Simulating MaaS drivers' behaviour with Agent-Based-Model

Problem description

In a two-sided mobility markets where service is provided by self-employed drivers paid by commercial platforms (like Uber, or ViaVan drivers), the supply of transport services is an outcome of drivers' choices. MaaS service providers, unlike conventional tendered public transport, are not designed or controlled, but are rather the collection of choices made by individual agents.

Each driver is free to accept or decline trip requests and operate in areas that s/he finds attractive. They have individual strategies to maximize their profit (e.g. reposition to attractive areas such as when surge pricing is active) and select the service they provide (individual or shared rides). Moreover, drivers may independently decide on their shifts and working days, including possibly changing job and stop providing services at all.

This makes the picture of MaaS supply side challenging to analyze, predict, describe and optimize. It is still unclear how to best represent drivers' behaviour and how it affects the system performance and reliability. In this project you will address this research gap with simulation experiments.

Assignment description

In this programme you will use our in-house agent based model for mobility as a service (MaaSSim) developed in Python with source code available for the Project. You will develop modules to simulate drivers' behaviour with particular interest in representing how drivers:

- Accept/reject requests
- Reposition after dropping-off passengers
- Adapt their working hours and shifts over time
- Maximize their profits

You will have the chance to use results of our focus groups, SP and RP results conducted within the Critical MaaS project (collected by Peyman Ashkrof).

Candidate background

T&P or TIL students who have knowledge and interest in network and demand analyses and have very good programming skills, in particular with Python and have affinity with optimisation. Able to handle large datasets and large-scale computational requirements.

Research group

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