

Survey on Bus Monitoring and Tracking System

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Abstract - Due to the high cost of time, several methods are proposed to reduce the wastage of time on the bus station. So, we proposed GPS based Bus Tracking and Monitoring system in which the tracking is done using GPS & GSM/GPRS technology and we will create Android Application which gives User interface to Passengers where they can access/view the Daily timetable of Bus, Bus route, Location of Bus, and Bus Arrival and Delay Timing information. The Base Station also gives response to passenger's request when they ask for some information about Bus, Bus Driver, Route of bus, Timing of bus.

Keywords - GPS, Mobile Computing, Routing, Bus Tracking, Bus arrival time prediction, Central Monitoring and Control, Cellular Based Tracking, Traffic Monitoring.

1. Introduction

The current scenario is that passengers have to keep waiting for the bus to arrive at the bus stop. The waiting time varies a lot depending upon various parameters. According to the current system the passenger does not have any information about the bus, its expected arrival time, the expected waiting time and what exactly is the current position of the bus. The waiting time of every passenger keeps on increasing every now and then. Thus there is a strong need to build such a system which will work in favour of the user and especially reduce his waiting time at the bus stop. Our main focus is to provide the user with such a system which will for sure reduce his waiting time and will provide him with all necessary details regarding the arrival time of the bus, its exact location and expected waiting time. Thus we have proposed a system which will work for the same. The previous work done in this field is as follows:

A) RFID Based Intelligent Bus Management and Monitoring System

This system summarizes the work on design and implementation of RFID-based system for tracking the location of buses provided for public transportation. The system consists of three main modules: In-Bus Module,

Bus-Stop Module and Base-Station Module. When bus leaves from BASE-Station, the RFID tag at BASE-Station is read by the RFID reader in the In-Bus Module and the tag data is then sent to BASE-Station via GSM [3].

B) How Long to Wait? Predicting Bus Arrival Time with Mobile Phone Based Participatory Sensing

The bus arrival time is primary information to most city transport travelers. Excessively long waiting time at bus stops often discourages the travelers and makes them reluctant to take buses. In this paper, we present a bus arrival time prediction system based on bus passengers' participatory sensing. With commodity mobile phones, the bus passengers' surrounding environmental context is effectively collected and utilized to estimate the bus traveling routes and predict bus arrival time at various bus stops [4].

1.1 Proposed Methodology

The proposed architecture helps in understanding The Bus monitoring system. The components of the following architecture are: GPS Tracking Device, a Server and a Database, Android/Java Phones, and Backup Database. The descriptions of the above named components are as follows:

A) GPS Technology

Global positioning system (GPS) is system composed of 24 communication satellites of United States. Once a location is computed, it can calculate an average speed and direction of traveling. Therefore, GPS is a key technology for giving device its position. Among the many ways, GPS tracking devices are used for tracking city bus. Many cities have found that using GPS tracking systems has helped them to improve the efficiency of city bus operation.

B) Bus Station Monitoring System

The main part of the architecture is Bus Station Monitoring system, where actually central management of

Bus is done, optimal route designing & real-time monitoring of traffic. The Central Monitoring System also saves the information about Bus Drivers, Conductor, and Other person who are the employee of Bus Station. The Monitoring system divided into two parts :

- i. System Database
- ii. Monitoring System

i. System Database

The System database stores the information about the buses, bus drivers, and information about the employee who are working in Bus Station. It's very important to store the correct and accurate information in the sorted format so server system can handle it properly and make changes according to requirements.

ii. Monitoring System

This part is the central part of the Bus Station Monitoring system and consists of a Server computer connected to the Internet through Router or Modem. It accepts the location information of the buses via respective GPS Device placed in Buses and stores it in the database. It sends the data about bus, its current location and route of bus with Google map which helps passengers to get arrival time of particular bus with optimized route of bus via GSM or Internet. The System generated message is sent to passengers when they ask for some information about buses and bus route. Passengers can also give feedback to the system by sending acknowledgement messages on getting a notification from the system.

1.2 Algorithms

A) A* Algorithm

A* algorithm is an informed search algorithm which uses the heuristic function to find out the next possible and feasible node which should be considered in the tree traversal. [7]

```
function A*(start,goal)
closedset := the empty set // The set of nodes already
evaluated.
openset := {start} // The set of tentative nodes to be
evaluated, initially containing the start node

came_from := the empty map // The map of navigated
nodes.

g_score[start] := 0 // Cost from start along best known
path.
```

```
// Estimated total cost from start to goal through y.
```

```
f_score[start] := g_score[start] +
heuristic_cost_estimate(start, goal)
```

```
whileopenset is not empty
current := the node in openset having the lowest f_score[]
value
if current = goal
returnreconstruct_path(came_from, goal)
```

```
remove current from openset
add current to closedset
for each neighbor in neighbor_nodes(current)
if neighbor in closedset
continue
```

```
tentative_g_score := g_score[current] +
dist_between(current,neighbor)
```

```
if neighbor not in openset or
tentative_g_score < g_score[neighbor]
came_from[neighbor] := current
g_score[neighbor] := tentative_g_score
f_score[neighbor] := g_score[neighbor] +
heuristic_cost_estimate(neighbor, goal)
if neighbor not in openset
add neighbor to openset
```

```
return failure
```

```
functionreconst
ruct_path(came_from, current_node)
ifcurrent_node in came_from
p := reconstruct_path(came_from,
came_from[current_node])
return (p + current_node)
else
returncurrent_node
```

1.3 Comparison of Existing System and Proposed System

The existing bus arrival time prediction system based on bus passengers' participatory sensing. With commodity mobile phones, the bus passengers' surrounding environmental context is effectively collected and utilized to estimate the bus traveling routes and predict bus arrival time at various bus stops.

The proposed system reduce the wastage of time on the bus station or waiting for the bus for more time is not preferred. So, we proposed GPS based Bus Travelling and Management system in which the tracking using GPS & GSM/GPRS technology.

We will create Android Application which gives User interface to Passengers where they can access/view the Daily timetable of Bus, Bus route, Location of Bus, and Bus Arrival and Delay Timing information. The Bus Station also give response to passenger's request when they ask for some information about Bus, Bus Driver, route of bus, Timing of bus.

The Proposed system is easy to use and provide effective management tool for Passengers in which they can find optimal route of bus, monitoring system for Bus Station where all central management done, optimal route designing & real-time monitoring of traffic. The Central Monitoring System also save the information about Bus Drivers, Conductor, and Other person who are the employee of Bus Station

2. Figures

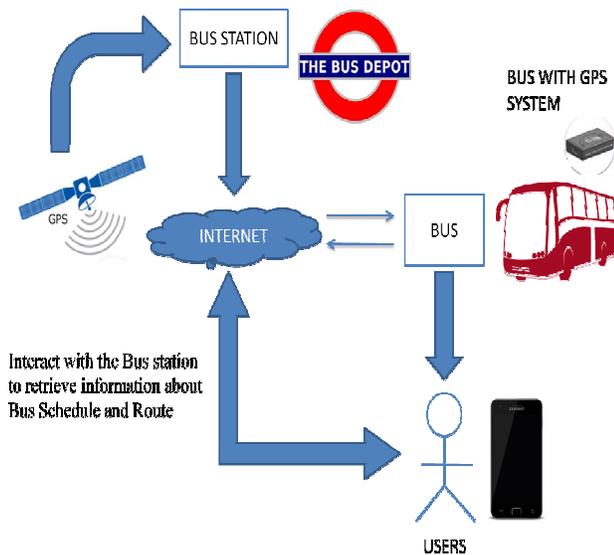


Fig. 1 Architecture of proposed System

3. Conclusion

Thus, in this paper we have made a comparison study between the existing system and the proposed system. We have tried to eliminate all the drawbacks of the existing system. The proposed system has a bright future in transportation field as it finds out the shortest path, takes the user to the destination in minimum time thus reducing his waiting time.

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