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Titel des Beitrags: Agent-based simulation of a shared, autonomous and electric on-demand mobility solution

Abstract: Recent technological progress in automation and electrification gives room to create sustainable, costumer-orientated and economical transportation solutions. For vehicle-based systems, on-demand mobility services are considered to play an important role. To support decision making in an early stage of development, we propose a mobility on-demand simulation that reflects its system behavior on an operational level. Its core forms a discrete event simulation combined with a multi-agent approach. The main entities are fully-automated electric taxis, a central dispatcher and customers. All agents live in a shared environment consisting of a street network and charging infrastructure. The dispatching center handles matchmaking between customers and vehicles with the help of a Contract Net Protocol. Taxis compete for customer transportation requests broadcasted by the dispatcher. Routing and charging decisions are made individually by each agent. A simulation study evaluates three mobility on-demand services for Munich. The basic scenario analyzes a limited service area, where a shared vehicle fleet is responsible for the entire local traffic demand. The second scenario considers additional commuter trips entering or leaving this zone. The third
scenario investigates a citywide operation. Key findings confirm the feasibility of operating a shared autonomous vehicle fleet with both high service levels and vehicle utilization.

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