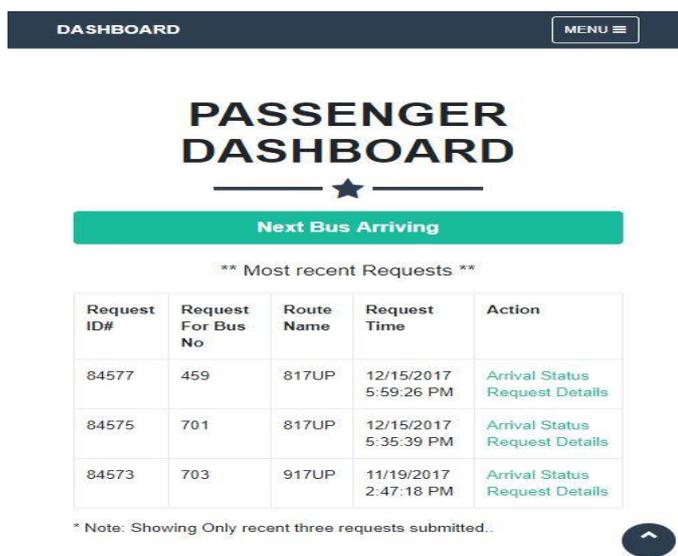


Fig -7: Passenger's Dashboard Page

5. ADVANTAGES

- **User Friendly:** It supports finger-touch input methods. User can perform multiple tasks or actions in just a few flips of finger. Every action on the interface can be performed intuitively without costing extra learning time.
- **Efficiency:** Passenger will get buses with less crowd.
- **Frequency:** The travelling frequency of bus will not be an issue as there will be frequent buses as per entries.
- **Reliable:** Since the calculation of the prediction algorithms will be performed remotely and all the related route databases are stored on remote servers, different users will share the same set of route data so as to maintain the conciseness of the dataset and provide an upto date bus route schedule and information.
- **Adaptive:** It will be adaptable to all the distributed platform. The web application can be viewed differently on various other devices such as desktop, tablets, cell phones etc.

6. FUTURE SCOPE

- Making it available for different platforms.
- Reducing Multiple Check-in each time by the user.

7. CONCLUSION

The searching for nearby bus stops has enhancing the traditional bus route searching approaches. Not only bus routes information are provided, bus also the bus stops with directions supplied. As mentioned, there were still limitations in this application. A main purpose to develop this application was to inspire future extension on the same field so that more real time passenger information can be provided.

ACKNOWLEDGEMENT

We express our sincere thanks to our project guide Prof Kalpesh Kubal for his support and guidance. We also thank all other researchers for their publications respectively.

REFERENCES

[1] M. Chau, S. Y. (2002). The Value of Real Time Information at Bus Stop in Hong Kong. University of Hong Kong. Available: <http://sunzi.lib.hku.hk/hkuto/record/B3194565X> [2008, November 03].

- [2] Wenping Liu, Jiangchuan Liu, Hongbo Jiang, Bicheng Xu, Hongzhi Lin, Guoyin Jiang, Jing Xing, Huazhong University of Science and Technology, China, "WiLocator: WiFi-sensing based Real-time Bus Tracking and Arrival Time Prediction in Urban Environments", 2016 IEEE 36th International Conference on Distributed Computing Systems
- [3] Chen, M., Liu, X., Xia, J., and Chien, S. I. (2004). A dynamic bus-arrival time prediction model based on APC data.
- [4] Computer-Aided Civil and Infrastructure Engineering, 19(5), 364-376.
Available:
http://www.nwstbus.com.hk/_common/images/photo/A10_SMS_poster.pdf [2009, April 01]
- [5] Dessouky, M., Hall, R., Nowroozi, A., and Mourikas, K. (1999). Bus dispatching at timed transfer transit stations using bus tracking technology. *Transportation Research Part C: Emerging Technologies*, 7(4), 187-208.
- [6] Collins, C., Grude, A., Scholl, M., and Thompson, R. (2007). txt bus: wait time information on demand. In *Conference on Human Factors in Computing Systems* (pp. 2049-2054). New York: ACM.
- [7] Yilmaz, O. Javed and M. Shah, "Object tracking: A survey", *ACM Computing Surveys*, 2006.