Special Session Proposal

Advanced Traffic and Network Management

Modality: Session with 6 presentations (~ 15 min each) and appr. 30 minutes for discussion.

Motivation and general scope:
The transition towards an advanced multimodal transport system requires better coordinated and organized traffic flows to optimize the entire transport network. Although network and traffic management has been in the spotlight for more than 3 decades, the recent advances in Connected Cooperative Autonomous Mobility (CCAM) services and the complexity in mobility patterns emerging in urban areas have recently put in question many of the existing practices as per their ability to reduce capacity bottlenecks and, traffic jams, thereby saving time, accelerate the transition towards connected and automated mobility and the development of new services and facilitate the integration of transport modes into a multimodal network for passengers and freight.

The advent of novel information and communication technologies and computational tools create new opportunities to revisit existing problems and propose innovative solutions to battle the above mentioned challenges. From the traffic and network management perspective, this special session focuses on presenting the concepts of operations for an efficient, resilient, and adaptable multi-modal network and traffic management system, using innovative data collection and fusion techniques, while leveraging state of the art technologies (e.g., artificial intelligence, high-performance computing). Submissions detailing research initiatives within Europe but also worldwide, related to network and traffic management, are encouraged.

Topics of interest for the special session (non-exhaustive list)
- Connected, cooperative and autonomous driving systems
- Deep learning & XAI methods for traffic management
- Optimization methods for traffic management
- Travel behavior modeling
- Behavioral modeling and interpretation
- Fleet optimization
- Traffic flow modeling
- Smart road infrastructure
- Decision-making in multi-actor traffic management settings
- Analytics and predictive modeling
- V2X communication in ITS
- Transit operations
Organizers
Gregor Papa, Jožef Stefan Institute, gregor.papa@ijs.si
Gregor Papa (http://cs.ijs.si/papa/) is a Senior researcher and a Head of Computer Systems Department at the Jožef Stefan Institute, Ljubljana, Slovenia, and an Associate Professor at the Jožef Stefan International Postgraduate School, Ljubljana, Slovenia. He received the PhD degree in Electrical engineering at the University of Ljubljana, Slovenia, in 2002. Gregor Papa's research interests include meta-heuristic optimization methods and hardware implementations of high-complexity algorithms, with a focus on dynamic setting of algorithms' control parameters. His work is published in several international journals and conference proceedings. He regularly organizes several conferences and workshops in the field of nature-inspired algorithms from the year 2004 till nowadays. He led and participated in several national and European projects. Gregor Papa is a member of the Editorial Board of the Automatika journal (Taylor & Francis) for the field “Applied Computational Intelligence”. He is a Consultant at the Slovenian Strategic research and innovation partnership for Smart cities and communities.

Antonio D. Masegosa, University of Deusto/Ikerbasque, ad.masegosa@deusto.es
Antonio D. Masegosa is IKERBASQUE Research Associate and the Principal Investigator of the Deusto Smart Mobility Group of the University of Deusto (Spain). He has published four books, twenty-four JCR papers and more than 30 papers in both international and national conferences. He has supervised two PhD theses and five MSc Thesis, and he is currently supervising two PhD theses. He is the work package scientific leader of three European projects and the PI of a national project and a regional project. He has also participated in 4 European research projects as well as 5 national and 4 regional research projects. He is a member of the program committee of international conferences such as IEEE CEC, GECCO, ICCCI, ECAL, HM and NICSO. His main research interests are Artificial Intelligence, Intelligent Systems, Soft Computing, Hybrid Metaheuristics, Machine Learning, Deep Learning, Intelligent Transportation Systems, Logistic Networks, Travel Behavior Analysis, Traffic Forecasting and Traffic Accident Prediction.

Eleni Mantouka, National Technical University of Athens, elmant@central.ntua.gr
Dr. Eleni Mantouka is a Senior Researcher at the Department of Transportation Planning and Engineering of the School of Civil Engineering of the NTUA. She has worked in the private sector as a Transportation Analyst – Researcher, has participated in European Research Projects and has prepared proposals for both national and European calls. Her research experience includes the application of machine and deep learning methods on identifying driving behavior and mobility patterns in urban networks, exploration of urban mobility, intelligent transport systems and sustainable and smart mobility.

List of potential contributors: The proposed subjects are very timely and of great interest to the academic community as well as the public and private sectors contemplating the deployment of CCAM. Other researchers in the field of transportation systems, with the focus on traffic and fleet management are also welcome.

Intended audience and expected attendance of the special session: The main audience are the academic and industrial researchers in the field of transportation systems that require the usage of advanced techniques of AI, optimization, which include dynamic control or the use of deep neural networks. Expected attendance is 50.
Materials and equipment needed for the special session: A projector and screen in the room are the main requirements.

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