Intelligent mobility on demand (iMoD): a review of literature and tools and future directions
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Urban mobility and accessibility is a problem for growing cities. New ideas are required to increase mobility and access in a sustainable way, taking congestion, fuel consumption, and environmental impacts into consideration.

One possible solution is sharing transport resources, along the lines of bike sharing, car sharing, or ride-sharing, and enhancing the benefits of shared resources by making them demand-responsive. Although these systems are gaining traction internationally, many fail due to poor implementation, planning and marketing. Being able to realistically simulate these systems to evaluate viability and demand before implementation is important.

A team of researchers at the University of Melbourne, Monash University and University of Newcastle is investigating the viability of novel mobility-on-demand systems. This involves estimating the demand for travel, modelling the behaviour of potential users, developing scheduling and matching algorithms, and building simulations to evaluate systems in various urban environments and scenarios.

This presentation reported on early research outcomes and work-in-progress, focusing on a thorough review of the demand-responsive transport (DRT) literature currently underway and simulation approaches.

We found that existing simulations worked with a limited number of DRT schemes and algorithms and often did not take realistic demand/travel time effects into account. In most cases, the simulations were operations-focused, meaning the emphasis was on allocating trip requests to vehicles; minimal attention was paid to individual preferences, e.g., mode choice, waiting/travel time.

In our early simulation attempts, we have trialled both SUMO, an open-source traffic simulator, and MATSim, a large scale agent-based travel simulation. We found that traffic microsimulation was good for operational testing and looking at the interaction between vehicles, while the larger-scale simulation was more promising for daily travel simulation and testing integration between modes.

For more information about the iMoD project, please visit http://imod-au.info.