# Tracking Local Trains VIA GPS and Double Decker Local Trains

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*Abstract*— The evolving technology favored for upgrading in the railways. Nowadays, the number of passengers travels in train & number of trains in India has increased tremendously. Due to the increase in number of trains the train times will be mostly delayed and the passengers have to wait at railway stations causing the crowd to grow. The best way to deal with such issues is to provide better service through GSM. This demands a real-time data gathering technique, a quick and true information and informing the passengers/travellers at the same. The implementation of a global positioning system (GPS) will help in tracking the trains every instance. Local trains are truly the lifeline of the city and hence applying GPS will play a very important role. This paper proposes the implementation of GPS/GPRS modules which are connected to the web server which in turn helps in locating the train.

***Key words:*** GPS, GSM, Intelligent Transportation Systems, Tracking Train, GPS Train

## I. INTRODUCTION

Indian Railways (IR) is India's national railway system is operated by the Ministry of Railways. It manages the fourth-largest railway network in the world by size, with 121,407 kilometers of total track over a 67,368-kilometre route.

Indian Railways carries over 13,000 passenger trains on a daily bases, on long-distance and suburban routes, from 7,349 stations all over India.

In the freight segment, IR runs more than 9,200 trains daily. The average speed of payload trains is around 24 kilometers per hour. Railway transport is capable of high levels of passenger and cargo utilization and energy efficient at the same time.

For passengers, time is wasted by waiting for the next arrival, and having connecting trains from other stations which routes to their destination, and often confusing or inconsistent schedules. Especially when the train doesn't arrival at the platform on which it should and delays in the time as well.

### A. *Existing system:*

- People have to wait for the train.
- The location of the train is informed manually using telephone and RF communication.
- They don't know about the time of location & arrival of train accurately.
- People have to contact the station master for such information.

### B. *Proposed system:*

- Vast reduces waiting time.
- Automatic information of train.
- Knowing about the train arrival time & location.
- Tracking the train itself is possible.

## II. HISTORY

The very first railway proposals for India were made in Madras in 1832. The country's first train, Red Hill Railway (built by Arthur Cotton, ran from Red Hills to the Chintadripet bridge in Madras in 1837. India's first passenger train, elevated by three steam locomotives, ran for 34 kilometers with 400 people in 14 carriages between Bori Bunder (Mumbai) and Thane on 16 April 1853.

By the time of Indian Independence in 1947 from the British, a railway network of more than 58,000 km had been built mainly for developing the hinterlands and transporting agriculture produce, minerals, and troops to cut off uprisings. Private enterprise played the preeminent role in railway construction during the early 19th century.

From that day to now there is no stopping but only developing of the Indian Railways.

## III. HOW IT WORKS

GPS is used as a positioning device and GSM is used as communication link between different modules. These modules include BASE Station Module, Vehicle system Module, section Module.

BASE Station Module contains a GSM engine connected to the computer and transmits the train number to BASE Station.

At the same time, it turns on GPS receiver installed in the train. The train then starts transmitting its location to the BASE Station.

The BASE of a GSM engine connected to a microcontroller for processing user request of train location as well as a number of other GSM engines connected to various computers for a separate train to update the location of train.

The trains location data from BASE Station is sent to each train station.

Train station Module after locating data through GSM engine displays it on dot matrix display installed at each train station.

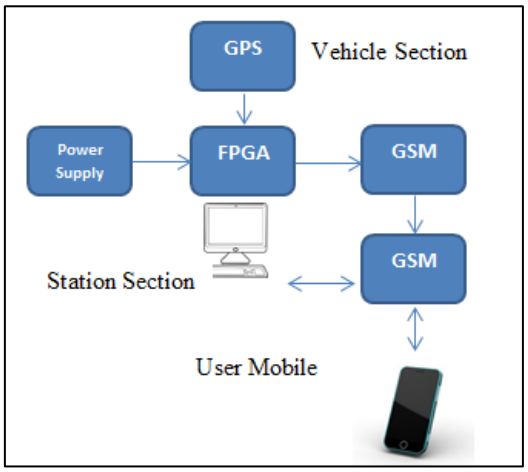


Fig 1: Block diagram of the proposed system

 

## IV. HARDWARE SPECIFICATION

The following hardware components are used in building the system:

### *A. GPS Receiver*

In order to keep track record of train receiver, powered from the train main battery, is installed in each train.

The Garmin GPS35 is a complete GPS receiver embedded antenna designed for a broad spectrum of system applications.

The GPS35 tracks up to twelve at a time. Plus it gives high performance and the memory backup allows the GPS35 to grasp critical data such as last position, date, and time

### *B. GSM Modem*

A wireless link between the modules is provided with GSM module.

A GSM modem accepts a SIM card, and operates on acceptance to a mobile operator, just like a regular mobile phone.

### *C. When a GSM is connected to a computer, it allows the GSM modem to communicate over the mobile network provided.*

*Microcontroller*

Microcontrollers are dedicated to one task and run one specific program. The program is stored in ROM (read-only memory) and mostly does not change.

It has a devoted input device and many a times has a small LED or LCD display for output to be seen. A microcontroller also takes input from the device it is controlling and then controls the device by sending signals to different components in the device.

### *D. Memory*

A nonvolatile RAM is needed for storing huge amount of data as well as to at station module for displaying on dot display.

NV-RAM can selected because it combines the RAM and ROM which as the read and write ability of RAM volatility of ROM.

### *E. Battery Backup*

Vehicle section module is provided so that whenever power from microcontroller continues to send the location to BASE station. A message is also sent regarding the disconnection of main battery. When the power is resumed, the internal battery begins to recharge.

### *F. Alarms*

The microcontroller unit in vehicle section sends different alarm signals for different events to the Base station module.

1) On Backup Battery: When the main battery is switched off due to some reason, a notification is sent to BASE station.
2) Stoppage: When the train is stationary for more than a specified time, BASE station is informed by a stoppage alarm.

   In case of an accident or any other problems occurred in train driver can notify the BASE station by simply pressing a button in the train.
3) Getting Late: When the train is not covering the distance in a defined range of time, an alarm signal of late is sent to BASE station.
4) Route Deviation: When the train deviates from its route more than the assigned margin a message is sent to the BASE station.

## V. CONCLUSION

The system has various modules which are wirelessly linked with GSM modems.

A new service, to help the people who use train as transport for traveling, is introduced inside the country. The service provides the user with current location information of desired trains based on which the user can adjust his schedule accordingly anywhere and at any time.

The service therefore eliminates the need of waiting at the train stations thus saving a lot of time. For the passengers not utilizing the service, displays are installed at railway stations to let them know the trains location coming towards that junction.

The system is also efficient in handling the emergency situations for example, in case some kind of technical fault occurred in the train, the operator at the train terminal is informed immediately.

## VI. FUTURE WORK

The system can be made automatic by installing cameras at train junction terminals and near stations which can automatically read the train number of the trains which passed by and thereby eliminating the operator.

An automatic route guider display can be installed in the trains for alternative route in case of serious rail route congestions or any faults occurred.

## VII. DOUBLE DECKER TRAINS

Regarding the rush and the crowd in trains another great solution for this is to provide double deck trains for local trains as well. In this the long route passengers or the ones who need to get down at the last station can seat in the lower part of the train whereas the other travellers can seat at the top. This is reduce the crowd to a large extent as the space increases.

The structure of the train has to be changed slightly. The door structure needs to be modified so that no one will get hurt and the boarding and departing can be easy. The number of doors also may be need to be increased in number due to the larger trains and more people getting in it. Stair cases also need to be fitted properly and the passages will use the same to get on and off the train.

The railways might have to fix the entry and exit points as well because the train will halt for less then 30 seconds making it difficult for the passengers to board and alight from the same door. Hence the platforms would need to be modified as well.

The double decker train would also be required to increase in height of course since it needs to be double decker. Seating capacity may also increase slightly. The number of couches would also be needed to be changed causing the platform length to be increased and changing the track alignment.

 

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