Hail-a-Drone: Enabling teleoperated taxi fleets

Despite impressive developments in automated driving technology, several technical, economic and social challenges hinder the large-scale deployment of highly or full automated vehicles. We present teleoperated driving - where in-car drivers are replaced by tele-drivers located at a control center - as a transient technology to enable a driverless, door-to-door taxi service. In this novel service, the transmission of video and audio streams of the vehicle surroundings via wireless networks to the taxi dispatch center allows a human operator to remotely sense the environment through a virtual windshield and to remotely operate the vehicle controls through an emulated cockpit. This safe and cost-effective transport service merges together aspects of taxi transport with car sharing services if the passenger drives part of the route. A large-scale empirical evaluation study proves the feasibility of this novel taxi operation mode and shows that the implementation of the system can reduce, on average, the number of drivers to between 15% and 27% when considering teleoperation during pickup/dropoff and service, respectively. A premium service where passengers are remotely also driven from their origin to the destination also presents considerable gains for taxi operators. Teleoperation of taxi fleets could revolutionize urban mobility by offering a cost-effective and safe door-to-door transportation service.