How Long to Wait? Predicting Bus Arrival Time With Mobile Phone Based Participatory Sensing

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. We develop a prototype system with different types of Android-based mobile phones and comprehensively experiment with the NTU campus shuttle buses as well as Singapore public buses over a 7-week period. 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 London bus system for 4 days, 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.

EXISTING SYSTEM:
When travelling with buses, the travellers usually want to know 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 buses. Nowadays, most bus operating companies have been providing their timetables on the web freely available for the travellers. The bus timetables, however, only provide very limited information (e.g., operating hours, time intervals, etc.), which are typically not timely updated. Other than those 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.

PROBLEM DEFINITION:
1) The schedule of a bus may be delayed due to many unpredictable factors (e.g., traffic conditions, harsh weather situation, etc)
2) However, usually requires the cooperation of the bus operating companies (e.g., installing special location tracking devices on the buses), and incurs substantial
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cost.

PROPOSED SYSTEM:
In this paper, we present a novel bus arrival time prediction system based on crowd-participatory sensing. We interviewed bus passengers on acquiring the bus arrival time. 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 on buses to 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 the instant bus route information (sharing users). To achieve such a goal, we let the bus passengers themselves cooperatively sense the bus route information using commodity mobile phones. 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.

ADVANTAGES OF PROPOSED SYSTEM:
1) Through directly bridging the sharing and querying users in the participatory framework, we build our system independent of the bus operating companies or other third-party service providers.
2) Based on the commodity mobile phones, our system obviates the need for special hardware or extra vehicle devices.

3) Automatically detecting ambient environments and generating bus route related reports, our approach does not require the explicit human inputs from the participants.

SYSTEM ARCHITECTURE:
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SYSTEM REQUIREMENTS:

HARDWARE REQUIREMENTS:

- System: Pentium IV 2.4 GHz.
- Hard Disk: 40 GB.
- Floppy Drive: 1.44 Mb.
- Monitor: 15 VGA Colour.
- Mouse: Logitech.
- Ram: 512 Mb.
- MOBILE: ANDROID

SOFTWARE REQUIREMENTS:

- Operating system: Windows XP/7.
- Coding Language: Java 1.7
- Tool Kit: Android 2.3 ABOVE
- IDE: Eclipse
REFERENCE:

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.