

# GPS Tracking System for Public Transport

Sandeep Bind<sup>1</sup>, Prof. Ramesh Solanki<sup>2</sup>

<sup>1,2</sup>Vivekanand Education Society's Institute of Technology

Hashu Advani Memorial Complex, Collector's Colony, Chembur, Mumbai – 400 074. India.

\*\*\*

**Abstract** –This paper is proposed to design and develop a bus tracking system which helps to know the location of the bus through information display devices on bus stop or mobile phone when a SMS (Short Message Service) is sent to a specific number thus showing the bus location via SMS. This design will continuously monitor a moving bus and report the position of the bus to centralized system. The GPS modem will give the data i.e. the latitude and longitude indicating the position of the bus. Display devices on bus stop shows updated information of upcoming buses and arrival time of it. Bus stop display will show information of buses under radius of 5km region. When the request is sent by user to the number at the GPS system, the system automatically sends a reply to that mobile number showing the upcoming buses list of both up and down line on that location. No external server or internet connection is involved in knowing the location to user end which reduces the cost and complexity. Commuter will get idea of upcoming buses on bus stop easily through a display screen.

**Keywords** – Global positioning system (GPS), Global System for Mobile communication (GSM), Display Devices, Short Message Service (SMS), Centralized Server, performance tracking system.

## I – INTRODUCTION

Today travelling through public transport in city became a hectic job. Commuter doesn't get any idea of current location of bus or exact timing of arriving bus. So commuter have to wait for a bus on bus stop for several minutes sometimes hours. Spending such valuable time on bus stop without knowing any information of bus is not acceptable at all. Traveller must be aware about upcoming buses timings or location on bus stop. So that he/she can plan further activities according to time required for travelling. In today's smart world according to all fast technologies public transport system must be advanced. So that it will match the working speed of people. Such informative system will help to improve interest of commuter towards public transport system. More use of public transport will reduce traffic congestions on roads. Such clear system will increase income of transport service indirectly of government. Commuter can travel happily without any hesitation. Such tracking system also helps organization to maintain the bus timings and

accordingly arrange further bus services. This monitoring will help system to provide more reliable service to customer. Transport system can also keep a track on driver's performance while he/she driving a bus. Tracking of all buses helps to reduce chances of vehicle theft operations. If any accident happens with bus system can easily identify the location of the accident and also helps to understand the causes of the accident. This is very helpful information for investigation.

In this system whenever any commuter arrives at bus stop he will get noticed with normal display screen. Display will continuously show upcoming buses details and there expected timing. Going through this information commuter will decide his/her further activity. If timings are not matching with he's schedule, then he/she may go for another transport option. And there is very rare chance for failure of timings because all buses are continuously monitored via GPS tracking system. Using such clear system commuter whether he is local or outsider can travel easily. Another option that system provides is of SMS service. A traveller will send a request message on particular number which will be centralized number of tracking system. Centralized system will get location of that particular mobile user. According to his/her location system will provide him/her information of upcoming buses on both up and down lines. This process will take very short times duration. Any user can do this without any login ID or passwords, on single SMS commuter will get all information. In this entire process no internet connection is required form commuter side. He /she will get information either by charging zero or by charges of single SMS. It is very cost effective process that every commuter will use it and afford it.

## II – PROBLEM DEFINITION

Travelling using public transport is nowadays time consuming process. For long time of waiting for bus and then more travelling time of buses commuter will get frustrated with all such time consuming process. There is no any advanced system that will show the exact details of upcoming buses coming on bus stop. The overall experience of public transport is not so good. New person in city will definitely get fed up with this kind of travelling service. Person used to wait for bus on bus stop for long time without knowing any information of upcoming buses. There is no any information

center that will provide information on commuter’s mobile phone. At the organizational level it is difficult to track all the buses without any proper system. All buses are running without any control over it. If any failure or accident of bus occurs, then it’s difficult to know the location of it. There is no any system to know the performance of the bus driver. They use to drive as they want on whatever speed. There is no any system which keeps runtime record of the system. All system works as 30-40 years old system. There are no any changes in it. This kind of system is very difficult to maintain. If any big problem occurs, then entire system will get crash. System is always dependent on upper activities. There is no any responsible system in between. Due to such system government pays more funds on maintenance and accuracy.

**III – CONCEPT AND OVERVIEW**

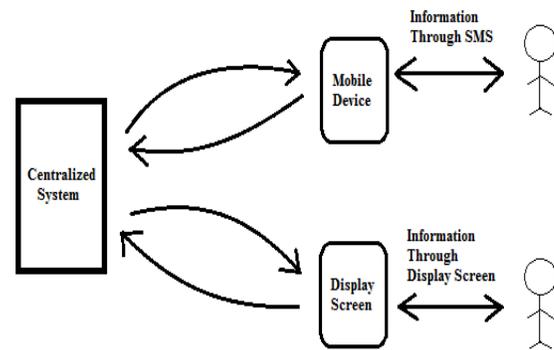
This overall process is basically designed to give hassle free experience to traveller so that they will use public transport more. And another objective is to help transport organization to maintain all there buses as well as service records. This concept came into picture just by knowing condition of today’s public transport system. Many commuters use another options for travelling which mainly increases road traffic. There are two phases in this system which provides information of buses to end user.

**1. Information through Display screen**

**2. Information through SMS service**

Information through display screen is simple way to provide information to traveller. Basically no any single end user involved in entire procedure of information sharing. All travellers will get same information on display device which will be continuously updated. Main device involved in the entire system is GPS modem installed is buses. This modem continuously sends location of bus to centralized system in terms of latitude and longitude. Centralized system transforms this all information in the form of bus routes and bus stops in a city. Transforms entire information according to location of bus stop. Arranges all upcoming buses information for particular bus stop in look up table and sends this information to device placed on bus stop. This information will be continuously updated and end user receives updated information every time. Device on bus stop continuously fetches this provided information and displays it on the screen. Entire work is carried out by centralized system. Devices on bus stop just fetches information and shows to traveller. Due to this run time process traveller get accurate information of upcoming buses on bus stop. Travellers don’t wait ideally for buses.

Another concept is of information via SMS service. A user will send requesting SMS to centralized system which will have common helpline number. After receiving SMS centralized system will get location of the end user. According to location of the user centralized system will send information of buses on both up and down line from nearer bus stop. User receives updated information of buses which helps him/her to match with further activities. On single SMS user receives information of upcoming buses which are travelling in 5km region from bus stop. This all information is based on real-time monitoring so there are very rare chances of failure. User will get accurate information on SMS.

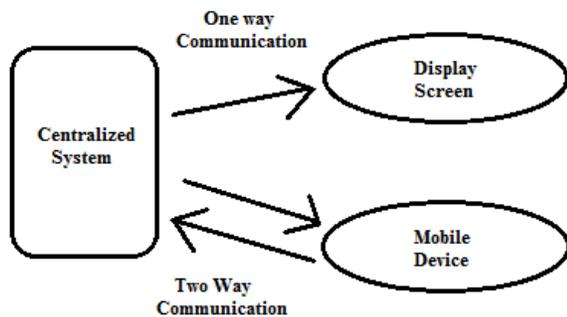


**IV – METHODOLOGY**

This system is combination of one-way and two-way communication system in which information through display screen uses one-way communication whether information through SMS uses two-way communication. In display screen phase only centralized system is involved which continuously send information to receiving device on bus stop. Device on bus stop partially acts as a client which only accepts information to traveller. But in the case of information through SMS two entities are involved. Traveller sends a request SMS to centralized system and centralized system sends reply SMS to traveller’s number including information of buses. It performs operation of two-way communication. Whether in the communication between GPS device in bus and centralized system, it performs two-way communication. Centralized system requests GPS device to send current location in the form of latitude and longitude. GPS system sends its current location continuously to system. This is how centralized system gets all updated information of buses. Information is further used for entire information sharing process. Once this system is applied then there’s no any requirement of changes. We can add more entities to it just by configuring centralized system.

**V - PROPOSED SYSTEM DESIGN**

Proposed system mainly includes three modules which actually performs main activity of information sharing. Centralized system is backbone of entire system. It is information source for both. It provides continuous run-time information of buses and there timing to display screen on bus stop similarly it provides information to it provides information to user as he/she request. System architecture works on those three components which have equal importance. Centralized system is designed in such a way that all information it collects that got stored in look-up table format. Then application at centralized system arranges this information as per bus routes and bus stops location. Each time location of bus changes so new data comes every time there for updating system is essential. This entire algorithm is dependent on centralized system there for centralized system must be powerful enough such that it can handle all data and arrange them properly. Centralized system must be reliable.



**VI - WORKING OF SYSTEM**

Whenever any traveller arrives at a bus stop he/she looks for buses sometimes bus arrives immediately sometimes it not. So at this time traveller waits for the bus but he/she used to wait on bus stop without knowing any information of upcoming buses on the bus stop. He/she waits ideally for a bus. At this time of waiting traveller completely rely on destiny that which bus will come or not. At such situation some informative system is essential that will tell traveller about upcoming buses on particular stop where he/she is waiting. Such that he/she can decide whether to wait for bus or take another transport option. Our system performs the same operation as mentioned above. Whenever traveller arrives on bus stop he notices display screen. Display screen continuously shows list of upcoming buses on that particular bus stop along with time of arrival. It displays information of buses within range of 5km form bus stop. As per bus stop located it displays information of buses travelling on same direction of route that is among up or down side. This information helps traveller to wait for bus or not. Or he/she

gets idea about how much time they need to wait. According to timing they arranges their further activities. And this provided information is completely based on real time monitoring GPS system so there are very few chances that information is incorrect. This similar information can be achieved via SMS service. Any traveller can send requesting SMS to centralized system. At the centralized system location of traveller get traced and as per his/her phones location system sends upcoming bus details on both up and down line which are accessible form nearer bus stops. This filtered information is send as a reply to traveller’s phone number. In this way traveller get all information of upcoming buses on up and down line. Information is along with timing so traveller can completely rely on information. This information guides traveller about upcoming buses and their arrival time.



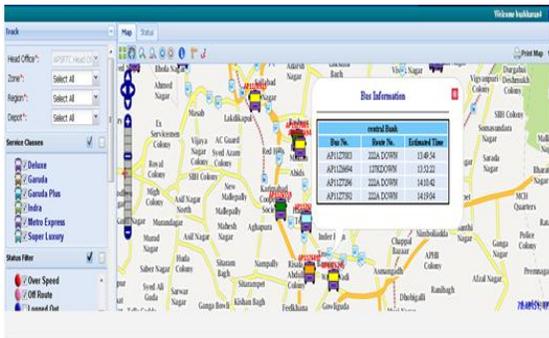
**Information of Bus on Display Screen**



**Information of Buses on SMS**

This is how traveller got information of buses. This was scenario at the user end but very important operations are used to take place at centralized system. GPS modem placed in bus continuously sends information of its current location to centralized system. This process works all the time from installation. Based on this information centralized system knows the location of each bus. As per this real time location of buses application arranges information of individual bus stop. That which bus is going to arrive on bus stop along with time of arrival of bus. This collective information is arranged into look-up tables as per bus stops and this information is continuously used to send to devices on bus stop. Device fetches this information and shows on display screens. In the case of SMS similar information get send by knowing the location of the traveller. Information is completely based on

location traced by system any user cannot change the location as per desire. This is how complete information of all buses and bus stop get arranged. This information is also helpful for organization to maintain their record. Organization can track any driver by this GPS system. If any accident or tragedy occurs, organization can easily trace the location of it. It is very helpful for organization to maintain record of each bus. It is also handles the security aspects of the organization. As considering safety while travelling this kind of monitoring helps a lot to maintain traffic and safety in city.



**Bus Locations at Centralized System**

**VII – APPLICATION**

Application of this system requires some necessary implementations.

1. Strict traffic rules in city
2. GPS modem in Bus
3. Advanced centralized system
4. Display screens on bus stop.
5. Always operational helpline number.
6. Real-Time monitoring

All this component will definitely help to give effective transport system in city, which will help citizens to travel without any stress.

**VIII – ADVANTAGES**

This system will mainly help commuter to travel hassle free. Single look at display device, traveller gets all information of upcoming buses and their respective arrival timings. By sending a simple SMS traveller gets information of buses on up and down line. Information on SMS is based on location of the traveller. Tracing of bus helps organization to maintain record of each bus and their travelling path. Organization can maintain record of each driver and can control their driving pattern. This system will help to improve the transport service. By implementing such advanced system organization can provide new generation experience to their traveller. This

fair system will attract more travellers to travel with public transport. More travellers who will use public transport directly help government to improve revenue. More use of public transport will reduce city traffic. So no any traffic congestion will occur. Due to which we can control pollution in city and help city to maintain environment. This is how this system will improve the lifestyle of citizen and provide them healthy and happy environment.

**IX – CONCLUSION**

GPS Tracking System for Public Transport is basically designed to help commuter to travel hassle free. It designed in such a way that it will give user friendly experience to traveler. This GPS tracking system will help organization to maintain all records. It will give good travelling experience.

**X – ADVANTAGES**

We would like to thank our college IMCOST who provided insight and expertise that greatly assisted the research. We would also like to thank Ms. Apexa Dave and Mr. Ramesh Mahadik for their support and assistance by providing proper formats and guidance.

**XI – REFERENCES**

1. R.S Gaonkar, “Microprocessor Architecture Programming and Application”, Wiley Eastern Ltd, New Delhi.
2. Krishna Kant, “Microprocessor and microcontroller”, Eastern Company Edition, New Delhi 2007.
3. Daniel. W. Lewis, “Fundamental of embedded software”, prentice hall of India, 2004.
4. William Stalling, “Wireless Communication and Networks”, 2nd edition, prentice hall of India, 2005.
5. Kunal Maurya, Mandeep Singh, Neelu Jain, “Real Time Vehicle Tracking System using GSM and GPS Technology- An Anti-Theft Tracking System”, International Journal of Electronics and Computer Science Engineering, ISSN 2277-1956/V1N31103
- [6]. Muruganandham and P.R Mukesh (2010) "Real time Web based vehicle tracking using GPS" World academy of science, Engineering and Technology
- [7] [https://en.wikipedia.org/wiki/Global\\_Positioning\\_System](https://en.wikipedia.org/wiki/Global_Positioning_System)
- [8] <http://www8.garmin.com/aboutGPS>
- [9] <http://searchmobilecomputing.techtarget.com/definition/Global-Positioning-System>
- [10] <http://gpsintegrated.com/products/mobilephonesmartphonetracking>
- [11] <http://www.cartrackingindia.in>