Bus Tracking and Waiting Time Prediction

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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 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 solely relies on the collaborative effort of the participating users and is independent from the bus operating companies, so it can be easily adopted to support universal bus service systems without requesting support from particular bus operating companies.

Instead of referring to GPS-enabled location information, we resort to more generally available and energy efficient sensing resources, including cell tower signals, movement statuses, audio recordings, etc., which bring less burden to the participatory party and encourage their participation. A prototype system with different types of Android-based mobile phones and comprehensively experiment with the some campus shuttle buses as well as public buses. The evaluation results suggest that the proposed system achieves outstanding prediction accuracy compared with those bus operator initiated and GPS supported solutions. We further adopt our system and conduct quick trial experiments with some bus system, which suggests the easy deployment of our system and promising system performance across cities. At the same time, the proposed solution is more generally available and energy friendly.

Keyword:- *Bus arrival time prediction, participatory sensing, mobile phones, cellular-based tracking*

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1. INTRODUCTION

Public transport, especially the bus transport, has been well developed in many parts of the world. The bus transport services reduce the private car usage and fuel consumption, and alleviate traffic congestion. 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. The proposed system solely relies on the collaborative effort of the participating users and is independent from the bus operating companies, so it can be easily adopted to support universal bus service systems without requesting support from particular bus operating companies.

Instead of referring to GPS-enabled location information, we resort to more generally available and energy efficient sensing resources, including cell tower signals, movement statuses, audio recordings, etc., which bring less burden to the participatory party and encourage their participation. A prototype system with different types of Android-based mobile phones and comprehensively experiment with the some campus shuttle buses as well as public buses. The evaluation results suggest that the proposed system achieves outstanding prediction accuracy compared with those bus operator initiated and GPS supported solutions. We further adopt our system and conduct quick trial experiments with some bus system, which suggests the easy deployment of our system and promising system performance across cities. At the same time, the proposed solution is more generally available and energy friendly.

2. LITERATURE SURVEY

[1] Zhou et al., "**how long to wait? Predicting bus arrival time with mobile phone based participatory sensing**", IEEE transactions on mobile computing, vol. 13, no. 6, pp.1228-1241, June 2014.In this paper 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.

[2] T. Abdelzaher et al., "**Mobiscopes for human spaces**," IEEE Pervasive Compute, vol. 6, o. 2, pp. 20–29, Apr. 2007.In this paper the roadway transport system is the primary information to most travelers. Terribly long waiting time at bus stop often discourages the customers and makes them hesitate to take buses. This paper introduces a new approach called a roadway transport prediction system based on bus passengers participatory sensing by using smart phones.

[3] G. Ananthanarayanan, M. Haridasan, I. Mohomed, D. Terry, and C. A. Thekkath, Startrack: "**A framework for enabling track-based applications**," in Proc. ACM MobiSys, 2009, pp. 207–220. This paper is based on track-based applications. Start rack was the first service designed to manage tracks of GPS location coordinates obtained from mobile de- vices and to facilitate the construction of track-based applications. Our early attempts to build practical applications on Star Track revealed substantial efficiency and scalability problems, including frequent client-server roundtrips, unnecessary data transfers, costly similarity comparisons involving thousands of tracks, and poor fault-tolerance.

[4] P. Bahl and V. N. Padmanabhan, "**RADAR: An in-building RF-based user location and tracking system**," in Proc. IEEE INFOCOM, 2000, pp. 775–784.In this paper the proliferation of mobile computing device & local area wireless networks has fostered a growing interest in location-aware system and services. In this paper we present RADAR, a radio-frequency based system for locating & tracking users inside buildings.

3. PROPOSED SYSTEM

When travelling with buses, the travellers usually want to known the accurate arrival time of the bus.Excessively long waiting time at bus stops may drive away the anxious travellers and make them reluctant to take the buses.

A. Proposed System Architecture:

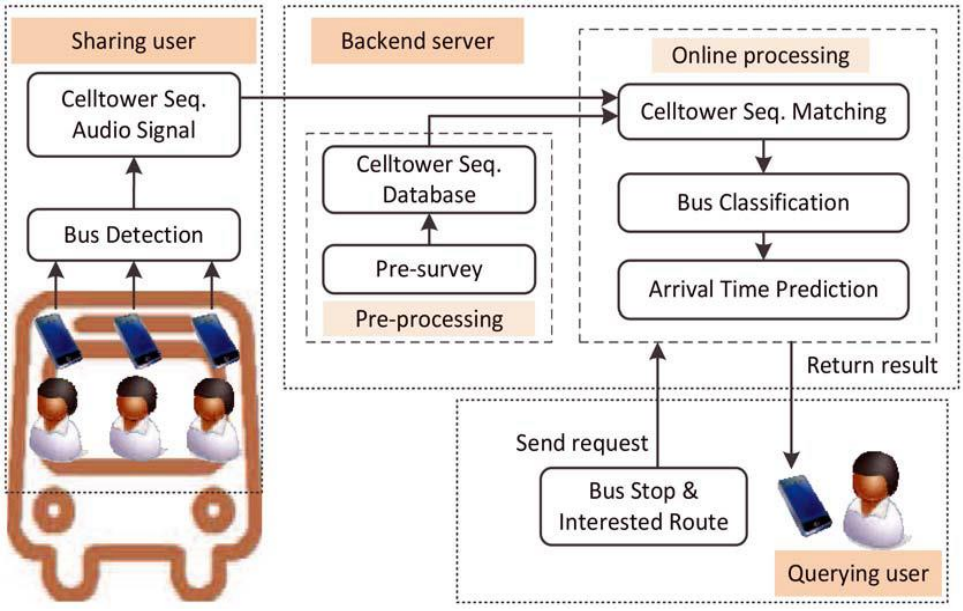

Figure 1: System Architecture

B . System Modules:

1. Department Management Module: Bus depot management shows information and registration of the department and the buses time table and driver management for that particular bus route.

2. Driver Registration Module: In this module the driver details is get registered and along with it buses allocated for him. The detail contact is getting stored in the database about the driver.

3. Customer Registration Module: Customer is going to register himself in the system and able to view all bus management and the driver management detail.

4. Route Management Module: The specific route information for the bus is get from this module.

5. Time Management Module: The management will going to show the departure and arrival time of all the buses in the system.

6. Route Mismatch Module: The route mismatch management will shows that if any bus takes any wrong route then our system gives notification about the route change.

7. Bus Tracking System Using GPS System : The bus tracking system gives advance information about the buses and about the timing of the buses in our system.

8. Bus Information : All customers are going to check all the bus information.

9. Feedback System : Any feedback related to the bus transportation is accepted by the feedback system may be of the security to the driver activity to authority of the Bus Department instantly.

6. CONCLUSION

Here we come to the conclusion that the proposed system will not only facilitate the passengers in various aspects but will also reducing the effort by centralizing the bus management system through technology.

In this paper, we present a crowd-participated bus arrival time prediction system. Primarily relying on inexpensive and widely available cellular signals, the proposed system provides cost-efficient solutions to the problem. We comprehensively evaluate the system through an Android prototype system. Over a 7-week experiment period, the evaluation results demonstrate that our system can accurately predict the bus arrival time. Being independent of any support from transit agencies and location services, the proposed scheme provides a flexible framework for participatory contribution of the community. For a particular city, the only requirement of our system implementation is that there exist a backend server and an IC card based bus system.

Future work includes how to encourage more participants to bootstrap the system because the number of sharing passengers affects the prediction accuracy in our system. This common issue of crowd-sourced solutions is largely influenced by the penetration rate and popularity of the services. One may actively promote the service to reach a critical penetration rate so as to ensure that at least one sharing user is on the bus willing to report the bus status. At the initial stage, we may encourage some specific passengers

(like the bus drivers) to install the mobile phone clients.

REFERENCES

[1]. Zhou et al., “how long to wait? Predicting bus arrival time with mobile phone based participatory sensing”, IEEE transactions on mobile computing, vol. 13, no.6,pp.1228-1241, June 2014.

[2]. T. Abdelzaher et al., “Mobiscopes for human spaces,” IEEE Pervasive Compute., vol. 6, o. 2, pp. 20–29, Apr. 2007.

[3].G. Ananthanarayanan, M. Haridasan, I. Mohomed, D. Terry, and C. A. Thekkath, Star track: A framework for enabling track-based applications," in Proc. ACM MobiSys, 2009, pp. 207–220.

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[5]. X. Bao and R. R. Choudhury, "MoVi: Mobile phone based video highlights via collaborative sensing," in Proc. ACM MobiSys, San Francisco, CA, USA, 2010, pp. 357–370.

[6]. J. Biagioni, T. Gerlich, T. Merrifield, and J. Eriksson, "Easy tracker: Automatic transit tracking, mapping, and arrival time prediction using smart phones," in Proc. ACM SenSys, 2011, pp. 1–14.

BIOGRAPHIES

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