

**Workshop title**

DAHA: Data-driven Approaches for Human-centered Mobility and Automated Driving Systems

**Workshop proposer(s)**

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**Abstract**

This workshop aims for exploring and sharing the state-of-the-art data-driven approaches used in modeling, simulation and control of human-centered mobility and automated driving systems. The methodologies could be stemming from diverse fields such as signal processing, data-mining, optimization, probabilistic and stochastic modeling, evolutionary algorithms and deep learning. The special focus will be placed in data-driven design and test methodologies for Automated Driving Systems (ADS) which may require the human-driver in-the-loop, in a shared-control structure or in supervisory (i.e. on-the-loop) role.

Data-driven approaches often provide practical and more applicable solutions when the model-based approaches cannot take the researchers to a full- understanding of the underlying mechanisms in the physical models. They can also be combined with model-based approaches to provide further verification and validations, especially concerning the automated driving systems and their functional design.

In this workshop, the use of public and institutional data repositories containing naturalistic driving data will be reconsidered to reveal their potential as an untapped multi-sensor and multi-modal data source. Such databases can be used as a basis for driver behavior modeling to guide the autonomous vehicle's cognitive and decision-making algorithms and verification of automated driving systems. Furthermore, combined with the traffic data and infrastructure-based networks, the new mobility, navigation and intelligent-routing solutions can be devised although these data sources could be often fragmented and unreliable.

The workshop aims to draw attention to human-centered system design perspective leveraging on the available rich data resources, although they may be fragmented. Novel methodologies to fuse numerical and contextual verbose data using naturalistic driving databases, on-line traffic, emergency and accident data will be of high interest. The state-of-the-art methods will be discussed in depth to combine rich data from different sources for information fusion, semantic analysis, navigation, control and decision-making algorithm design for safe and efficient transportation and mobility.

**Keywords**

- Transportation Security
- ITS Policy, Design, Architecture and Standards
- Data Mining and Data Analysis



### **Topics of interest**

- Signal processing for effective human-machine interaction in automated driving
- Driver monitoring systems, algorithms and applications
- Transition of control between human drivers and automated systems
- Take-over-request (TOR) system design
- Data-driven enablers for transition to full-autonomy
- Shared-control structures using data-driven enhancements
- Multi-modal in-vehicle signal processing for context (i.e. traffic situation) awareness
- Traffic and Road- scene reconstruction
- Semantic intelligence for automated driving
- Algorithms for collaborative driving systems
- Haptic systems and signal processing applications for human driver- vehicle interaction
- Signal processing for Eco-driving solutions
- Simulations for traffic and driver behavior influence on safety, efficiency and eco-driving
- AI for human-centered automated driving systems