Workshop Proposal

• Title:

3rd Workshop on Next Generation Transportation Networks: Emerging Technologies, Data Analytics and Perspectives

• Contents:

  o Motivation and objectives.

  This workshop intends to provide insight into current developments in transportation network modeling facilitated by the new opportunities and challenges created by emerging trends in the field. Transportation networks are evolving and transforming under the influence of emerging technologies, advanced data-driven analytics approaches, and new systems-based perspectives.

  o Relevance to the ITS community.

  Recent technical advancements, including information, communication, and sensing technologies, connected and/or autonomous vehicles, electric and renewable-energy vehicles, vehicle-to-infrastructure connectivity are a few of the driving factors in transforming today's transportation systems. The big data that is both generated and required by these emerging technologies has further inspired the development and application of novel analysis approaches, including the use of machine learning (ML), artificial intelligence (AI), cloud-based computing, and digital twins, for modeling, prediction, and data-driven decision making in transportation networks. Finally, new perspectives in transportation, including shared mobility, mobility-as-a-service, and multimodal systems form another driving force in shaping the future transportation networks. These advancements present new challenges and opportunities for improving network efficiency, mobility, reliability, and sustainability. As a result, we are witnessing and participating in the development of a next generation of transportation networks. The aim of this workshop is to give an overview of current developments in network modeling that leverage these emerging technologies, approaches, and trends in transportation, as well as provide insight into future challenges and opportunities in network modeling.

  o Topics of interest.

  • Network modeling, impacts and applications of:
    o Stationary and mobile sensing technologies
    o Connected and/or autonomous vehicles
    o Vehicle-to-infrastructure connectivity
Vehicle, intersection, and network-level control strategies

• Data-driven modeling and analysis, including AI and ML, as applied to:
  o Network performance characterization
  o Network performance prediction
  o Decision making and control
  o Digital twins

• Advanced modeling of:
  o Shared mobility fleets
  o Multimodal systems
  o Interactions between emerging modes and services
  o Electric and renewable energy vehicles

• Dedicated website.

A dedicated website for the workshop will be developed soon. The website for the 1st iteration of this workshop (in 2021) can be found here: https://next-itsc.github.io/

• Format: Full day/half day/other (provide details)

Most likely full day, depending on the number of speakers. The previous 2 iterations of this workshop were both full day.

• Organizers (names, affiliations, emails, and short bio):

Monika Filipovska
Affiliation: University of Connecticut
Email: monika.filipovska@uconn.edu
Bio: Dr. Monika Filipovska is an assistant professor in the Department of Civil and Environmental Engineering at the University of Connecticut. She completed her M.S. and Ph.D. in Civil and Environmental Engineering in Transportation Systems Analysis and Planning at Northwestern University. She received her B.S. in Urban Systems Engineering and Mathematics at New York University in Abu Dhabi. Dr. Filipovska's research is focused on transportation network modeling with emerging technologies and mobility services. Her work devises and applies predictive and predictive analytics for real-time operation of transportation systems.

Lili Du
Affiliation: University of Florida
Email: lili.du@essie.ufl.edu
Bio: Dr. Lili Du is an associate professor in the Department of Civil and Coastal Engineering, University of Florida. Before joining UF, she worked as an assistant and associate professor at the Illinois Institute of Technology from 2012-2017, and as a Post-doctoral Research Associate for NEXTRANS, the USDOT Region V Regional University Transportation Center at Purdue University from 2008 to 2012. Dr. Du received her Ph.D. degree in Decision Sciences and Engineering Systems with a minor in Operations Research and Statistics from Rensselaer Polytechnic Institute in 2008. Dr. Du received her MS degree in Industrial Engineering from Tsinghua University in 2003 and her BS degree in Mechanical Engineering from Xi'an Jiaotong University, China in 1998. Dr. Du's research is characterized by applying operations research, network modeling,
statistical and machine learning approaches into transportation system analysis and network modeling. She currently focuses on several interdisciplinary research areas, including CV/AV/CAV network impacts and platooning control, electrical vehicles, resilient civil infrastructure networks, sustainable multimodal transportation systems, mobility as services, and traffic flow analysis.

Hao Yang
Affiliation: McMaster University
Email: haoyang@mcmaster.ca
Bio: Dr. Hao Yang is an Assistant Professor in Transportation Engineering in the Department of Civil Engineering at McMaster University. He completed his M.S. and Ph.D. at the University of California, Irvine. He was also awarded a second Master’s degree in Statistics from the University of California, Irvine. He completed his B.S. at the University of Science and Technology of China. Dr. Yang's research focuses on the design and evaluation of connected and autonomous vehicle implementations to improve vehicle mobility and energy efficiency for the rapid development of smart cities.

Fatemeh Fakhrmoosavi
Affiliation: University of Connecticut
Email: moosavi@uconn.edu
Bio: Dr. Fatemeh Fakhrmoosavi is an assistant professor in the department of Civil and Environmental Engineering at the University of Connecticut. She received her Ph.D. and MSc degrees in Civil Engineering-Transportation Engineering from Michigan State University and was a Postdoctoral Fellow at the University of Texas Austin. Dr. Fakhrmoosavi’s research is primarily focused on investigating the impact of autonomous electric vehicles on transportation networks and planning for the future of transportation systems.

Sponsored by TRB AEP40-5 subcommittee on Emerging Technologies in Network Modeling.

- Potential contributors to the workshop (names, affiliations, contact information, abstracts (if available):

The workshop is planned around a group of invited speakers as listed further below. However, the workshop will also welcome other submitted contributions. Since the workshop is sponsored by the TRB AEP40-5 subcommittee on Emerging Technologies in Network Modeling, the organizers will distribute a call for contributions to the subcommittee and its parent committee AEP40 Standing Committee on Transportation Network Modeling (more information here: https://trb-aep40.org/).

- Intended audience and expected attendance for the workshop (including a clear statement how interaction between presenters and attendance will be fostered):

The workshop is intended for researchers, practitioners, and graduate students interested in transportation network modeling and its relation to emerging technologies, data analytics, and trends in the field of transportation. New developments reshaping transportation networks are of interest to transportation planners, mobility providers, and city administrators. The talks will cover some of the key aspects of
modeling approaches and applications related to emerging technologies, analytics, and perspectives in transportation and demonstrate cutting-edge research. The workshop will be concluded with a 1-hour panel discussion with all the speakers.

Expected attendance: 50+

- Invited speakers (if any):

  Ömer Verbas, Argonne National Laboratory, omer@anl.gov
  Xiaopeng Li, University of Wisconsin – Madison, xli2485@wisc.edu
  Song Gao, University of Massachusetts, Amherst, sgao@umass.edu
  Jing Dong-O’Brien, Iowa State University, jingdong@iastate.edu
  Sina Bahrami, Eindhoven University of Technology, s.bahram11@tue.nl
  Danjue Chen, University of Massachusetts Lowell, Danjue_Chen@uml.edu
  Harith Abdulsatar, McMaster University, bduhl30@mcmaster.ca
  Seyhan Ucar, Toyota Motor North America, seyhan.ucar@toyota.com
  Li Zhang, Tesla, lizhang@tesla.com

- Materials and equipment needed for the workshop:

  Audio-visual equipment and support for presentations.

- Contact details of the proposers (email, postal address, etc):

  Primary Contact: Monika Filipovska
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  261 Glenbrook Road, Unit 3037
  Storrs, CT 06269-3037
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