DOI: http://dx.doi.org/10.26483/ijarcs.v9i1.5157

ISSN No. 0976-5697

Volume 9, No. 1, January-February 2018

International Journal of Advanced Research in Computer Science

REVIEW ARTICLE

Available Online at www.ijarcs.info

SURVEY ON CHANGES IN PASSENGER FLOWS

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Abstract: As crowd is in the city and various regions is unpredicted in that various events such as natural disasters, accidents, and public gatherings are occurred. In 2017 near Manikpur railway station in Uttar Pradesh killing three and injuring at least nine passenger because of the thirteen coaches of Vasco Da Gama-Patna Express derailed. A huge and complicated networks in the railway system increase uncertainty in the network because they provides various transfer routes to passenger. Visualization is one of the most important techniques for predicting such situations. In this paper, we proposed a new approach for visual integration of traffic analysis and social media analysis using two forms of big data: railway station data and social media data like SMS service. This paper present different views to explore changes in passenger flow and abnormal situations extract from railway station data as well as passengers feedback taken through social media. It exhibits the possibilities and usefulness of our visualization environment using a dataset studies and experts feedback about various kinds of events.

Keywords: Visual analysis, Information visualization, Data mining, big data, Railway station data, Social media data.

I. INTRODUCTION

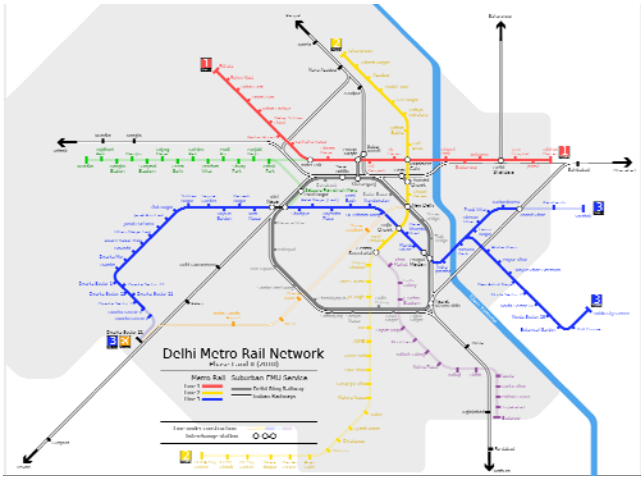
Railways as well as metros in mega-cities are always required to increase their flexibility to extreme situations caused by various events. For example, Tokyo is the mega-city in Japan, will host the 2020 Summer Olympics and Paralympics which causes large amount movements of peoples over the large area around Tokyo[1]. Mostly inland earthquakes are mostly occurred in the Tokyo. Using railway station data and social media data enables passengers to replay previous events and to find out abnormal situations of railway systems.

This paper related to railway that provides facilities to route, information visualization, visual analysis and other information about passenger. Some analysis systems use both movable data and social media data to understand traffic problems. They can't support both finding unusual situations from temporal space and exploring temporal propagation of them. For effective exploration the system needs to satisfy few demands:

- Discover unnecessary environment from difference between regular and after event passenger behavior.
- Understanding changes in passenger flows and inheritation of unnecessary environment in each time period on railway network.
- A system required for exploring information about passengers feedback and activities that can not be derive from database.

To address the above demands we built analysis system by propagating following visualization elements:

- HeatMap view provides daily or temporary passenger flow,
- Animated ribbon view provides passenger flow when any type of events will be occur,
- Line chart view provides an passenger flow at a particular time. In brief we have made following few contributions
- We inset one of the visual analysis system that propagate railway station data inclosing source-destination data and social media data.
- We provide three views Heatmap, AnimatedRibbon and Line chart view to analyze changes in passenger behavior in critical transportation system.



II. LITERATURE SURVAY

Masahiko Itoh, Member, IEEE, Daisaku Yokoyama, Member, IEEE, Masashi Toyoda, Member, IEEE, Yoshimitsu Tomita, Satoshi Kawamura, and Masaru Kitsuregawa, Fellow, IEEE invented Visual exploration of changes in passenger flows and tweets on mega-city metro network. Transportation systems in mega-cities are affected by various kinds of events such as natural, disasters, accidents, and public gatherings. This system provides multiple views to visually explore changes in passengers' behavior [1].

Robert Krueger_ Dennis Thom_ Thomas Ertl Visual analysis of movement behavior using web data for context enrichment. With increasing use of GPS devices huge location-based information is accessible. Thus not only more movements of people are tracked but also point of interest information becomes available in increasing geo-spatial density. It uses this approach to enrich trajectory data with semantic point of interest information and show how additional insights can be gained for analysis of movement behavior [2].

I.Ceapa, C. Smith, and L. Capra invented Avoiding the crowds: Understanding tube station congestion patterns from trip data. This paper describes how historical automated fare collection systems data can be combined in order to reveal station crowding patterns. This paper analyze demonstrates that crowdedness is a highly regular phenomenon during working week [3].

L. Sun, D. - H. Lee, A. Erath, and X. Huang invented Using smart card data to extract passenger's spatio-temporal density and train's trajectory of MRT system. Rapid tranit systems are the most important public transportation service modes in many large cities around the world. Hence, its service reliability is of high importance for government and transit agencies. Despite taking all the necessary precautions, disruptions cannot be entirely prevented but what transit agencies can do is to prepare to respond to failure in a timely and effective manner. To this end, information about daily travel demand patterns are crucial to develop efficient failure response strategies. To the extent of urban computing, smart card data offers us the opportunity to investigate and understand the demand pattern of passengers and service level from transit operators [4].

C. Tominski, P. Schulze- Wollgast, and H. Schumann invent 3D information visualization for time dependent data on maps, It describe approach for visualize temporal data on maps. This approach is based on 3D information visualization and hiding. It will show multiple time dependent attributes on maps [5].

III. PROPOSED SYSTEM

Our system proposes a visual analysis system that supports evaluation of problems that occurred in metro by using two types of big data: collect station logs from dataset system of railway station data and by using social media data.
Visualization accessed by the analysed results reflects real situations such as disasters, accidents and public gatherings.
Our system consists of three visualized views for building analysis system:

Heat Map View: This view provides a temporal flow of passengers before any situations or events occurred. For easily discovering unusual phenomena in passenger flows on a particular line. It consists of station data for X-axis as a origin and Y-axis as a destination. It is used for spotting interesting phenomena by using patterns of colors. The red spot shows high crowd and green shows low crowd.

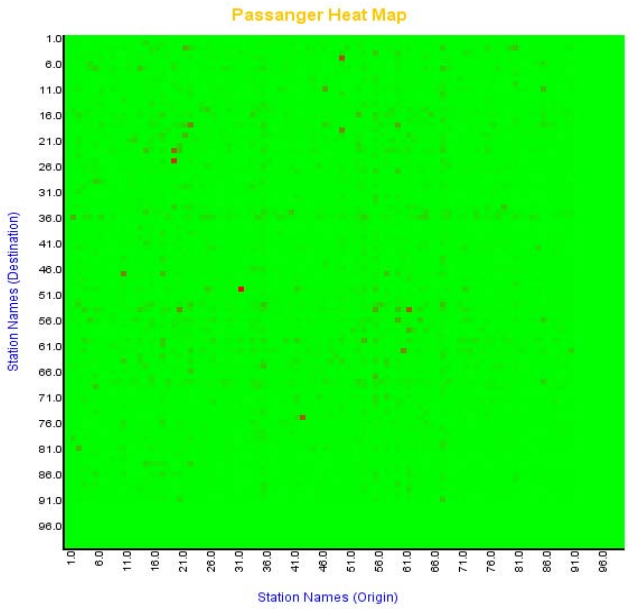


Fig. HeatMap View

Animated Ribbon View: This view provides a flow of passengers when any events are happened. The Animated Ribbon View shows the unconscious changes in the passenger flow which occur in the railway networks.

Line Chart View: This view provides flow passengers at a particular time. The line chart is a type of chart which displays information. The points are connected to each other through straight line.

A) Algorithm:

1) K-Mean:

1 Initialize Cluster Centroid μ1,μ2,μ3,⋯μkεRn random

2 Repeat until Convergence

{

For Every i, Set

c(i) := argMinj || x(i) −μj ||2

For each j,

Set μj := Σm i=11{ci=j}x(i) / Σm i=11{ci=j}

}

IV. SYSTEM ARCHITECTURE

This is system architecture where actual processing has been done. Here it consist visualized views: heat map, animated ribbon, and line chart for working on passenger flow on each railway station. All information is fetch from the railway station dataset.

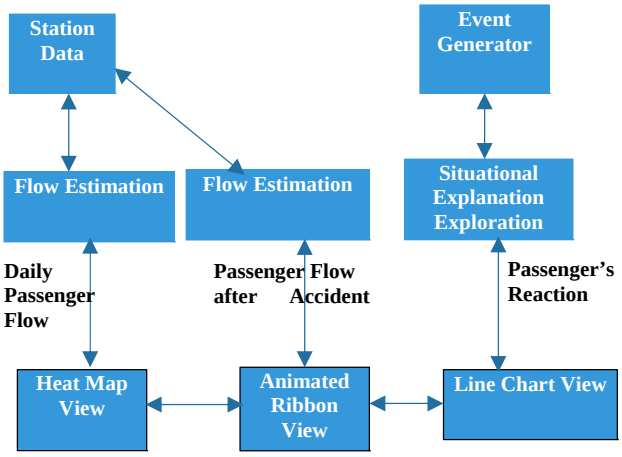


Fig. System architecture

V. TECHNOLOGIES

Java Platform: Java is a set of computer software's and developed by Sun Microsystem and now acquired by Oracle. It provides system for developing application software that used in cross platform computer system.

RStudio: It is an open-source IDE for R, it is a programming language used for graphics. This studio is available in two versions or editions: RStudio Desktop where a program runs as a desktop application and RStudio Server allows accessing RStudio using web browser and it is running on a remote server.

VI. SCOPE OF WORK

Main goal of this system is to develop a new approach for visualizing the flow of passenger. This project appears to the passenger and other travelling transport source and analyzes the passenger flow and also to avoid future crises that can be occurred naturally or man-made which can be accessed through social media.

VII. CONCLUSION

This system will offers reliability, time savings and easy control to the all passengers. This project will provide high security and a system that reduces the work and resources required in traditional process. Also proposed system will provides the new way of computing and displaying operations with responsive and attractive user interface.

This project will proposed a visual environment to explore changes in passengers flow on the railway station and their causes and consequences by using static data extracted from the dataset. This approach enables us to extract and visualize

(1) Passenger flows on a complicated metro network from large amount of data from the Dataset and

(2) Unusual environment and their circulation on a spatio-temporal space.

VIII. ACKNOWLEDGEMENT

We take this opportunity to express our gratitude to "Dnyanshree Institute of Engineering And Technology Sajjangad, Satara." For sanctioning us the project **"Visual Exploration of Passenger flows."**

We wish to express our gratitude to our Principal Dr. A. D. Jadhav Sir for encouragements.

We are extremely grateful to Prof. Miss.Gaikwad S.S. and Mr.Nilakhe O.C., Head of Department of Computer Science & Engineering of our college for encouraging & inspiring guidance

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