Visual Exploration of Transportation System
In Mega City

Mr. M.VETRISELVAN, M.E.,1 Guide Mr. R.VIJAYABHARATHI, M.E.,2
( PG Scholar1, Assistant Professor2)
Department of Computer Science And Engineering
MRK Institute of Technology, Kattumannarkoil

Abstract: Transportation systems in mega-cities are often affected by various kinds of events such as natural disasters, accidents, and public gatherings. Highly dense and complicated networks in the transportation systems propagate confusion in the network because they offer various possible transfer routes to passengers. This paper proposes visual integration of traffic analysis and social media analysis using two forms of big data: smart card data on the Tokyo Metro and social media data on Twitter. In our system provides multiple coordinated views to visually, intuitively, and simultaneously explore changes in passengers’ behavior and abnormal situations extracted from smart card data and situational.

Index term: Transportation, traffic analysis, social media.

I. INTRODUCTION

To increase the resilience of the systems, lessons must be learned from past events to understand how the systems are affected by changes in passengers’ behaviors. Integration of smart card data and social media data enables us to replay past events and to discover abnormal situations of transportation systems, propagations of abnormalities over transportation networks, and passengers’ complaints or dissatisfaction about which even train system operators and station staff do not know. I demonstrate the usefulness of our novel visualization system through a series of case studies extracted from real data related to natural disasters, accidents, and public gatherings. These case studies show how our visualization system enables users such as domain experts in the metro operating company to explore hidden knowledge based on data-driven analysis and visualization that were previously unattainable.

I demonstrate the usefulness of our novel visualization system through a series of case studies extracted from real data
related to natural disasters, accidents, and public gatherings. These case studies show how our visualization system enables users such as domain experts in the metro operating company to explore hidden knowledge based on data-driven analysis and visualization that were previously unattainable. I have made the following contributions.

1. I will introduce one of the first visual analysis systems that integrate smart card data including origin-destination data and textual social media data.

2. I will provide three coordinated views, HeatMap, AnimatedRibbon and TweetBubble view, to help analysts to understand changes in passengers’ behavior in the complex transportation systems.

3. AnimatedRibbon view provides a novel visualization technique to dynamically represent changes in multiple attributes values of both nodes and edges in a network while embedding them in a spatial context.

4. The case studies using real data and domain experts’ feedbacks strongly highlight the effectiveness of our system and three visualization components.

II. RELATED WORK

B. Pan, Y. Zheng, D. Wilkie, and C. Shahabi, “Crowd sensing of traffic anomalies based on human mobility and social media”, The advances in mobile computing and social networking services enable people to probe the dynamics of a city. In this paper, I address the problem of detecting and describing traffic anomalies using crowd sensing with two forms of data, human mobility and social media. Traffic anomalies are caused by accidents, control, protests, sport events, celebrations, disasters and other events. Unlike existing traffic-anomaly-detection methods, I am identify anomalies according to drivers’ routing behavior on an urban road network. Here, a detected anomaly is represented by a sub-graph of a road network where drivers' routing behaviors significantly differ from their original patterns. Then try to describe the detected anomaly by mining representative terms from the social media that people posted when the anomaly happened. The system for detecting such traffic anomalies can benefit both drivers and transportation authorities, e.g., by notifying drivers approaching an anomaly and suggesting alternative routes, as well as supporting traffic jam diagnosis and dispersal. I evaluate our system with a GPS trajectory
also reported are smart card commercialization experiments conducted all over the world. Finally, the most promising research avenues for smart card data in this field are presented; for example, comparison of planned and implemented schedules, systematic schedule adjustments, and the survival models applied to ridership.

W. Zeng, C. Fu, S. M. Arisona, A. Erath, and H. Qu, “Visualizing mobility of public transportation system”, Public transportation systems (PTSs) play an important role in modern cities, providing shared/massive transportation services that are essential for the general public. However, due to their increasing complexity, designing effective methods to visualize and explore PTS is highly challenging. Most existing techniques employ network visualization methods and focus on showing the network topology across stops while ignoring various mobility-related factors such as riding time, transfer time, waiting time, and round-the-clock patterns. This work aims to visualize and explore passenger mobility in a PTS with a family of analytical tasks based on inputs from transportation researchers. After exploring different design alternatives, I come up with an integrated solution with three.

M.-P. Pelletier, M. Trépanier, and C. Morency, “Smart card data use in public transit: A literature review”. Smart card automated fare collection systems are being used more and more by public transit agencies. While their main purpose is to collect revenue, they also produce large quantities of very detailed data on onboard transactions. These data can be very useful to transit planners, from the day-to-day operation of the transit system to the strategic long-term planning of the network. This review covers several aspects of smart card data use in the public transit context. First, the technologies are presented: the hardware and information systems required to operate these tools; and privacy concerns and legal issues related to the dissemination of smart card data, data storage, and encryption are addressed. Then, the various uses of the data at three levels of management are described: strategic (long-term planning), tactical (service adjustments and network development), and operational (ridership statistics and performance indicators).
visualization modules: isochrone map view for geographical information, isotime flow map view for effective temporal information comparison and manipulation, and OD-pair journey view for detailed visual analysis of mobility factors along routes between specific origin-destination pairs. The isotime flow map linearizes a flow map into a parallel isoline representation, maximizing the visualization of mobility information along the horizontal time axis while presenting clear and smooth pathways from origin to destinations. Moreover, I devise several interactive visual query methods for users to easily explore the dynamics of PTS mobility over space and time. Lastly, I also construct a PTS mobility model from millions of real passenger trajectories, and evaluate our visualization techniques with assorted case studies with the transportation researchers.

A. Slingsby, J. Wood, and J. Dykes, “Treemap cartography for showing spatial and temporal traffic patterns”, Depicting spatial and temporal aspects of traffic flows of different types is challenging. I use a treemap based technique that is able to show multiple aspects of large quantities of spatial and temporal traffic data simultaneously. Treemaps present multivariate data as a hierarchy of rectangles that are nested within each other. Each level of the hierarchy is used to carry information about one variable, with rectangle size, arrangement and colour being potential information-carrying ‘channels’ for reflecting properties of the data.

Z. Wang, T. Ye, M. Lu, X. Yuan, H. Qu, J. Yuan, and Q. Wu, “Visual exploration of sparse traffic trajectory data”, in this paper, I present a visual analysis system to explore sparse traffic trajectory data recorded by transportation cells. Such data contains the movements of nearly all moving vehicles on the major roads of a city. Therefore it is very suitable for macro-traffic analysis. However, the vehicle movements are recorded only when they pass through the cells. The exact tracks between two consecutive cells are unknown. To deal with such uncertainties, I am first design a local animation, showing the vehicle movements only in the vicinity of cells. Besides, I am ignore the micro-behaviors of individual vehicles, and focus on the macro-traffic patterns. I apply existing trajectory aggregation techniques to the dataset, studying cell status pattern and inter-cell flow pattern. Beyond that, I propose to study the correlation between these two patterns with dynamic graph
visualization techniques. It allows us to check how traffic congestion on one cell is correlated with traffic flows on neighbouring links, and with route selection in its neighbourhood. Case studies show the effectiveness of our system.

III. SYSTEM ANALYSIS

Systems analysis is a problem solving technique that decomposes a system into its component pieces for the purpose of the studying how well those component parts work and interact to accomplish their purpose.

A. Existing Work

I demonstrate the usefulness of our novel visualization system through a series of case studies extracted from real data related to natural disasters, accidents. I will introduce one of the first visual analysis systems that integrate smart card data including origin-destination data and textual social media data and public gatherings.

B. Limitations

1. Event detection from social networks analysis is a more challenging problem than event detection from traditional media like blogs, emails, etc., where texts are well formatted.

2. It contain a huge amount of not useful or meaningless information

C. Proposed Work

Heat Map view provides a temporal overview of unusual phenomena in passenger Flows. Animated Ribbon view visualizes temporal changes in passenger flows with spatial contexts and propagation of unusual phenomena over the whole metro network using animation, and Tweet Bubble view provides an overview of trends of keywords explaining the situation during the unusual phenomena.
• HeatMap view provides a temporal overview of unusual phenomena in passenger flows,
• AnimatedRibbon view visualizes temporal changes in passenger flows with spatial contexts and propagation of unusual phenomena over the whole metro network using animation,
• TweetBubble view provides an overview of trends of keywords explaining the situation during the unusual phenomena.

D. Advantages

• Multiple coordinated views to visually, intuitively, and simultaneously explore changes in passengers’ behavior and abnormal situations. Extracted from smart card data.
• Real data and domain experts’ feedbacks strongly highlight the effectiveness of our system.

IV. MODULES

A. Tweet User

In this module, user should register to subscribe in tweet analysis scheme. After registration, user will be able to login into their home page. After subscribing in to tweet analysis, traffic information will be received from administrator.

B. Administrator

In this module, administrator will maintain user details and traffic related information. He/she will be analyzed and add information about traffic details.

C. Detecting Target Event

In this module, to detect a target event using Twitter. First, I crawl tweets including keywords related to a target event. From them, I extract tweets that certainly refer to a target event using devices that have been trained with machine learning. Second, I detect a target event and estimate the location from those tweets by treating Twitter users as “social sensors.”(i.e. proxy sensor).

V. SYSTEM ARCHITECTURE

System architecture is a conceptual model that defines the structure, behavior, and more views of a system. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures and behaviors of the system.
VI. EXPLORATION ENVIRONMENT FOR PASSENGER FLOWS

I am describing how to design visualization views for supporting exploration requirements described. I provide three types of visualization views: HeatMap view and AnimatedRibbon view to explore unusual phenomena of passenger flows and spatio-temporal propagation of them extracted by the methods mentioned in Section, and TweetBubble view to explore situational explanations extracted by the method described in Section. These views are coordinated with each other.

A. Heatmap View

For easily discovering unusual phenomena in passenger flows on a particular line, over multiple lines over one day and exploring their temporal characteristics from the wide range of temporal overviews, HeatMap view provides functions for overviewing deviation from average passenger flows in each time bin on each section for every line over one day. It is used for spotting interesting phenomena by using patterns of colors. Although it does not provide spatial context, after finding out interesting temporal spots showing crowdedness or emptiness, I can explore spatial changes in them by combining HeatMap views with AnimatedRibbon views. Moreover, I can observe their causes and effects by combining HeatMap views with TweetBubble views.

VII. CONCLUSION

In this paper proposed a novel visual fusion environment to explore changes in flows of passengers on the Tokyo Metro and their causes and effects by using more than four years’ worth of data extracted from the smart card system and Twitter. Our novel approach enables us to extract and visualize passenger flows on a complicated metro network from large scale data from the smart card system and unusual phenomena and their propagation on a spatio-temporal space. Moreover I integrated two forms of big-data (data from the smart card system and Twitter) into a visual exploration system to explore...
causes and/or effects of unusual phenomena. The case studies and reviews by train operating system experts showed the possibilities and usefulness of our system to observe real situations during the events.

REFERENCES