Reality Mining and Proposal for Real Time Approach towards Road Traffic Management

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Abstract: Reality mining has evolved as the most emerging topic in the field of mining these days. So, instead of mining the data, reality mining focuses on searching mobile data. The data to be mined is collected from the mobile phones or other open sources taken under consideration or surveillance .Through the proposal , the idea is to show the utility of reality mining in such fields which will not only enhance the living conditions of the human beings but will also predict some interesting facts about the humans to improve the severe problems related to health, road traffic congestion, human nature and diseases. In the perspective approach to solve the problem of the road traffic congestion, the idea is to collect the data from the mobile phones based on the criteria of the most traffic prone areas of the city. The proposal aims at taking the real time approach toward designing an application to reduce road traffic on roads using the open source system of Android. Due to the availability of Android mobile phones with majority of people, this application can be used easily by people.

Keywords: Reality Mining, Road Traffic Management, Android Application, Data Mining, Mobile

I. INTRODUCTION

Reality mining is the collection and analysis of machine-sensed environmental data pertaining to human social behavior, with the goal of identifying predictable patterns of behavior. Reality mining studies human interactions based on the usage of wireless devices such as mobile phones and GPS systems providing a more accurate picture of what people do, where they go, and with whom they communicate with rather than from more subjective sources such as a person's own account. Reality mining is one aspect of digital footprint analysis [6]. The analytical review of the concepts of the reality mining includes how real time data of cell phones can be used in order to track the pervasiveness of the person and it's surroundings. Cell phones have become an important platform for the understanding of social dynamics and influence, because of their pervasiveness, sensing capabilities, and computational power.

Many applications have emerged in recent years in mobile health, mobile banking, location based services, media democracy, and social movements [7]. Such applications used in mobile phone have not only made life easy and convenient but has also made mobile phone which reflects our lifestyle and daily activities. Reality Mining emphasize on using the data collected from our mobile phone to predict various facts which can further be used to generate interesting patterns.

The road traffic management is based on routing the traffic dynamically during the peak hours. The real time management of the road traffic is a severe problem and many times the bottleneck caused by it is a great problem to the people. The problem of traffic jam in India is a common problem due to narrow roads, encroachment on roads, frequent accidents, unplanned roads etc. The metro train is relieved Delhi people a lot but still areas of Metro under construction

II. PROPOSED WORK

An application can be implemented to suggest the best congestion free route based on the source and destination selected by the user. Global Positioning System can locate the position of the application users. The commuters in the same vicinity can be combined together so that lesser number of vehicles travels on the same path. The proposal aims at taking the real time approach toward designing an application to reduce road traffic on roads using the open source system of Android. The real time data collected from the mobile phones under surveillance can be mined for the interest to get the most congested areas of the city at specific times. The message of the congested areas can be conveyed to the end users of the system so that they can follow the alternative route and avoid the congested one. Though the system is feasible but still the percentage of feasibility and applicability will depend on the later aspects of the design and application. The idea of the proposed research is to go through the concepts of the reality mining and applying the same in order to avoid congestion of the traffic on roads.

III. PROSPECTS OF REALITY MINING

We live our lives in digital networks. We wake up in the morning, check our e-mail, make a quick phone call, commute to work, buy lunch. Many of these transactions leave digital breadcrumbs--tiny records of our daily experiences. Reality mining, which pulls together these crumbs using statistical analysis and machine learning methods, offers an increasingly comprehensive picture of our lives, both individually and collectively, with the potential of transforming our understanding of ourselves, our organizations, and our society in a fashion that was barely conceivable just a few years ago. It is for this reason that reality mining was recently identified by Technology Review as one of "10 emerging technologies that could change the world"[8].

Mobile phones have the potential to generate an un-precedence data for social research. By installing cus- tom logging applications on higher end phones, it is possible to quantify behavioral information including tone of voice, the people typically proximate on Saturday nights, and even an individual's media consumption habits. However, mobile phones are playing an increasingly important role in social re- search due not only to these growing technical functionalities, but also to their ubiquity around the world. Every one of the approximately 4 billion mobile phones in use today have   continuous access to information about information an individual's social behavior, including communication and movement data[2].

Reality mining is concerned with the collection and analysis of sensed data pertaining to human social behavior [1]. By collecting and aggregating the data streams generated from Smartphone installed sensors (e.g. physiological measures, GPS tracks, proximity, location, and activity information) and combining them with user-generated content (UGC), we are able to gain insight into the dynamics of both individual and group behavior [2]. Such dynamics can help us predict what a single user will do next, model the behavior of large organizations, detect trends, spot emerging phenomena and events, mine public opinion, etc. What is particularly interesting in this case is the fact that mobile and social network citizens can act as the living sensors of their city, its social aspects, its cultural events or even its mobility status by doing no more than their everyday activities. Following the principles of pervasive computing the reality mining concept promises a plentiful and particularly rich content allowing to grasp the actual footprint of a living society in almost real time [9].

IV.   ISSUES PERTAINING TO REALITY MINING

While the promise of reality mining is great, the idea of collecting so much personal information naturally raises many questions about privacy. It is crucial that behavior-logging technology not be forced on anyone. But legal statutes are lagging behind data collection capabilities, making it particularly important to begin discussing how the technology will and should be used. Therefore, an additional focus has to be kept in consideration that will lead to the development of a legal and ethical framework concerning the data used by reality mining techniques [8]. According to the survey done by Anmol Madan and Benjamin N. Waber to understand the diffusion behaviors, they outfitted sixty-five undergraduate residents of a university dormitory with Windows Mobile smart-phones, enhanced with software for long-term data collection. These participants represented eighty percent of the total population of the dormitory, which is known for its pro-technology orientation and tight-knit community [10].

V.   OBJECTIVE OF PRPOSED APPROACH

a.   To understand the basic concepts of reality mining and its utility in various fields.
b.   To analyze the applicability of reality mining and use the dataset collected from mobile to improve the traffic problems faced by people.
c.   To check the feasibility of an android application
d.   To avoid creating bottlenecks in the road traffic using a mobile application and which may further be

enhanced to designing new less congested road designs.

Though there are still many applications for controlling road traffic congestion but those are not up to the mark to support the end user's to a great extent. Hence the proposed research will concentrate in making the application less complicated and easy to use. There will be automatic update of the route to be followed by the user so that one can avoid traffic jam.

VI.   APPLICATIONS OF REALITTY MINING

a.   Traffic Control predictions and information
b.   Crime Control Interventions
c.   Major Disease Avoidance & Preventions
d.   Market Surveys in more Predictive Manner
e.   Human Behavior study in broader terms

VII.   APPROACH OF REALITY MINING TOWARD ROAD TRAFFIC MANAGEMENT

Traffic congestion is a severe problem in mostly the urban areas where the traffic is increasing more day by day. The infrastructure of roads in many developing and under developed country is not designed to bear such heavy traffics especially in peak hours. The result causes road traffic congestion and bottlenecks.

a.   Currently, there are some traffic alert systems in Sri Lanka to aid road users by providing real time traffic alerts. Dialog Plc provides real time traffic alerts through SATNAV system . This system provides automated and voice supported navigation with the use of GPS data[11]. But we have no such mobile application in India.
b.   Another GPS system called T-Navi partners with Mobitel to provide live updates on traffic jams or road congestion [11]. All such kind of systems works for intelligent traffic systems. None of the system is based fully on the real time user data sharing based.

Our approach is to design an Android app for managing the traffic in India which uses reality mining in such a way that the users of the app may post their information in real time. Such information can be shared with a group of people which can help them to avoid the congestion roads. It can also provide real time traffic alerts to road travelers, giving them information about the routes having traffic jam. The app will   the use Global Positioning System (GPS) based vehicle tracking, vehicle motion based traffic condition evaluation, mobile and web technologies.

VIII.   RESEARCH METHODOLOGY USED

The research methodology includes collecting the real time data and mining the data to get interesting patterns and create the data set. The interesting patterns are used to move towards using the real time data to design an android application for managing the road traffic.

The following are the steps involved in the Research Methodology:
a.   Studying Reality Mining
b.   Understanding Reality Mining & Sits Significance
c.   Study Existing Road Traffic Application
d.   Study and learn Android Application Development Using Eclipse

e. Modeling & Designing the Android Application
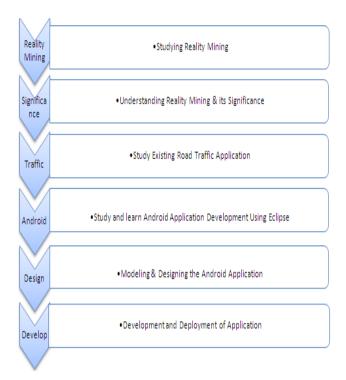f. Development and Deployment of Application

Figure. 1. Research Methodology

IX. CONCLUSION

Reality Mining is an emerging concept which is mostly being used for the predictions related to human behavior based on the data collected through the usage of mobile phone by individuals. The analytical review of Reality Mining is done in brief and its various concepts which are applicable in the implementation for designing the Android App are also taken under consideration. The approach and feasibility of a real time system for Road Traffic Management is also discussed in the paper.

X. FUTURE PERSPRCTIVE

As far as the reality mining application is concerned, it can be used in many other forecasts which are beneficial to the human beings. The implementation of the Android App of Road Traffic Management will be the future work. The real time based application will be designed and will be tested on mobile phone users. The utility of the proposed system will be checked by using the system to avoid traffic jams in an efficient manner.

XI. REFERENCES

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