HIROSHIMA UNIVERSITY TAOYAKA ASMO Center IDEC

Lecture by Prof. Yinhai WANG, University of Washington

Toward Smart and Connected Communities: Challenges and Opportunities in Transportation

The 71th Taoyaka Seminar | The 322th IDEC Seminar | ASMO Seminar

15:00 – 17:00, July 15, 2016; Large Meeting Room, 1F, IDEC

Transportation involves human, infrastructure, vehicle, and environmental interactions and is therefore a very complicated system. Transportation activities are found affecting public health, air quality, sustainability, etc., and thus tie to everyone's daily life and are critical for achieving goals of smart and connected communities. Traditionally, transportation has been studied through classical methods, typically with ideal assumptions, limited data support, and poor computing resources. While the theories (such as traffic flow and driver behavior models) developed through these efforts provide valuable insights in understanding transportation-related issues, they are often ineffective in large-scale transportation system analysis with massive amount of data from various sources.

With recent advances in sensing, networking, and computing technologies, more and more cities and communities have launched their smart cities/communities plans to improve quality of life, sustainability, efficiency, and productivity. Sensor networks are fundamental elements of smart cities and the data they produce have the potential of generating the intelligence needed to make urban transportation smarter. We expect that many new transportation-related data and computational resources will become available in the smart cities context. These new assets are likely to bring in new opportunities to understand transportation systems better and address those critical transportation issues in a faster, more accountable, and more cost-effective way. To take advantage of these big data, a new theoretical framework and its supporting platform are clearly needed to integrate the quickly growing massive amount of data, typically from numerous sources of varying spatial and temporal characteristics, into the large-scale transportation problem solving and decision making processes. Efforts along this line are likely to form up a new subject area, namely e-science of transportation, in the years to come. Through his talk, the speaker will share his vision and pilot research on extracting transportation big data streams from the smart cities sensor networks and demonstrate the values of these data in large-scale system analysis and decision support through an online regional-map-based data platform named Digital Roadway Interactive Visualization and Evaluation Network (DRIVE Net)

Short bio

Dr. Yinhai Wang is a professor in transportation engineering and the founding director of the Smart Transportation Applications and Research Laboratory (STAR Lab) at the University of Washington (UW). He also serves as director for Pacific Northwest Transportation Consortium (PacTrans), USDOT University Transportation Center for Federal Region 10. Dr. Wang has a Ph.D. in transportation engineering from the University of Tokyo (1998) and a master's degree in computer science from the UW. Dr. Wang's active research fields include traffic sensing, smart transportation systems, e-science of transportation, transportation safety, etc.

Dr. Wang has actively involved in numerous research projects and received over $53 million of research funds as principal investigator over the past fifteen years. He has published over 110 peer-reviewed journal articles, three edited books, one book chapter, and nearly 50 peer-reviewed conference papers. To disseminate research findings, he has delivered over 120 invited talks and nearly 200 other academic presentations.

Dr. Wang serves as a member of the Transportation Information Systems and Technology Committee and Highway Capacity and Quality of Service Committee of the Transportation Research Board (TRB). He is currently on the Board of Governors for the ASCE Transportation & Development Institute and a member of the steering committee for the IEEE Smart Cities. He was an elected member of the Board of Governors for the IEEE ITS Society from 2010 to 2013. Additionally, Dr. Wang is associate editor for three journals: Journal of ITS, Journal of Computing in Civil Engineering, and Journal of Transportation Engineering. He was the winner of the ASCE Journal of Transportation Engineering Best Paper Award for 2003. He was also a conference co-chair for the 2015 IEEE International Smart Cities Conference to be held in Guadalajara, Mexico from October 25 to 28 2015.

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