

Solutions Concerning Information Systems for Real Time Bus Arrival

S. L. Bangare, A. D. Kadam, P. S. Bangare, P. V. Katariya, C. A. Khot, N. R. Kankure

Abstract—In today's world public transport systems plays an important role in the development of the country. Many factors such as mobility, environmental and energy objectives place demands on public transport systems. Current systems which are old and in need of upgrading, must expand service area, improve efficiency and increase service frequency to serve these demands of the public travelling through the improved transportation system. Research is necessary to solve operating problems, to adapt appropriate new technologies from other industries, and to introduce innovations into the transport industry and provide people with the real time arrival predictions so as to save their time over waiting & measure the performance of different transport systems. This paper provides means by which the transport industry can develop innovative near-term solutions to meet demands placed on it.

Index Terms—Automatic vehicle location (AVL), Automatic passenger counter (APC), Passenger system, Real Time Bus

I. INTRODUCTION

1990s, the deployment of automatic vehicle locator (AVL) systems to better monitor and control operations was seen throughout the world. The focus of most of these deployments was to increase operational efficiency, to provide customer information. As these deployments matured, transit agencies recognized that data from an AVL system could be used to provide customers with real-time predictions of bus arrivals. At the same time, many transit systems in Europe were demonstrating the benefits of providing such real-time information to their customers [1] [3].

II. NECESSITATE

As we know that today's passenger information systems are the basic communication link between transport corporations and the traveling public. Along with system reliability, safety, and general appearance, the ability for operators to provide accurate, current information on arrival and

departure times and gates—information the traveler needs to keep moving efficiently—is a key component of customer satisfaction [2][4].

A passenger in city like Pune often faces the decision of whether it would be quicker to wait for the next bus or to walk or to hire a cab/rickshaw to reach his/her destination. Many passengers are often late to work; students are late for classes because they decide to wait for the bus instead of just simply using an alternate transportation.

III. EXISTING SCENARIO

Many new technologies can be applied to public transport systems, especially buses, which don't run according to the predefined time table as described by the authorities due to reasons like traffic jams, breakdowns etc. This increases the due time and makes people uncertain of bus arrival time which ultimately makes public transport system unattractive for passengers. The bus corporations usually provide free bus timetables on the websites. Such bus timetables are usually static and offer very limited information like operating hours, time intervals, etc., moreover these time tables are not timely updated according to real-time traffic conditions. Although many commercial bus information providers offer the real time bus arrival information, the service usually comes with significant cost. The total capital cost for deployment of link infrastructure to deliver transit services is very high, which would eventually increase expenditure of passengers. When traveling with buses, the passengers usually want to know the precised arrival time of the bus. Unreasonably long waiting time at bus stops may disappoint the concerned passengers and make them disinclined to take buses. Other than official timetables, many public services (e.g., Google Maps) are provided for travelers. Although such services offer useful information, they are far from satisfactory to the bus travelers. For example, the schedule of a bus may be delayed due to many unpredictable factors (e.g., traffic conditions, harsh weather situation, etc.). The accurate arrival time of next bus will allow travelers to take alternative transport choices instead, and thus mitigate their anxiety and improve their experience. Many commercial bus information providers offer the real-time bus arrival time to the public [1]. Providing such services, however, usually requires the cooperation of the bus operating companies (e.g., installing special location tracking devices on the buses), and incurs substantial cost. To predict the arrival time of the next bus at a particular stop. Most systems are using light-emitting diode signs [also called dynamic message signs (DMSs)] and liquid crystal displays to present bus arrival information at stops.

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However, other methods of information dissemination are being used as well; including the Unlike the Western Europe, utilizing the bus arrival prediction system is not prevalent in India [1]. Recently, the Kowloon Motor Bus Co. Ltd. and the City bus Ltd. have also developed their own bus arrival time prediction system. Kowloon Motor Bus Co. Ltd. was the first bus company in Hong Kong to provide a Bus Stop Announcement System on their buses, so that speakers on the bus would tell the information of the upcoming bus stops to passengers. The system was controlled by the driver only and is not relying on GPS receivers; therefore, if the bus captain forgets to press the button, no stops information would be announced Kowloon Motor Bus Co. Ltd. has also adopted the Electronic Terminus Management System (Kowloon Motor Bus Co. Limited., 2009) with full network coverage recently. When bus captains have arrived the terminus, he/she can just swipe their smart cards on a card reader, so that their arrival time is recorded, departure time is calculated and displayed to passengers through their LED display equipped at the terminus.

Similar mechanism as with the “txt bus”, passengers can get real time bus arrival information through SMS messages. Real time information of the bus can be provided is because each of the Route A10 bus has equipped with a GPS receiver, so that location and timing information can be delivered to passengers through control terminal. In most parts of the Western Europe and Japan, Real time passenger information systems have been approved for a decade for providing bus arrival information. But actual implementation of those real time information systems in India still remains an uncertainty [3] [4].

IV. PROBLEMS FACED IN EXISTING BUS TRANSPORT SYSTEMS

A. Over speeding:

Due to over speeding number of bus accidents have occurred leading to deaths of passengers and public property destruction. Speed thrills but it also kills! Over speeding is the main cause when it comes to road accidents in the city. Statistics available with the traffic police shows that of 1, 531 road accidents that took place last year, 413 accidents were caused due to over speeding. This means nearly 27% of total accidents have taken place due to over speeding. Of 413 accidents caused due to over speeding, 150 accidents were fatal. The over speeding of vehicles has claimed lives of 163 people and have left 166 people seriously injured last year.

B. Fuel consumption:

To increase the operational efficiency amount of fuel consumed by transit system need to be monitored closely and maximize the profits thereby reducing the cost over fuel.

C. Door open alert:

There is a need of the door open alert to avoid accidents especially in case of school buses.

D. Bus vacancy:

Due to large human population in India there is huge rush which makes most of buses almost full, hence people waiting for the same at next bus stops simply waste their time spending on bus stops. This existing situation needs an effective solution. So that people don't waste time at the bus stops waiting for the bus which is already full when it is arriving.

E. Illegal Travelling:

Many people travel in the buses illegally not buying the tickets supported by Ticket Checker's and thereby making wrong use of their designation. There is need to avoid this by providing automatic ticket collecting system.

V. SOLUTIONS FOR EXISTING PROBLEMS

The suggested system uses dynamic information to generate estimated time of arrival of buses at stops along the route. When this information is provided to passengers by wireless e.g. Internet media, they can spend their time efficiently and reach the bus stop just before the bus arrives, or take another means of transport if the bus is delayed. This will make the public transport system competitive and passenger- friendly. The use of private vehicles is reduced when more people use public transportation facilities, which in turn reduces traffic and pollution.

The underlying technology, which is an AVL system, is necessary for determining real-time arrival information. AVL systems provide information about:

- 1] The location of each bus.
- 2] Vehicle speed and direction, and schedule adherence.
- 3] Providing information to the customer, data from real-time bus arrival. Information systems are used for other purposes, including optimizing service and operations. We also can use this information to perform route and schedule restructuring; to conduct general planning, such as operations and defining bus routes and to develop new services.

VI. SOLUTIONS FOR AVOIDING OVER SPEEDING PROBLEMS

Over speeding can be avoided by transmitting bus speed information at real time. If it is observed that bus is crossing certain threshold speed as defined for that route it will generate an alert to corresponding buses and also report of threshold speed crossed will be generated. This report will be help to keep track records of driver.

VII. AUTOMATIC PASSENGER COUNTERS (APC) AS SOLUTION TO VACANCY IN BUS

Automatic Passenger Counters interpretation for an increase of quantity and quality of real time information about the bus operation and they usually work with AVL system to enhance accuracy. The information collected consists of a newer version of vehicle location, speeds, travel time, occupancies, etc. Information collection is an automated process and done when passengers boarding and alighting at different time and locations. The current vehicle location and the direction of travel are displayed. Another example combines the real time vehicle location display with predicted arrival time. This system, called RideFinder, was deployed by the Central Ohio Transit Authority on kiosks in August 2001. The touch-screen interactive kiosks not only display a map of the hotel airport circulator route with the actual location of the buses and the estimated arrival time of the bus at that stop, but they can be used to access weather information and information on the agency's services and fares. In addition, arrival time is provided in audio format. The visually impaired can simply push a button on the kiosk to hear estimated bus arrival times [1] [3].

VIII. SCOPE OF PROPOSED WORK

- a GPS based system that can determine the distance of the Bus and next bus stop
- a timing device can tell when the bus should arrive to a particular bus stop
- Time required to reach the next stop
- a map interface that shows the potential bus stops
- Bus tracking
- a get off notification by voice feedback
- Advertisement and tourist places notifications based on location

IX. SOLUTIONS FOR PROVIDING REAL TIME BUS ARRIVAL SYSTEM

- The module inside the bus provides following information on displays inside the buses:
- Speed of the bus
- Current time and date;
- Route number and final destination of vehicle;
- Next stop and distance to next stop
- Due time to next stop , either in countdown format or time

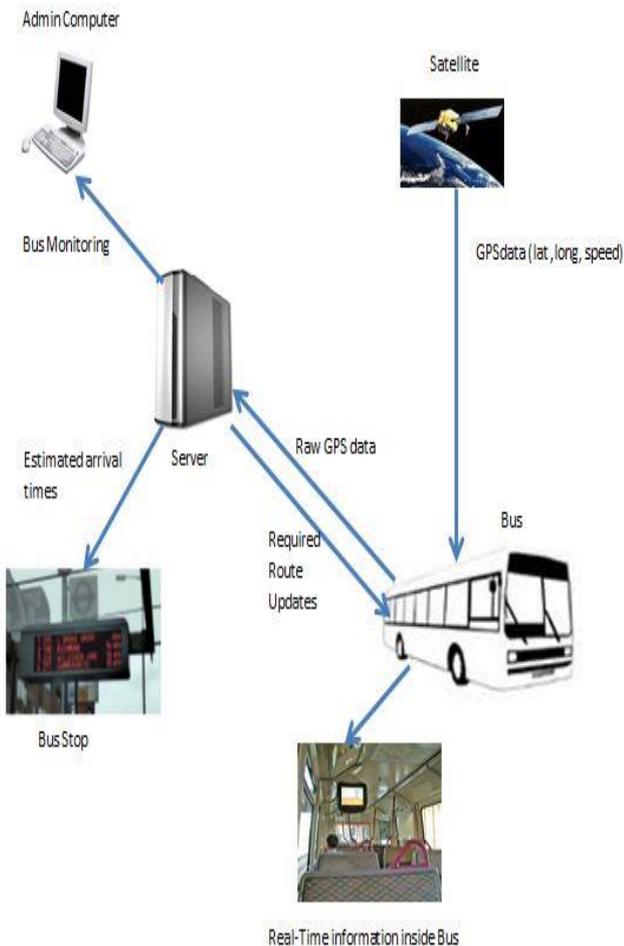


Fig 1: Concept of System

❖ Module on server side provides following information:

- It will Record bus arrival time at every bus stop
- Estimates bus travel time using previous bus information;

- And calculates arrival times for approaching buses to all bus stops.
- ❖ Module on bus stop would provide following information:
 - Latest bus arriving at the bus stops.
 - Arrival time of the bus to reach the stop.
 - Bus going to different stops

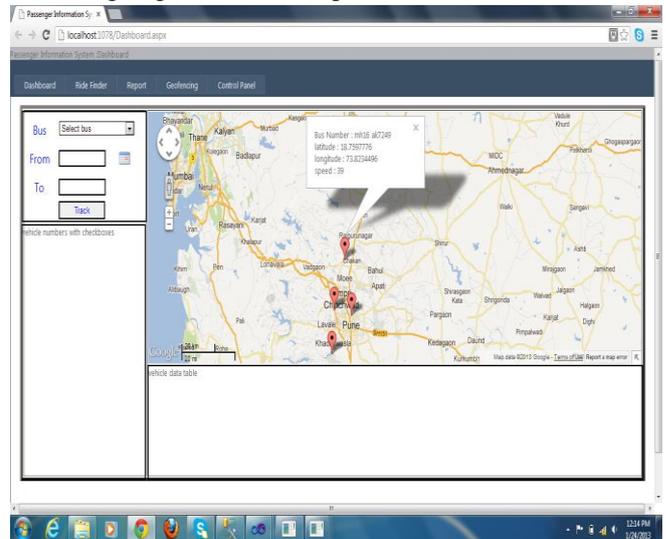


Fig 2: Screen shot of proposed work till current development

X. CONCLUSION

This paper is a review of work done for the Real Time Bus Arrival Information Systems in India and abroad with new techniques developed.

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