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A Survey on Pickpocket Identification from Transportation

Nafsila M[1*], Anish Abraham[2]

[1]M.Tech Scholar, Department of Computer Science, RIT Kottayam, Kerala, India
[2]Assistant Professor, Department of Computer Science, RIT Kottayam, Kerala, India

A B S T R A C T

The public transportation passengers have main aim for pickpockets. In several cities, there are several chance to thefts occur in public transportation systems, because passengers tend to pay less attention to their things, when they are in a very rush or in a crowded environment. It is challenging to detect theft behaviors committed by cunning thieves who know the way to run away without being disclosed. The automated fare collection (AFC) systems is used for collecting the transactional records, which have become valuable for understanding both personal traveling behaviors and collective mobility patterns in urban areas. Most of existing woks focused on identifying regular, collective mobility pattern like commute flows and transit networks. Our study creatively leveraged such data for identifying pickpocket suspect. It creates a suspect detection and surveillance system which identify the pickpocket suspect based on the transit system. To distinguish the pickpockets from the regular passengers a two step framework is used. The first step of the framework is to filter the regular passengers using an anomaly detection algorithm and the second step is the suspect detection. The two-step approach exploits the strengths of unsupervised outlier detection and supervised classification models to identify thieves.

Keywords:Classification, Public Safety, Anomaly Detection, Mobility Patterns

1. Introduction

The popularity of Smart Card Automated Fare Collection (SCAFC) Systems increases in urban transit take advantage of new technologies. It improve the customer's satisfaction (unique card, various tickets, more flexibility in the possible uses, secured uses, and so on), and to make easy revenue collection for public transport authorities. which generate large amount of data every day about the utilization of the public transport system. In each transaction, other than revenue collection, it also provide information about how many people use the transport system, when, where, on what route, and even more. Mostly in a transit network the data describe for each boarding, the exact time, some precision on location and some extra information about the card itself (type of card, type of ticket (fare), expire of card, geographic area of validity, and so on).

The passengers in a public transportation system have been the tendency for pickpockets. It happens regularly in public transportation systems for the reason that when they are in a rush or in a crowded environment passengers tend to give less attention to their things. Many cities in the world are reported to suffer from the pickpocket problem, which has led to public safety concerns. Provide a smart observation and tracking tool for the security personnel of the transportation systems is dangerous task. The technologies like data processing and information technology have capabilities; through transactional records collected by automated fare collection (AFC) systems have become valuable for understandingpassengers' mobility patterns and the urban dynamics. However, most of the studies focused on identifying regular, collective mobility patterns, such as commute flows and transit networks. It is probable to identify thieves using AFC records because behavioral differences are coined in the mobility footprints, which can help to separate suspects from regular passengers. Traveling for an extended length of time, making transfers unnecessary , and/or wandering on certain routes while making random stops Such characteristics make suspects detect. Most of the passengers move from one place to another place using shortest time or shortest distance, or a minimal number of transfers.so the initial task is to recognize useful useful attributes to differentiate odd one from normal passengers. The identified feature should not only helps understand the behaviors of pickpockets, but also helps to detect suspect. The other way, using normal outlier detection methods tends to outcomes a sizable amount of false positives. Especially, not every trip made by a regular passenger looks normal. Regular

commuters may irregularly make trips to go to their friends or places of interest, and a few of such trips may look suspicious by what proportion they deviate from regular behaviors. From a large number of Automated Fare Collection records only a tiny fraction of which are pickpockets. Identifying a small group of people in a large-scale dataset is big task.

Finally in this approach the initial work is to construct a feature representation for profiling regular passengers. In addition, a framework is elaborate to divide regular movement patterns from irregular behaviors, and then distinguish thieves from regular passengers. We first partition the town area into regions with functional categories. Then, the passengers mobility behaviors are separated from transit records and incident reports. Furthermore, we construct a private mobility database to store the profile of each passenger. then , develop a framework by normal passenger filtering and suspect detection. Finally, the user feedback information, like newly confirmed thieves, are entered for training.

2. Literature Review

In this Paper [1], the author describes optimal planning for transportation system system is one among the keys serving to bring a sustainable implement and an honest quality of life in urban areas. Compared to private transit, public transit helps road space more effectively and gives fewer accidents and emissions. So, in many cities people have a preference to take private transportation further than public transportation owing to the problem of public transportation services. In this approach, we focus on the popularity and optimization of defective region pairs with difficult bus routing to develop utilization efficiency of public transportation systems, consistent with people's real insist for public transportation system. To this final, we first produce an incorporated mobility pattern recognize between the situation traces of taxicabs and therefore the mobility records in bus transactions. Derived from the mobility patterns, we introduces a contained transportation mode option model, with which we will dynamically predict the bus travel demand for several bus routing by taking into account both bus and taxi travel strain. This technique used for bus routing reorganization which achieve to change as many people from private transportation to public transportation as probably given budget constraints on the bus route changes. We influence the model to recognize region pairs with defective bus routes, which are efficiently, optimized using this method. In studies the techniques are performed in Beijing on real-world information together which contains 19 million taxi trips and 10 million bus trips.

In this Paper [2], the author describes substantial data gathered by automated fare collection (AFC) methods give chances for studying both personal traveling activities and united mobility patterns in the urban area. Previous studies on the Automated Fare Collection data have primarily focused on recognizing passengers' movement patterns. In this approach, therefore, they innovatively leveraged such data for recognizing thieves in the public transportation systems. Certainly, stopping thepickpockets in the public transportation systems has been difficult for increasing passenger happiness and public safety. Therefore, it is demanding to tell thief from routine passengers in practice. To this final, they implement a suspect detection and observation system, which can recognize pickpocket suspects, based on their every day transit records. Particularly, they initially extracted a number of attributes from each passenger's every day activities in the transportation systems. Then, they took two-step methods that exploit the value of unsupervised outlier recognition and supervised categorization models to predict thieves, who exhibit irregular traveling activities. Investigational outcome demonstrated the efficiency of our method. They also implement a prototype method with a user-friendly interface for the security personnel for surveillance.

In this Paper [3], the author describes we instantly detect interesting phenomena, entitled black holes and volcano's, from an STG. Specifically, a black hole is a sub graph (of an STG) that has the overall inflow greater than the overall outflow by a threshold, while a volcano is a sub graph with the overall outflow greater than the overall inflow by a threshold (detecting volcano's from an STG is proved to be equivalent to the detection of black holes). The online detection of black holes/volcano's can timely reflect anomalous events, such as disasters, catastrophic accidents, and therefore help keep public safety. The methods of black holes/volcano and the interaction between them expose human mobility techniques in a city, thus help to create a better city preparation or develop a system's operation in good organization. Derived from a well-designed STG catalog, we suggest a two-step black hole prediction algorithm: The initial step finds a group of applicant grid cells to start from; the other step explores an initial edge up an applicant cell to a region and prunes other applicant cells after a region is predicted. Then, we adapt this prediction algorithm to a nonstop black hole detection situation. We estimate our method based on Beijing taxicab information and the bike trip information in New York, analyzing urban anomalies and human mobility patterns.

In this Paper [4], the author describes the function of a metro station area is significant for city planners to think about when establishing a context-aware Transit-Oriented Development policy round the station area. It is difficult to infer through the functions of metro station areas using the static land use allocation and other traditional review datasets. The described approach gather the features involving round the metro station catchment areas consistent with the patterns of staying behaviors derived from open-end credit data. We initially define the staying behaviors by the spatial and sequential constraints of the two consecutive alighting and boarding records from the individual travel profile. After that we cluster and label the whole staying behaviors by considering the activities of duration, frequency, and start time. By predicting the percentage of special types of aggregated activities happening around each metro station, we cluster and explore the functions of the metro station area. Enhancing as a case study, we analyze the conclusion of metro systems and discuss the similarities and differences between the functions and the land use distribution around the station area. The conclusion show that even through there exist some agreements, there's also a niche between the people activities and therefore the land uses round the station area. These results possibly will give us deeper imminent into how people act round the stations by metro systems, which can ultimately benefit the urban planning and policy development.

In this Paper [5], the author illustrates recent years have witnessed the success of binary hashing techniques in approximate nearest neighbor search. Several hash tables are normally built using hashing to wrap more preferred outcome in the hit buckets of each table. So, some work studies the combined

methods to constructing several informative hash tables using any type of hashing techniques. Recently, for many table searches, it also lacks of a common query-adaptive and fine-grained position method that will be enhance the binary quantization loss suffered in the standard hashing methods. To overcomes the above risk, we initially regard the table construction as a selection risk in excess of a set of applicant hash functions in this approach. we describes a well organized solution which is used to finding the most instructive and independent hash functions for both tables with the graph demonstration of the function set by consecutively applies normalized dominant set . For some extend to decrease the redundancy in the middle of tables, we identifty the reciprocal hash tables in a boosting manner, where the hash function graph is well organized with high weights maintained on the misclassified national pairs of given hash tables. we put forward a query-adaptive bitwise weighting method to process the ranking of the retrieved buckets within a convinced Hamming radius from the query, to allow fine-grained bucket ranking in each hash table, utilizing the discriminative power of its hash functions and their supplement for nearest neighbor search.

In this Paper [6], the author proposes to the promising analysis of public transportation fare card data for a good accepting of passengers' mobility patterns and path choices. A new heuristic is awaited to approximation the stop-level source and destinations by finding the traveler behaviors in the observed transactions in a fare card dataset. The major concentration pointed in this strategy is evaluating the actual passenger trajectories for multi-leg journeys. The main challenge is the opinion of origins and destinations by distinguishing the transfer interchanges from the activity locations ,If the fare card dataset concludes together boarding and alighting sequence of each transaction . Construct on usually used criteria for recognizing transfers, this methodology proposes a new method to raise the accuracy of short behavior detection to estimate the passengers' true origins and destinations. The set of criteria in this methodology is based on the planned concept of "off-optimality" for a more precise recognition of short/hidden behavior within the labeled shares. The measure of off-optimality assimilates different variables of the transit service between the given journey ends (including alternative paths and routes, service headways, walk distances/times, transfer points, etc.) and reflects persons into a minimal quantity to construct the accuracy of opinion. moreover, the time gap between two transactions, the overall travel period, and the circuit of the path trajectories are additional variables that are used in distinguishing the true transfers from behaviors.

In this Paper [7], the author proposes Understanding urban capacities and their associations with human exercises has extraordinary ramifications for savvy and reasonable urban advancement. In this examination, we present a novel way to deal with revealing urban capacities by accumulating human exercises construed from cell phone situating and internet based life information. The outcomes demonstrate that the proposed methodology can catch citywide elements of both human exercises and urban capacities. It likewise recommends that albeit numerous urban zones are formally marked with a solitary land-use type, they'll give various capacities after a while contingent upon the kinds and scope of human exercises. The investigation shows that consolidating various information on human exercises could yield an improved comprehension of urban capacities, which would profit momentary urban basic leadership and long haul urban approach making.

In this Paper [8], the author portrays Smart card information organized via robotized passage accumulation (AFC) frameworks are significant assets for considering urban portability. In this paper, we propose two ways to deal with bunch savvy card information, which can be utilized to remove versatility designs in an open transportation framework.

In this Paper [9], the maker delineates Commuting mirrors the end of the day travel conduct of people and altogether impacts urban traffic blockage and outflow. Ongoing advances in information accessibility give new chances to grasp driving examples productively and successfully. This investigation builds up a progression of information mining strategies to recognize the spatiotemporal driving examples of Beijing open travel riders. exploiting one-month travel savvy card information, we measure spatiotemporal consistency of individual suburbanites, including arrangement , working environment, and takeoff time.

In this Paper [10], the author describes the wide utilization of unavoidable registering innovation has took into account the development of huge information on spatial conduct and consequently gives a chance to investigate dynamic urban space. In this paper, an eigende composition technique is proposed to catch the traditional samples of travelers' variety after a while among all metro stations even as to research the spatial heterogeneity of the dynamic space around the metro stations dependent on the basic examples with low dimensional structures.

In this Paper [11], the author describes although blended use is a developing methodology that has been generally acknowledged in urban getting ready for advancing neighborhood energy, there is no accord on the best way to quantitatively quantify the blend and the impacts of blended use on neighborhood liveliness. Shannon entropy, the most ordinarily utilized decent variety estimation in evaluating blended use, has been seen as lacking in estimating the multifaceted, multidimensional attributes of blended use.

In this Paper [12], the author delineates Investigating human versatility examples can support analysts and offices comprehend the main thrusts of human development, with potential advantages for urban arranging and traffic the board. In this way, thisexamination researches urban human intermingling and dissimilarity designs and their associations with the urban utilitarian condition, which is useful for urban approach advancement, urban arranging and traffic the executives.

In this Paper [13], the author proposes a Transit situated advancement (TOD), which is commonly comprehended as the arrangement of higher-thickness, blended use, enhancement rich, and walk able improvement around fast travel stations, has been advocated as one of the best answers for boosting the potential rate of profitability for existing and future quick travel framework ventures. However, obviously not all usage of TOD is that the equivalent in

each station catchment region over a travel organizes. This heterogeneity in station territory settings presents huge unpredictability for organizers and policymakers keen on understanding existing TOD conditions, a region's TOD potential, and the applicable strategy and arranging intercessions required to accomplish arranging objectives. It likewise makes inconveniences for scientists keen on partner station settings with different TOD results.

In this Paper [14], the maker portrays whereas swiping frequency changes are associated with travelers' activity intensity and activity type, it is possible to present the characteristics of the metro station all the way through patterns of aggregated staying behaviors that occurred approximately metro stations. For example, if a person checks out of the metro station at 8 a.m. and evaluates in at the same station at 6 p.m.,his staying behavior around the station has a high option to be identified as work. Following the above reason, we split the transit records consistent with the staying activity that happened around the station area and inspect the aggregated activity patterns.As a replacement of centering on the trip episodes as in the existing surveys, in this paper we spotlight the staying duration episodes to unveil the activity patterns hidden behind the card swiping behavior . The concept of staying behavior is not new, although it is denoted by different names. The maker denoted the activities between the trip chains as the reliable Passengers Transit activities and targeted detecting home and work activities.

In this Paper [15], the maker delineates as identified the typical durations of the activity intervals. for this reason , both works pointed out more on the duration distribution of the activity chains of single passengers. The physical environment around various stations has not yet been connected to human behavior patterns. In addition, whether there are spatial variations of staying behaviors in several metro stations and how to infer the functions of the catchment basin of a metro station from activities recorded in SCD remains unknown. In the direction of address this risk, this method studies how the combined staying activities in various station areas derived from SCD contribute to characterizing the social functions of the stations.

3. Conclusion

This survey helps to analyze and study various activity patterns to detect anomaly behaviors. Anomaly detection from the travel log or trajectory data may be a brighter process nowadays. The process is very challenging due to several reasons such as in every users mobility patterns are unique ; the trajectories are dynamic and need frequent updating. Detecting outlier/ anomaly from those dynamic and updatable datasets need more concentration. The techniques should be developed carefully. This paper surveyed various applications associated with the general public transit records like identifying pickpocket suspects, daily activity pattern detection, path planning, traffic abnormality detection, etc. from this summary a replacement technique are often developed and integrated into the recent applications.

REFERENCES

[1]. Yanchi Liu, Chuanren Liu, Nicholas Jing Yuan, "Intelligent bus routing with heterogeneous human mobility patterns", Knowledge and Information Systems, 2017.
[2]. Bowen Du, Chuanren Liu, Wenjun Zhou, "Catch Me If You Can: Detecting Pickpocket Suspects from Large-Scale Transit Records", ACM, 2016.
[3]. [3] Liang Hong, Yu Zheng, Duncan Yung, "Detecting Urban Black Holes Based on Human Mobility",ACM, 2015.
[4]. Yang Zhou , Zhixiang Fang , Qingming Zhan, "Inferring Social Functions Available in the Metro Station Area from Passengers' Staying Activities in Smart Card Data" , International Journal of Geo Information, 2017.
[5]. Xianglong Liu, Cheng Deng, "Query-Adaptive Reciprocal Hash Tables for Nearest Neighbor Search", IEEE, 2016.
[6]. Nassir, N.; Hickman, M.; Ma, Z.L. Activity detection and transfer identification for public transit fare card data, Transportation, 2015.
[7]. Tu, W.; Cao, J.; Yue, Y.; Shaw, S.-L.; Zhou, M.; Wang, Z.; Chang, X.; Xu, Y.; Li, Q. "Coupling mobile phone and social media data: A new approach to understanding urban functions and diurnal patterns". International. J. Geogr.Information Science, 2017.
[8]. El Mahrsi, M.K.; Côme, E.; Oukhellou, L.; Verleysen, "M. Clustering Smart Card Data for Urban Mobility Analysis. IEEE Trans", Intell. Transp. Syst. 2017.
[9]. Ma, X.; Liu, C.; Wen, H.; Wang, Y.; Wu, Y.J. "Understanding commuting patterns using transit smart card data". J. Transp. Geogr. 2017.
[10]. Gong, Y.; Lin, Y.; Duan, Z. "Exploring the spatiotemporal structure of dynamic urban space using metro smart card records". Comput. Environ. Urban Syst. 2017.
[11]. Yue, Y.; Zhuang, Y.; Yeh, A.G.O.; Xie, J.-Y.; Ma, C.-L.; Li, Q.-Q. "Measurements of POI-based mixed use and their relationships with neighborhood vibrancy", Int. J. Geogr. Inf. Sci. 2016.
[12]. Yang, X.; Fang, Z.; Xu, Y.; Shaw, S.-L.; Zhao, Z.; Yin, L.; Zhang, T.; Lin, Y. "Understanding Spatiotemporal Patterns of Human Convergence and Divergence Using Mobile Phone Location Data". ISPRS Int. J. Geo-Inf. 2016.
[13]. Higgins, C.D.; Kanaroglou, P.S. "A latent class method for classifying and evaluating the performance of station area transit-oriented development in the Toronto region". J. Transp. Geogr. 2016.
[14]. Bouman, P.; Kroon, L.; Vervest, P., "Detecting Activity Patterns from Smart Card Data", Benelux Conference on Artificial Intelligence, 2013.
[15]. Chakirov, A.; Erath, A. "Activity identification and primary location modeling based on smart card payment data for public transport Activity Identification and Primary Location Modelling based on Smart Card Payment Data for Public Transport", International Conference on Travel Behaviour Research (IATBR),2012.