Predicting Bus Arrival Time with Mobile Phone Based Participatory Sensing

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Abstract:
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 mobile devices GPS enable feature to obtain arrival time of Bus and utilized to estimate the bus traveling routes and predict bus arrival time at various bus stops.

Keywords: Geocoder,GPS,Latitude,LocationManager, Longitude, LocationProvider

I. INTRODUCTION

In the proposed system, we elaborate the “Bus arrival time prediction system with mobile phone” concept. With mobile phone surrounding environmental context is effectively collected and utilized to estimate the bus traveling routes and predict bus arrival time at various bus stops. Most passengers indicate that they want to instantly track the arrival time of the next buses and they are willing to contribute their location information of buses that help to establish a system to estimate the arrival time at various bus stops for the community. This motivates us to design a crowd-participated service to bridge those who want to know bus arrival time (querying users) to those who are on the bus and able to share their instant bus route information(sharing users). 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. It Reduces cost by Replacing GPS Tracker with the Android Phone and also it is less demanding and easy to deploy. The most of the computation burden have been shifted to the backend server where the uploaded information from sharing users is processed and the requests from querying users are addressed. There is one administrator who only has authority to update the information. Querying user can able to reserve the seat of bus. From number of seats that are available in bus, the user can choose the particular vacant seat and reserve it. Only one user can reserve one seat.

A) 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.

B) Background and Motivation
The bus companies usually provide free bus timetables on the web. Such bus timetables, however, only provide very limited information (e.g., operating hours, time intervals, etc.), which are typically not timely updated according to instant traffic conditions. Although many commercial bus information providers offer the real time bus arrival information, the service usually comes with substantial cost. With a fleet of thousands of buses, the installment of in-vehicle GPS systems incurs tens of millions of dollars. The network infrastructure to deliver the transit service raises the deployment cost even higher, which would eventually translate to increased expenditure of passengers. For those reasons, current research works explore new approaches independent of bus companies to acquire transit information. The common rationale of such approaches is to continuously and accurately track the absolute physical location of the buses, which typically uses GPS for localization. Although many GPS-enabled mobile phones are available on the market, a good number of mobile phones are still shipped without GPS modules. Those typical limitations of the localization based schemes motivate alternative approaches without using GPS signal or other localization methods. Besides, GPS module consumes substantial amount of energy, significantly reducing the lifetime of power-constrained mobile phones.

1.1 Proposed Methodology

A. System Architecture:

As depicted in Figure querying user queries the bus arrival time by sending the request to the backend server. The
querying user indicates the interested bus route and bus stop to receive the predicted bus arrival time. We need to carefully classify the bus route information from the mixed reports of participatory users without user’s manual indication. Such automatic classification is non-trivial. We consolidate the above techniques and implement a prototype system with the Android platform using mobile phones. The sharing user on the other hand contributes the mobile phone sensing information to the system. In particular, the sharing passengers may anonymously upload their sensing data collected on buses to a processing server, which intelligently processes the data and distributes useful information to those querying users. After a sharing user gets on a bus, the data collection module starts to collect a sequence of nearby phone IDs. The collected data is transmitted to the server. The most of the computation burden have been shifted to the backend server where the uploaded information from sharing users is processed and the requests from querying users are addressed. There is one administrator who only has authority to update the bus information. Querying user can able to reserve the seat of bus. From number of seats that are available in bus, the user can choose the particular vacant seat and reserve it. Only one user can reserve one seat. Once the seat gets reserved, other users cannot occupy the same seat. The passenger can also cancel the seat, if the journey has been cancelled.

B. Modules

A) GPS Tracing:
GPS Tracing is issued to trace the location of bus using android application. This application is handled by user which consist bus route information. User can find how many routes are available to travel from source to destination. These routes are saved within the database and it is very easy to retrieve the route. If route is changed, the administrator can only modify the routes. If the user wants to share their exact current location with other registered users, then it is done by using the technique called as shared user. Using ‘shared user’ technique, the user in bus will upload his current location. Due to some unpredictable reasons such as traffic, natural disastrous etc. the bus may run late in time. So uploading the current location of the bus will be helpful for the other user who is waiting for bus to travel.

B) Geospatial Prediction:
To predict the bus arrival time using navigation approach the Geospatial prediction mechanism is used. Navigation system receives signals from the GPS satellites and identifies the relative bus position and direction by combining the information received by onboard sensors. The GPS satellite can also help you to find the route to the destination using various databases like road network, traffic data, site information data and even the background data consisting of reverse bridges etc.

C) Notifier:
When querying user send request to server it checks whether the bus is near about the bus stop or not. If bus is about the 500m distance from stop, then querying user got notification on the title bar of the application. A notification is a message you can display to the user outside of your application’s normal UI. Notifications in Android are represented by the Notification class. To create notifications, Notification Manager class is used which can be received from the Context, e.g. an activity or a service, via the get System Service () method.

D) Seat Reservation:
Application is developed, that provides facility for user to reserve the seat. Passenger can check available and reserved seats. Once the seat gets reserved, other users cannot occupy that particular seat. Only one person can reserve one seat at a time. The passenger has authority to cancel the reserved seat which is helpful for the next passenger to reserve the seat. Sharing user can not reserve the seat because sharing user is already present in the bus.

Important Constructs

A) Location Manager
This class provides access to the system location services. These services allow applications to obtain periodic updates of the device’s geographical location. The LocationManager class provides access to the Android location service. This service allows to access location providers, to register location update listeners and proximity alerts and more. In this proposed system the LocationManager class is used for accessing the location services of the bus.

B) Location Provider
The LocationProvider class is the superclass of the different location providers which deliver the information about the current location. This information is stored in the Location class. In proposed system the LocationProvider class is used for accessing current location of the bus.

C) Geocoder
The Geocoder class allows determine the geo-coordinates (longitude, latitude) for a given address and possible addresses for given geo-coordinates. In proposed system the Geocoder class is used for accessing the geo-coordinates (longitude, latitude) of the bus.

II. RESULTS AND DISCUSSION

In fig.2 shows that login page activity, registered user will login into the system. If the user is new then, user need to first register with their required fields like, user name, password, and gender and phone number. User’s necessary information is stored into the database which is helpful for identifying the user. Before sing this application every user need to login and enter into the next page. This provides unique identity to user, user need to login with their unique Email-id and password and fig.3 shows that admin side website. Only admin is having an authority to login this page.
As shown in figure 4. The user can choose the source and destination. Once the user GPS logged in, the user can choose the source (from) and destination (to) and select the appropriate route. All the information about source and destination is stored in database at server side. As shown in figure 5, at server side, admin can do various operations such as, Add bus, Delete bus, Update bus, Add Intermediate stops, Display bus and seat reservation.

Once the user enter the source destination and selects the route the application will show the next pop up page as shown in fig 6, which contains the available buses for the source destination and route selected by the user. It also shows the information about latitude and longitude of the bus, so that the user can predict the exact location of the bus. As shown in fig 7, Admin has the compute control over the server side. The admin can do the various operations such as, bus number, source, destination, arrival time, Departure time and no. of stops.

A) 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 reduces 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 & 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 gives response to passenger's request when they ask for some information about Bus, Bus Driver, route of bus, Timing of bus.

II. CONCLUSION

The comparative study has been done between the existing system and the proposed system. The drawbacks of the existing system, such as bus companies provide timetable which are typically not timely updated according to instant traffic conditions also the schedule of bus may be delayed due to many unpredictable factors. The proposed system has a bright future in transportation field as it finds out the Bus route path, takes the user to the destination in minimum time thus reducing the users waiting time. Also the seat reservation facility adds new functionality to existing system.

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IV. REFERENCES

[1]. Pengfei Zhou, Student Member, IEEE, Yuanqing Zheng, Student Member, IEEE and Mo Li, Member, IEEE “How Long to Wait? Predicting Bus Arrival Time With Mobile Phone Based Participatory Sensing” IEEE TRANSACTIONS ON MOBILE COMPUTING, VOL. 13, NO. 6, JUNE 2014.


