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A Survey on Different Approaches for Analysing Urban Mobility

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Abstract - *The following paper reviews on a framework of current trends, data analysis, evaluation of urban mobility including the factors affecting it using social media concept. By the end of the paper we will be summarizing the advanced methods that are used for analyzing urban mobility. The main motive of this review is to suggest a suitable mechanism for urban mobility through Facebook events.*

Keywords: *Urban mobility, Social media, Fuzzy logic, Urban Traffic control, Taxi GPS Data, call detail record, Fuzzy Multitagent System.*

I. INTRODUCTION

The urban mobility plays an important role in big cities. Mobility is increasing rapidly in different areas of the world as a result of population growth and technology developments. As a result, efficient methods are required to manage the traffic such that its side-effects such as traffic congestion, accidents and injuries, waste of resources, noise/air pollution can be reduced. In order to reduce the traffic problems, various strategies have been proposed, including enhancement of road capacity through construction of new roads, improvement of public transportation systems, road pricing and congestion charging, and development of modern Intelligent Transportation Systems (ITS). In order to control the urban traffic, the different approaches have laid path in developing the advanced techniques. [1-49] In order to better enrich development and research system of urban mobility, and guide the practice of urban traffic control system development, this paper, based on previous studies, attempts to do some research on the general line of thought of urban

Mobility, with a view to arrive at the framework of urban traffic control system development, there by guiding the practice of urban traffic control system using social media. With rapid urbanization so many countries have faced serious problems like Traffic control ,congestion ,which have broadened the pressure of developing the traffic control system ,hence posed great threat on urban sustainable development for example china. Unfortunately, automatically detecting and resisting real time urban emergency events using social media is not that easy.

II. SOCIAL MEDIA CONCEPT

Trying to understand and read the dynamics of an urban settlement has traditionally been a challenging endeavor, often requiring long hours of observation and interviews. This process has been extremely simplified thanks to the raise of new methodologies of data recollection and representation, induced by the diffusion of digital technologies. Mainly interesting is the chance offered by the collection, organization and interpretation of data coming from social networks, passively provided by users. Therefore, a large number of individuals can be studied, without directly involving them in the research: whether the user expresses no restrictions in terms of privacy rights, this data can be easily obtained, gathered and visualized towards proper maps. There are clear advantages in the employ of so-obtained information, primarily because they are automatically produced, free and continuously updated.

Recently, with the high speed development of the social networks such as Twitter ,Facebook and Weibo, many researchers have published their work of using the data from social networks including special events for targeted advertising , marketing , localization of natural disasters , and predicting sentiment of investors investigated the real-time nature of Twitter and Facebook, put particular attention to event detection. The social media data usually has high value in the traffic surveillance system. The social media data can provide the real time condition of the road network. On the other hands, the huge volume of social data brings the challenge for mining the value from the social media data .The social media device is with fast data in/out. The velocity of collecting social media data is faster than that of processing and analyzing them. The high velocity of social media devices brings the big challenges for processing and analyzing social media data

III. RELATED WORKS FOR DATA ANALYSIS

Table 1: The different methods of data analysis to predict urban mobility

Data Analyzing approach	Characteritics and Method	References
Taxi GPS data	<p>GPS data collected from travel vehicles contain plenty of information, such as speed, travel direction, longitude and latitude.</p> <p>Data are a set of points sorted according to the sampling time.</p> <p>firstly, the collected points are discretized as the time discretization (T)</p> <p>secondly, a coordinate transforming is operated to change longitude/latitude coordinates to a map coordinates;</p> <p>thirdly, the original points of roads are matched onto the segments (i r).</p> <p>There are various map-matching methods, such as shortest distance, Bayesian network, and belief theory.</p> <p>finally, the average road traffic speed (RTS) is calculated and transformed to traffic state based on transforming criterions (methods).</p>	[1] ,[2]
Fuzzy Mulitagent System	<p>Deal with the large-sized traffic systems, In a multi-agent architecture for urban traffic networks, there are two options:</p> <p>first is that the control instruments (e.g., the traffic signals)</p> <p>second option is that both the controllers and the users of the system are considered as agents that communicate with each other.</p> <p>Traffic network is divided into sub-areas each composed of an intersection and the corresponding traffic signals and sensors that count the flows on the entrances and exits of the intersection.</p> <p>Each intersection is controlled by an agent that uses a fuzzy controller. The process of designing the agent-based control system for each sub-area includes collecting and clustering a huge number of data in an off-line stage.</p> <p>A fuzzy rule base is then constructed and a fuzzy control system is designed. The agents will finally exchange information with their neighboring agents in order to make the best global decision.</p> <p>Two stages of calculations- online and offline stage.</p>	[3],[4]

<p>Call Record detail</p>	<p>Call detail record (CDR) is a data record generated by telecommunication equipment like a telephone exchange or cell tower.</p> <p>Proposed a hierarchical model with multiple layers for processing the CDR data for identifying the user activities and mobility patterns.</p> <p>In each layer we have used a set of procedures to find out different information or patterns about the user by using the raw CDR data and the information obtained in the previous layers in each layer we have used a set.</p> <p>Procedures to find out different information or patterns about the user by using the raw CDR data and the information obtained in the previous layers.</p> <p>In the first layer, we have used the CDR data to find the usual stay locations of the users. For every user, in the CDR data, we have their locations with the date and times of the call activity made.</p> <p>In the next layer, when the home and workplace of the regular working group is found, we have used this information.</p> <p>To calculate the distance between their home and working place. From the information found in this layer, we can proceed with further layers for finding more information about these people</p>	<p>[5],[6]</p>
<p>Social media such as Facebook</p>	<p>Examine their publicly shared data. With the aid of these data, observing city dweller's moving and their purpose can be handled in a cost-effective way.</p> <p>The system works is combined with Fuzzy logic. On the way of solving a problem, estimation theory can be useful too, mainly adopting from Bayes theorem.</p> <p>The aim is determining the most probable and favorable case. Considering traffic management this means determining critical areas for incidents (traffic jam, accident) and selecting a route to avoid them in advance. For planning the best routes data mining is inevitable. Our sources are: current state of traffic, results of a statistical analysis from already available data.</p> <p>consider the following:</p> <ul style="list-style-type: none"> - Traffic Message Channel (TMC) - CDR data - GPS data <p>The busiest district has been determined by the highest numbers of users who confirmed the event.</p> <p>Suppose t_e is the time of the event and t_c is the announcement of it. Then $d = t_e - t_c$. Users have three options to select from regarding to their presence on the event:</p> <ul style="list-style-type: none"> - attend - do not attend - might attend <p>Examines the border crossroads of central districts. The number of routes toward a certain district Determines a possible ways to reach the district from other districts. The more possible route is available the quicker to get there or leave the district. Neighbor districts have numerous mutual routes, so we divided the affected.</p>	<p>[7],[8],[9],[10],[11],[12],[13]</p>

	The moving of the mass is visualized by a petri net.	
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CONCLUSION

This study helps upcoming scientists and researchers for opting a suitable classification procedure in their specific study. Using Taxi GPS data, fuzzy multi-agent control system, CDR, Facebook events in this study, we determined the mass flow potential routes with good approach, using precalculation, the number of congestions and possibly accidents can be reduced. The transport of the city can be optimized with publicly accessible data from Social media. If we are taking the weather data into consideration as well these routes can be weighted even further, however we did not take this into account at now. Overall, with proper evaluation and data processing the events announced to the general. Public gives usable data in the view of transport planning.

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