Real-Time Traffic Reporting through Social Networking

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Abstract - The rapidly growing urban sprawl has given birth to the problem of traffic congestion that has turned into a major hurdle in the growth of developing countries. A possible solution to this problem is a Traffic Warning System (TWS) which can notify the users regarding the level of congestion on the road they are going to travel. This paper proposes to solve the aforementioned problem through the use of social networking. This will be made possible by the development of an Android-based smart phone application, wherein the users will be able to update the traffic status of their current location. This information will be useful to the travellers who may be going in the same direction and pass the same location later. The most striking feature of this application, which is going to contribute to its popularity, is the use of Android as the platform. Owing to the free and open source software license of Android, there has been an explosion in the number of phones running on this platform, and its popularity among the people using them. This large user-base might work to our advantage and ultimately lead the induction of TWS into a Global Positioning System (GPS).
Keywords – ARTM, TWS, DOT, ITS

I. INTRODUCTION

With the rapidly growing urban population and increased rural mobility to city areas has brought quite a few challenges in developing countries, where traffic congestion remains a major hurdle to progress. Obviously, efforts are underway to relieve the population of such inconvenience. There are joint programs being considered by the government, technology and the people. Intelligent Traffic Systems, or ITS, is a technology that has helped in solving this problem to a great extent. However, this technology will still take some time to encompass the globe, because of limitations in R&D, infrastructure and the current economic scenario. Given the massive infrastructural requirements, which are still evolving, we are left with very limited choices. What is needed is a more imaginative, holistic and integrated approach to the problem.

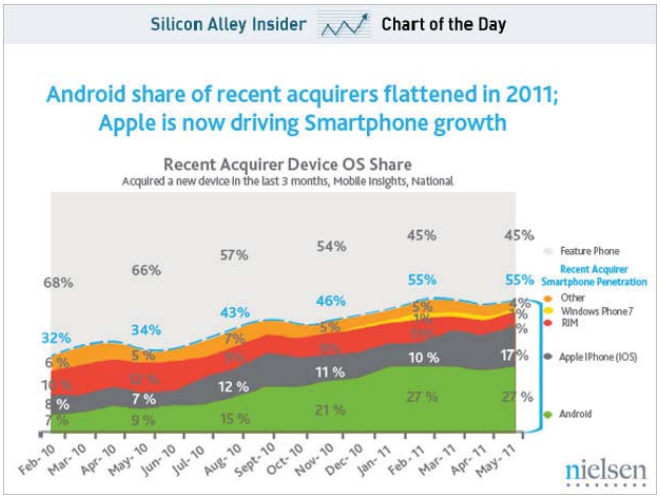

Figure 1:- Mobile OS Anyalsis Graph [13]

In the year 2009, collective intelligence expert Dirk Helbing from the Dresden University of Technology in Germany and his team investigated how ants move around their colony. They set up an ant highway with two routes of different widths from the nest to some sugar syrup. Unsurprisingly, the narrower route soon became congested. But when an ant returning along the congested route to the nest collided with another ant just starting out, the returning ant pushed the newcomer onto the other path. However, if the returning ant had enjoyed a trouble-free journey, it would not have redirected the newcomer. The researchers created a computer model of more complex ant networks with routes of different lengths. The team found that even though ants being rerouted sometimes took a longer route, they still got to the food quickly and efficiently [5].
The purpose of quoting the above study is to highlight the fact that if human drivers travelling in opposite directions could pass congestion information to each other in this way, we would all be better off and the problem would no more be a hard nut to crack. This paper, therefore, focuses on how to solve the social networking.

II. PLATFORM

Today, the smart phone is no longer the exclusive property of the particular class. It is for men and women of all ages. The top issue of this year was android, instead of Symbian, IOS and other smart phone OS.

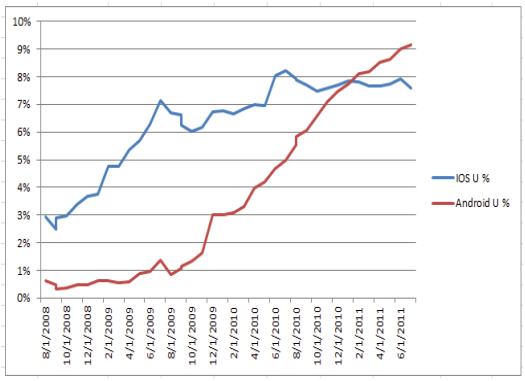

Figure 2:- Android vs Symbian

The Android platform has finally taken the lead in the smartphone market, leaving Nokia, Apple and RIM far behind. That's according to analysis from Canalys, which tracked worldwide smartphone shipments throughout 2010 and just published its report for the fourth quarter of the year. According to Canalys, 32.9 million Android devices were shipped worldwide during the fourth quarter 2010, compared to the previous leader (Nokia's Symbian platform) at 31.0 million [10].
Owing to the free and open source software license of Android, there has been an explosion in the amount of phones running this platform, and also the people using them. Since, social networking is a concept dealing with use in multitude; the above data is convincing enough for using android as the platform for developing the application.

III. WORKING

The use of the application is going to be as simple as updating ‘likes’ over a Facebook page or comment. Users would download the application over their smart phones and sign themselves up.
The application would be facilitated with a map just like Google or any conventional GPS device. A user has to fill in the starting point and the destination. The traffic density over the various routes will be displayed. This density would be as a result of the updates by users passing congruent locations over those routes. This can be illustrated with the help of the following:

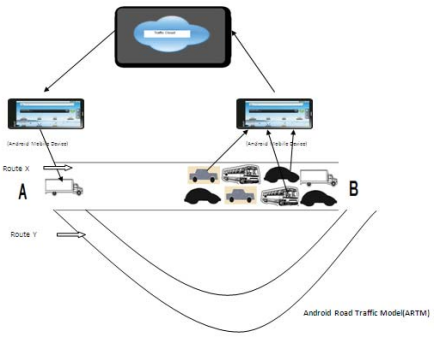

Figure 3:-Android Road Traffic Model(ARTM)

Assume that a traveler has to go from point A to point B. He signs into the app, and fills in the destination and the starting point. Now, the users at point B, update the traffic density at that point (heavy in this case) using their smart phones. This information is updated over the traffic cloud. The user at point A is displayed the traffic information over that point while taking the route X.

- The application would offer the user to update traffic information over his/her course, in the form of 3 options- *High Traffic*, *Medium Traffic* and *Low Traffic*.

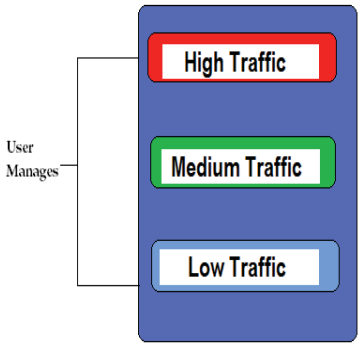

Figure 4 Trafiic Levels

Being high in this case, the user is suggested an alternate route (Y) with lighter traffic. This information is also obtained from the user updates. Following are the salient features of the app:

- This traffic information would be updated after a particular time interval. A period of 15 minutes has been thought of as an appropriate interval.
- Traffic information over a particular time of day would be stored in the cloud and the system would monitor this on monthly basis to give intelligent results for future, e.g. information like, a particular area encountering high traffic density between 10:00 am and 11:00 am for over a month would help guide users in future even if enough response is not obtained from masses on a particular day.

IV. USE OF TRAFFIC CLOUD

Cloud computing, a booming technology, could provide opportunity to continue to take advantage of new developments in IT technologies at affordable costs. Cloud computing is likely to be an attractive proposition to start-up and small to medium enterprises and traffic establishments. Hence, we propose that our concept should be backed by a cloud.

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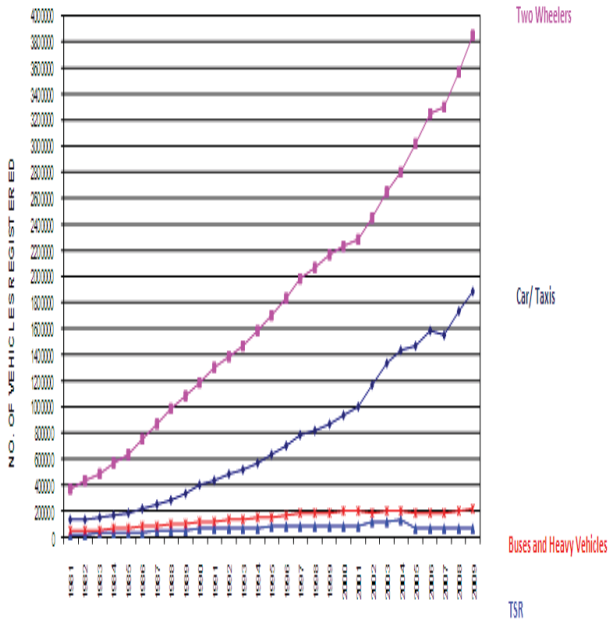

Figure 5:- As of June 30th 2009 more than 6.0 million vehicles were registered in Delhi, equivalent to the total number in Kolkata, Mumbai and Chennai. (Source: [8])

Traffic Conditions in Delhi

In Delhi alone, there are 5.5 million registered vehicles, which is the highest in the world among all cities most of which do not follow any pollution emission norm (within municipal limits), while the Delhi metropolitan region (NCR Delhi) has 11.2 million vehicles. Delhi and NCR lose nearly 42 crore (420 million) man-hours every month while commuting between home and office through public transport, due to the traffic congestion [2].
Cars and two-wheelers together drive less than 20% of its people -- and yet roads are choked. As of June 30th 2009 more than 6.0 million vehicles were registered in Delhi, equivalent to the total number in Kolkata, Mumbai and Chennai.

Figure 5 :- Road Vehicle Trafiic

V. CURRENTLY AVAILABLE TOOLS

GPS and Google Earth are the major technologies which have revolutionized route and location tracing, the world over. They have induced themselves into providing traffic information as well. Google Maps offer Real-time Traffic View but the problem is that it covers only few highway areas through DoT (Deptt. Of Transport, USA) sensors. However, here, the setup required and the infrastructural cost involved is large. Moreover, in case of

GPS, the service has to be renewed periodically and the user needs to buy and carry along, an extra device. Therefore, these services are still in their infancy.

VI. CONCLUSION

The aforementioned data clearly indicates the immediate need of a traffic warning system since the scorching pace of economic growth and the growing incomes of India's burgeoning middle class are only likely to make the situation worse. The improvements in infrastructure will always lag behind the increase in traffic. However, Information Technology can take the lead. With number of internet users in India estimated at more than 50 million (source: Internet and Mobile Association of India) and those in the metros, which can give this concept a head start, at about 70% of the above, we justify the use of social networking to meet the cause.

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