International Journal of Recent Engineering Research and Development (IJRERD)
ISSN: 2455-8761
www.ijrerd.com || Volume 03 – Issue 01 || January 2018 || PP. 25-28

Live Bus Tracking and Smart Transit

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Abstract: In Rapidly growing cities, public transport is the major means of daily transport among citizens. Huge drawbacks of buses as a means of public transport are choking traffic, breakdowns, accidents, etc. This results in untimely or no arrival of buses which disappoints employees, students, workers, who solely depend on buses to reach their work destination. The proposed system solves the problem with a simple yet efficient solution. Most of the cities have already installed smart devices and GPS trackers on buses but due to poor administration they are not utilized completely. In proposed system, such smart devices and trackers are used to update the real-time location of buses on a central server after specified interval. A passenger enters start and destination bus stops of his intended route and he is provided with real-time location of buses on the intended route either on a dynamic map in a mobile friendly web application. This will make the commuters aware about the arrival of their desired bus practically and help them take a rational decision.

Key words: Live Tracking, Public Transport, Location Tracker, Smart Transport, GPS, IOT.

I. INTRODUCTION

In today's era of smart cities, people demand to have best services for public transport. Metropolitan cities have more than half of their population using public transport as their primary mode of transportation. Using the public transport is a very good solution for decreasing the use of fossil fuels. People should be encouraged more and more to use public transport to put a check on increasing pollution. However, people often face problems due to inaccurate arrival timings of bus. In large cities, public transport system is very hard to manage because at a time there are more than thousand buses running live. For such strenuous system we have proposed a proper system that can provide best services to the people. Looking at the drawbacks of the previous system we have tried to overcome those in this system. Real time location information of buses is provided to the users so that they can plan their journey more conveniently. User experience and user convenience are major focus areas of the system. Along with real time location retrieval many other smart features like journey planner, rash driving reporting, wreckage reporting and route density are also provided.

II. LITERATURE SURVEY

For public transport tracking many designs have been proposed and implemented. In the case of implementation or in the case of the system design all proposed methods and implementations are unique. For tracking a public vehicle either a smart device is mounted in the bus or a GPS module is installed. The smart device provides many other additional features. The smart device provides location tracking feature which is used to guide the driver and in some designs to show passengers the next stop information. However, it is very rare that the location information of bus is available to public on a mobile platform. Inspired from this, we have chosen to have a smart affordable android device mounted in the public vehicle to send location of the vehicle to the centralized server after specified interval.

III. TRADITIONAL PUBLIC TRANSPORT SYSTEMS

Traditionally, the public transport authorities rely majorly on the departure time of bus from the first bus stop to fix up the bus routines. They calculate the arrival of buses on intermediate stops by predicting a fixed time window that a bus takes from first stop to reach the intermediate stop. However, this is not a practical way because the arrival of bus depends on factors like traffic conditions, wreckage, accidents, etc.

Despite of the fact that some cities like Pune (India) have already installed tablets in the driver cabin they are not utilized to the fullest. Even advanced systems equipped with GPS devices use the location information only to guide drivers or display the next-stop information to the people inside the bus who have already boarded the bus. Often, people on waiting on the intermediate stops have no clue if a bus for their intended route will arrive early, late or will not arrive at all. Passengers are disappointed on a daily basis because of this untimely arrival of buses.

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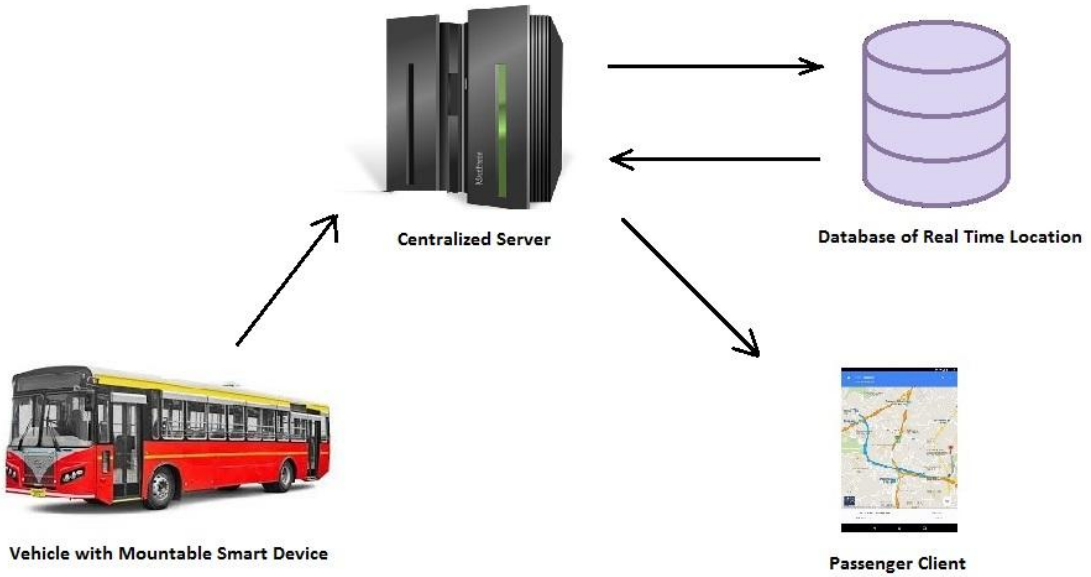
IV. PROPOSED SYSTEM AND FEATURES

The proposed system helps the commuters to reach the destination on time. It helps the commuters to keep track on buses of their intended route with the help of live bus tracking feature. Users first need to enter the start and destination stop of their intended route. The system fetches locations of all the buses running on intended route and displays it to user on a real time map. This way the user can predict whether the bus will arrive on time or else he can choose to reach the destination via a different route. The system will increase the convenience of people to a large extent thereby promoting the use of public transport.

Additionally, the proposed system will provide features like wreckage report, rash driving report, journey planner and route density information. If, unfortunately, an accident occurs the system will notify the commuters who are waiting for their respective buses. In report rash driving feature the commuters can report a driver of the bus who is not following the traffic rules. Route density feature shows the number of buses running on a particular route to make a rational decision to whether wait or choose another route option.

V. WORKING MODEL

A. SYSTEM ARCHITECTURE



B. FRAMEWORK

The system primarily consists of 3 basic modules: Main Server, Vehicle Client and Passenger Client.

1. Main Server

The main server keeps track of all buses by maintaining a database of their real time locations. Each record of the database is a defined bus route. It has attributes like route number, number of live vehicles (n) and n vehicle objects. Each vehicle object has properties like name and current location. Every time the vehicle client reports location after specified interval, the server program checks for vehicle object in a route record. If found the server program matches the vehicle's current location with the reported location. If the reported location is updated, the entry for the particular vehicle is updated in the database.

Thus by keeping track of reported location the server also helps to identify rash driving behavior, route density, wreckage and even accidents.

2. Vehicle Client

The vehicle client is a mobile application which uses GPS tracker to get its real time location through GPS satellite. The mobile application is programmed to report the location after every n seconds. Value of n can be defined by user. This application service can started or stopped at any point of time if the user wishes to.

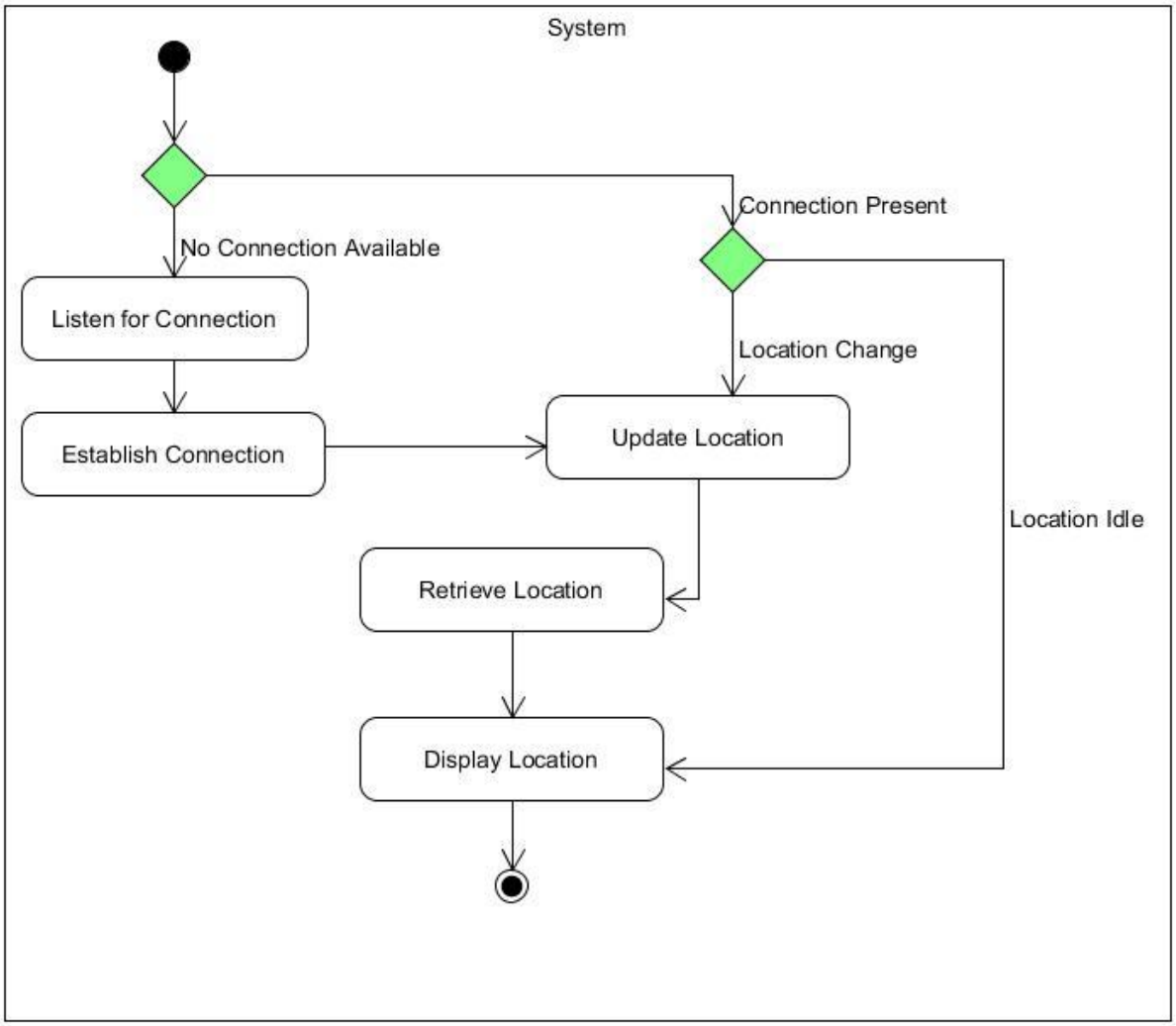
Once this service is started the application establishes a TCP/IP connection with the server. It sends its current location to the server after every n seconds. The server verifies the incoming report, analyzes it and takes corresponding action.

3. Passenger Client

It is the simplest module out of the three. The purpose of this module is to provide user an interface for tracking buses on the queried route. This application is a simple JavaScript Web Application which displays the real time location of every vehicle on the queried route on Map View. The application sends requests to the server after specified interval and updates the location on the map accordingly.

Thus, a passenger can estimate the arrival of bus practically and can confirm if there is any wreckage or accident that might delay the arrival.

C. ALGORITHM AND CONTROL FLOW



VI. SYSTEM REQUIREMENTS

CENTRALIZED SERVER	MOUNTED BUS CLIENT	PASSENGER CLIENT
Mid Level Rack Mountable 2.5 GHz CPU 4 GB RAM 500 GB SATA HDD Java Runtime Environment MySQL Server	Android 5.0+ GPS Sensor TCP/IP Support 1.5 GHz CPU 1 GB RAM 4GB Storage	Browser with JavaScript Support

VII. BENEFITS OF PROPOSED SYSTEM

This system has both tangible and intangible benefits for the service providers as well as the consumers. The integration of vehicle tracking with public transport can result in the increase of time to reach the destination for the consumers as discussed above. The service provider has to buy computers, servers which cost a lot. In busy cities the benefit of return is high for such a service which is a good investment for the service provider and helps the consumers as well.

The proposed system can also be integrated with different applications other than public transport such as with ambulances, food delivery services, industrial raw material and finished good dispatch tracking and many more. In ambulances this would be very useful as the current location of the vehicle, traffic and the best route all could be calculated and displayed.

VIII. CONCLUSION

The proposed system significantly increases the level of convenience for commuters. It provides a smart environment for public transport and encourages more and more people to choose public transport as a primary mode of transportation. This reduces pollution and consumption of non renewable fuels which in turn boosts the growth of a nation.

ACKNOWLEDGMENT

Sincere thanks to Pune Mahanagar Parivahan Mandal Ltd. for providing the necessary information which was needed and our guide Prof. Poonamkumar S. Hanwate and Head of Department Prof. Shwetambari A. Chiwhane and other faculty members of computer science for giving the valuable suggestions and for guiding us.

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