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A Decentralized Low Communication Traffic Alert System using Cloud Messaging

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Abstract

Traffic monitoring systems deployed until now, use data that is collected through fixed sensors. The development of Smart Traffic Systems has made possible the Advances on the modern mobile devices, which use the traffic information gathered by the drivers' mobile devices to provide route guidance. Our work is focused on building a Low Processing Real-Time Traffic Information System based mobile devices and message passing cloud server, which are used for both acquiring traffic information data and for providing feedback and guidance to drivers. This paper demonstrates the low communication features and requirements for dynamic route guidance together with possible solutions. One of the key component of the system is the cloud server that gathers data in and passes to the client without requiring the client to request the server for traffic data. The Paper can be developed using Android and works on any android enabled device with cloud server as a communicator between phones.

Keywords: congestion, GPS, WLAN, C2DM

INTRODUCTION

Traffic congestion in big cities all over the world is one of the major problem affecting millions of people in their everyday life. Traffic monitoring systems which are deployed until now, utilize data that is collected mainly through fixed sensors, which provide information about the number and speed of vehicles that cross them. Nevertheless, this type of system is not deployed at wide scales mostly because of its high cost.

Mobile devices used as traffic sensors present major advantages compared to other solutions. So far, all the existing solutions require the design, implementation and maintenance of special infrastructure, which can be both expensive and difficult to deploy. On the other hand, cellular networks are already widely deployed and provide large coverage of the population. Modern mobile devices come equipped with Global Position System (GPS) receivers which itself can calculate the device's location as well as the speed with sufficient accuracy. On the communication side, many wireless standards (3G/4G/WLAN) are included already and most of the upcoming standards are expected to be integrated in the near future. This connectivity capacity and the array of sensors equipped in the mobile devices, make them suitable for gathering a large amount of traffic data. Finally, modern mobile devices feature high resolution screens and touch screens that can be used for interacting with the driver and display detailed information. Although the motivation behind using mobile devices in Smart Traffic Systems is

obvious, there are still many challenges and issues that must be addressed accurately before deploying it to the real world. The most critical ones are related to security and privacy of the users and to efficient positioning and real-time route guidance. A key component of such a system must be the mobile application which will collect the traffic data, integrate security algorithms and finally present guidance information to the driver.

In many cases Cloud computing will offer the appropriate scalability, flexibility and cost-model for many different types of services. According to Gartner, both cloud computing and mobile applications and media tablets are on the top 10 list of *strategic technologies for 2011*. This proves the importance of these technologies and how crucial it is to continue to push the boundary on what is possible to offer to the end product users with the ever-improving hardware and network infrastructure available. We believe that a combination of a cloud based content publisher and a smart phone content subscriber will be best suited.

We focus on a concept of tying both cloud computing and mobile devices together through push messaging. Push messaging provides the possibility for mobile devices to receive messages from a content publisher via a cloud application. In this context, we will look at a fairly new technology, called C2DM (Cloud to Device Messaging), which is part of the Android platform and has been developed by Google.

REVIEW OF RELEVANT LITERATURE

The Traffic alert system are not new as of now we have seen system where we can get SMS alerts about the traffic regions but these application lags accuracy and SMS Delivery System is not reliable in busy scenario's and the user may get alerts when he doesn't requires and it's not his interesting view of point. The Google maps can only display the route between two GPS co-ordinates but doesn't provide the traffic information between the points.

Mobistras- A Traffic Alert System provided the traffic information using GPS, The application monitors the user location while travelling fetch's information about the traffic by sending the GPS co-ordinates to the Server which stores the information about the traffic in that location, allows user to get Location based notes alert, report accident spots, search places near a location using reliable data networks, It is fast, accurate and get traffic alerts according to the user path, displays visual map path along the path.

But Mobistras imposes the processing and communication overhead on mobile devices. Since the mobiles has to communicate with the centralized server periodically for traffic data on the server imposes and lot of processing overhead, since mobile devices constrained with power supply, mobistras application imposes a lot of power consumption on mobiles.

PROPOSED ARCHITECTURE

The proposed system provides the traffic information using GPS, The application monitors the user location while travelling fetch's information about the traffic by sending the GPS co-ordinates to the Cloud Server which provides messaging service to both online and offline clients, allows user to get Location based notes alert. The cloud's messaging service reduces the Burdon on the clients to look for the server for traffic data timely which reduces the processing overhead on the clients by 90% and the data communication by 50% compared to previous approaches

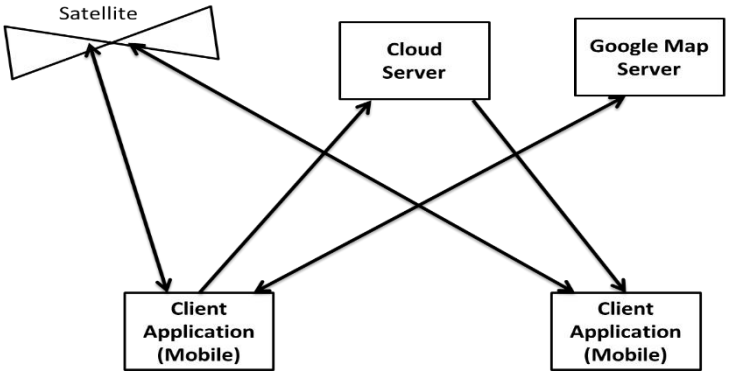

Fig. 3.1 Architecture

RESULTS AND DISCUSSION

The Protocol involves 2 parties

1. The Cloud Server
2. The Mobile Application

The propose protocol reduces the processing overhead on small devices by 90% and communication overhead by 50% compared to previous traffic alert systems. The traffic alert protocol is described below. The Cloud's push to device messaging feature allows the request to be transferred to the mobile when they become connected to the internet which allows messages to be delivered both online and offline mode. The decentralized approach reduces the overhead on client to store and retrieve the data from the server periodically.

The working of this project is described below

Assume an Example two user's wants to travel in the same route, The First user is ahead in the route with respect to the second user. Assume first user finds the traffic in the route, he intimates to all the users of the traffic alert system by sending the message to the cloud server that contains the GPS Co-Ordinates of the traffic area. Unlike previous HTTP Server's the Cloud Server's Push Cloud to device messaging allows the message to be transferred to the traffic alert if they are reachable, if the users are not available, Cloud Server sends the message to the offline client as soon as they become available. This feature of server approaching the client reduces the burden of storing data on the server and making the client application to periodically check the server's database for data availability.

After receiving the message from the server, Client application checks his current location and calculates the distance between message's location and current location, if the distance is less than 2 kms and is in the path of the user's route, Client application raises the Alert by giving voice alert to the user and displays the traffic notification on the google map, The application also provides Route directions to the user. The application reduces the processing overhead, since the application is not required to check the server database for data availability and data communication by 50% since there is no need send requests to the server periodically. The Proposed approach allows users get alert from the traffic police by getting the alerts updated from the police mobile phone.

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