TOP TEN

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System-wide Analysis of On-Demand Ride Pooling Impacts

On-Demand Ride Pooling (ODRP) services have the chance to improve urban traffic congestion, while offering customer-centric mobility services. Simulation studies have shown promising impacts, the results vastly depend on system modelling and the chosen system parameters, suffering from high computation time and input data needed, making it difficult to analyse the ODRP overall impacts. Hence, the aim of this project is to explore the system-wide impacts of ODRP services and to determine in which parameter space these services might be attractive for customers, profitable for operators and can improve traffic conditions. To overcome the drawbacks of agent-based simulations, an analytical modelling approach is used Initially the influence of service quality parameters and network modelling details on the percentage of shareable trips in an area is captured. Secondly, the traffic impacts of ride pooling are analytically investigated by using the macroscopic fundamental diagram. Finally, an overall analytical model is developed to capture the requirements of customers, operators, and cities, allowing an exploration of the framework conditions for which a win-win-win situation can be realised. The analytical models are tested by an agent-based simulation and a microscopic traffic simulation for a study area in Munich city. The results prove the validity of the developed models to quickly analyse the overall impact of ride pooling, requiring low input data and computational time, while making their transferability to other cities possible. Policy makers and operators could use the results of this project for better planning and implementation of ODRP services.