The Third Workshop on Data-driven Intelligent Transportation

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ABSTRACT

Traffic is the pulse of the city. Transportation systems can involve humans, vehicles, shipments, information technology, and the physical infrastructure, all interacting in complex ways. Intelligent transportation enables the city to function in a more efficient and effective way. A wide range of city data become increasingly available, such as taxi trips, surveillance camera data, human mobility data from mobile phones or location-based services, events from social media, car accident reports, bike-sharing information, Points-Of-Interest, traffic sensors, public transportation data, and many more. This abundance of data poses a grand challenge to the CIKM research community: How to utilize such data toward city intelligence, across various transportation tasks? The 3rd workshop of "Data-driven Intelligent Transportation" welcomes articles and presentations in the areas of transportation systems, data mining, and artificial intelligence, conveying new advances and developments in theory, modeling, simulation, testing, case studies, as well as large-scale deployment.

CCS CONCEPTS

• **Information systems** → **Data mining**; • **Applied computing** → **Transportation**.

KEYWORDS

Transportation, spatio-temporal data mining, urban computing

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1 WORKSHOP OBJECTIVES AND TOPICS

Transportation is one of the most important components of any city in the world. In the US, the transportation sector accounts for 27% of energy consumption [2]. According to the "Texas A&M 2021 URBAN MOBILITY REPORT" [3], road congestion in 2019 (pre-pandemic) led U.S. drivers to waste 3.5 billion gallons of fuel and spend 8.7 billion hours sitting in traffic. The average commuter wastes 54 hours a year stuck in traffic – more than an entire week of full-time work. An intelligent transportation system is much needed to enable a sustainable and efficient city. In the meantime, modern technologies enable us to collect city data at an unprecedented speed. A wide range of city data has become increasingly available, such as taxi trips, surveillance camera data, human mobility data from mobile phones or location-based services, events, car accidents, shared bikes, POI, traffic from loop sensors, public transportation data, and many more. This abundance of data poses a grand challenge to the research community: How can we utilize such large-scale city data for a more intelligent transportation system? While intelligent transportation is not a new topic, especially in the field of transportation research, existing solutions are not effectively utilizing large-scale city data and new computing technologies. Data and computing can help tackle many transportation questions, including traffic signal control, route planning, shared transportation, autonomous driving, mixed transportation environment, and data sensing. We see active movements for data-driven techniques in transportation worldwide. In China, the government is actively implementing platforms to use mobility data to improve traffic situations [4]. Qatar recently started the TASMU initiative and plans to spend QR 6B over the next five years for various activities around smart cities in Qatar, and transportation is the first key component of this initiative [1]. This workshop would like to bring together the researchers to share exciting data-driven techniques to solve transportation problems.

The main topics on which contributions have been solicited, and which form the main themes of the workshop, are:

- Data mining techniques for transportation: traffic forecasting, travel time estimation, traffic estimation, semantic mobility data understanding, data visualization, and interactive design
- Intelligent control and planning in transportation: traffic signal control, autonomous driving, vehicle dispatching, route planning, public transportation management, including air, road, and rail traffic management
- Open datasets, benchmarks and demonstrations in transportation
- Security, privacy, and safety issues in transportation systems
- Support systems for drivers, pedestrians, bike riders, policymakers, and other parties

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- Public policy and regulatory and societal issues in transportation systems
- Intelligent transportation systems integration into existing road infrastructure

2 ORGANISING COMMITTEE

Hua Wei is currently an Assistant Professor at the Department of Informatics in the New Jersey Institute of Technology (NJIT). He obtained his Ph.D. from the Pennsylvania State University. His research interests lie in the field of spatio-temporal data mining and reinforcement learning, and intelligent transportation. He serves as the Smart City Day Chair at WSDM 2022 and has been organizing workshops, such as the Data-Driven Intelligent Transportation workshop in conjunction with KDD 2019 and Prescriptive Analytics for the Physical World in conjunction with the KDD 2020. He has also been organizing well-received academic competitions, including the City Brain Challenge in KDD Cup 2021 and the Challenge on Mobility Intervention for Epidemics held in conjunction with the workshop on Prescriptive Analytics for the Physical World.

Guni Sharon is an assistant professor in the department of computer science and engineering (CSE) at Texas A&M University. He received his doctoral, master's and bachelor's degrees in information systems engineering from Ben-Gurion University. Dr. Sharon has a strong research record in reinforcement learning, combinatorial search, multiagent route assignment, game theory, flow and convex optimization, and multiagent modeling and simulation. He was recognized for his contributions to these disciplines by receiving the "Outstanding Paper Award" from the Association for the Advancement of Artificial Intelligence (AAAI) and the "Prominent Paper Award" from the journal of Artificial Intelligence (AIJ). Dr. Sharon gained vast knowledge and experience in utilizing his theoretical foundations towards traffic management and traffic optimization application. He was recognized for his contributions to this discipline by providing an invited talk at the "Reinforcement Learning for Transportation" workshop in the international conference on intelligent transportation systems (ITSC).

Cathy Wu is an Assistant Professor at MIT in the Laboratory for Information & Decision Systems (LIDS), the Department of Civil and Environmental Engineering (CEE), and the Institute for Data, Systems, & Society (IDSS). She holds a Ph.D. from UC Berkeley, and B.S. and M.Eng. from MIT, all in Electrical Engineering and Computer Science (EECS), and completed a Postdoc at Microsoft Research. She studies the impacts of autonomy in transportation, from a lens of robotics, machine learning, control, and optimization, with particular emphasis on sustainability. Her work has been acknowledged by several awards, including the 2019 IEEE ITSS Best Ph.D. Dissertation Award, 2019 Microsoft Location Summit Hall of Fame, 2018 Milton Pikarsky Memorial Dissertation Award, the 2016 IEEE ITSC Best Paper Award, and numerous fellowships, and has appeared in the press, including MIT News, Wired, and Science Magazine. Her contributions to the community include an open-source framework called Flow which eases the study of traffic microsimulation using deep reinforcement learning, as well as a corresponding set of benchmark tasks. She has organized a Special Session on Reinforcement Learning for Transportation at the IEEE Intelligent Transportation Systems Conference (ITSC), as well as a tutorial and workshop at ITSC on the same topic. She has also co-organized a number of workshops at IEEE Conference on Decision and Control (CDC), Knowledge Discovery and Data Mining (KDD), and Automated Road Transportation Symposium (ARTS) on topics related to autonomy in transport, data-driven intelligent transportation, and impacts of automated vehicles. She is a member of the Early Career Editorial Advisory Board (EAB) for the Transportation Research: Part C (TR-C) journal.

Sanjay Chawla is a Senior Research Director and leads the Qatar Center for Artificial Intelligence with the Qatar Computing Research Institute. His research work spans diverse areas of data mining and machine learning, including analysis of spatio-temporal data and anomaly detection. His work has received several best paper awards, most recently the most influential paper in the last ten years at PAKDD 2021. Before joining QCRI he was a Professor and Head of School of Information Technologies, University of Sydney, Australia. He was a PC-Cochair of ACM SIGKDD 2021.

Zhenhui (Jessie) Li is the Chief Scientist at Yunqi Academy of Engineering, a non-profit organization for technological innovation. Her research has been dedicated to innovating spatial-temporal data mining techniques to address real-world problems in cities, environment, and society. Dr. Li obtained her Ph.D. in computer science from the University of Illinois at Urbana-Champaign (UIUC) and was a tenured associate professor at the Pennsylvania State University. She serves as the KDD Cup Chair in 2021 and has been organizing multiple workshops, including the Urban Computing Workshop in conjunction with KDD 2018, Driven Intelligent Transportation workshop in conjunction with KDD 2019, and Prescriptive Analytics for the Physical World in conjunction with the KDD 2020.

3 WORKSHOP PROGRAMS

The workshop is planned to be a full-day event. There will be three key sessions in the workshop. The first session will involve a keynote address followed by three paper presentations in the area of modeling stock market trading. The paper presentations will be followed by a panel constituting the paper authors. The idea of this panel will be to foster discussion and collaboration among authors who have worked in a similar domain. The second session will involve the paper presentations on fraud detection and a similar panel discussion among authors to foster collaboration. The final session will involve another keynote session on the broader area of modeling uncertainty in the financial world. Finally, we will conclude the workshop with a guided but open discussion among participants to (a) identify potential areas of research, (b) determine possibilities for collaboration, and (c) explore the potential of working on a follow-up workshop in this domain.

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