

Title: Improving Urban Transport by Combining Connected Vehicles, Machine Learning and Digital Twins

Abstract: Severe reoccurring daily congestions create problems in today's urban transport environments. This is especially evident in signalized intersections and urban motorways. To alleviate the congestion problem, services from the domain of Intelligent Transportation Systems (ITS) are applied—particularly, the traffic control service. The crucial part of such a service is the appropriate control law that must cope with large changes in daily or seasonal traffic demand. New approaches apply data from connected vehicles (CVs) and learning-based systems to create traffic controllers that can cope with such large changes in traffic demand. Thus, the control law is trained using CV data during the operation of the traffic control system. Reinforcement learning is one of the often-used approaches, but it demands a large training set regarding different traffic scenarios. One solution is to apply the digital twin technology enabling parallel evaluation and training of the learning-based traffic controller.