



INFERRING AND PREDICTING PASSENGER DELAYS AND THEIR
PROPAGATION IN PUBLIC TRANSPORT NETWORKS

Abstract: Public transport systems constitute a critical infrastructure and are subject to recurrent disturbances and disruptions. Notwithstanding, only little is known about the determinants of its vulnerability and methods and techniques to analyze and mitigate the impacts of disruptions. In this seminar, I will present a series of studies focused on the network-wide analysis of passenger delays in metropolitan public transport networks. First, I will present a data-driven approach to predict how often different disruption types occur at different stations of a public transport network, and to predict the impact related to these disruptions as measured in terms of passenger delays. Second, a method for estimating network passenger delay from individual smartcard trajectories will be presented. The method allows decomposing the passenger delay of a trajectory into its corresponding track segment delay, initial waiting time and transfer delay. Third, the propagation of delays across the network is investigated using Bayesian networks.

Bio: Oded Cats is an Associate Professor of Passenger Transport Systems at Delft University of Technology. He is the co-director of the Smart Public Transport Lab at TU Delft, leading a research group that works closely with public transport authorities and operators. His research develops methods and models of multi-modal metropolitan passenger transport systems by combining advancements from behavioral sciences, operations research and complex network theory. His research contributions focus on the development of dynamic transit assignment models, the optimization of passenger service operations, network robustness analysis and real-time control methods. He is the recipient of a personal European Research Council starting grant devoted to mobility on demand (CriticalMaaS) and is leading several European and national research projects. He (co-)authored more than 150 peer-reviewed scientific publications in international journals and conference proceedings.

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