Aggregate four-step models and disaggregate agent-based models, but what is in between?

MT-ITS, 17th June 2021
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Needs and objectives

- Shared mobility services are penetrating the European cities
- Introduction of such services in cities calls for proper evaluation of them, to avoid inefficiency & ineffectiveness
- Modelling of shared mobility requires agent based approaches (based on existing pertinent literature)
- However, many cities, especially small & medium sized cities, continue to use the traditional strategic 4-step modelling approach
- Need for an intermediate modelling approach, which can be integrated to the existing models of the cities
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Intermediate modelling approach – This is what is in between!

BS: Bike-Sharing
CS: Car-Sharing
RS: Ride-Sharing

Red colour shaded boxes indicate the existing components in the traditional four-step transport modelling approach.

Narayanan et al. (2021)
Aggregate four-step models and disaggregate agent-based models, but what is in between? Details about individual steps

<table>
<thead>
<tr>
<th>Step</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Synthetic population generation</td>
<td>Iterative proportional updating algorithm and data-driven sampling and statistical matching procedure for enrichment</td>
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<tr>
<td>4. Disaggregate mode choice model</td>
<td>Multinomial logit model based on smoted household survey data</td>
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<tr>
<td>5. Fleet management</td>
<td>Optimization methods, machine learning tools and service simulator (Aimsun Ride)</td>
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<td>8. Emission calculation</td>
<td>Simplified COPERT model based on EMEP</td>
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<td>9. Car-ownership</td>
<td>Multinomial logit model</td>
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<td>10. Induced demand estimation</td>
<td>Nested logit model</td>
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</table>

COPERT - COmputer Programme to estimate Emissions from Road Transport
EMEP - European Monitoring and Evaluation Programme for air pollutants
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Summary

- An intermediate modelling approach between the traditional strategic and the agent and activity based approaches, by adopting the disaggregate modelling principle from agent and activity based approach
- Cities can integrate our new models into their existing simulation system, without the need to build something from scratch or buy a new software
- Individual model codes are available in a GitHub repository
- More models than what is presented now
Thank you for your attention!

santhanakrishnan.narayanan@tum.de

MOMENTUM GitHub public repository