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Creating a Baseline Scenario for Simulating Travel Demand: A Case Study for Preparing the Region Test Bed Lower Saxony, Germany

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About the authors

- **Antje von Schmidt** has a diploma degree in Computer Science from the Berlin University of Applied Sciences. She works in the department "Mobility and Urban Development" at the DLR - Institute of Transport Research. Her research interests are in the field of transport demand modeling, data science, and visualization.
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Research topics and current research questions of our working group

Research topics

- agent-based travel demand modeling
- simulating scenarios to estimate the impact of possible measures in transportation planning
- simulating scenarios for future development of human mobility

Research questions in current projects

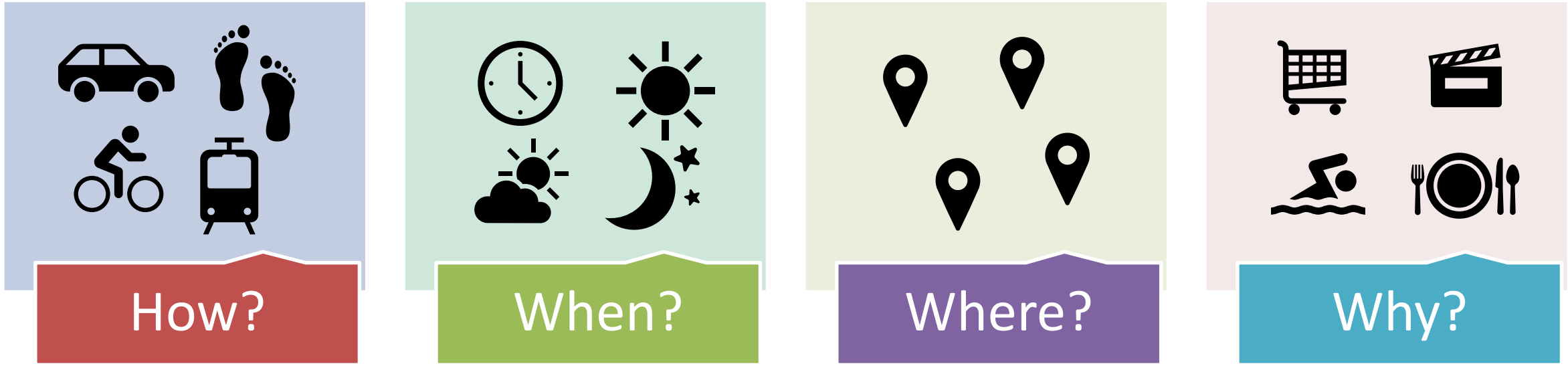
- fleet management of shared mobility (Urmo Digital)
- effects of autonomous vehicles in travel behavior (Automover, KoFiF)
- evaluation of mobility concepts in car reduced town quarters (MoveUrban)
- our research areas are mainly located in Germany (e.g., Berlin, Region Test Bed Lower Saxony), but other study areas are possible as well

Agent-based travel demand models are important for transportation planning

These models are used to estimate the impact of possible measures, such as the installation of a new public transportation infrastructure.

They can also provide important insights on various possible future developments in travel demand, like due to an aging population, the use of innovative vehicles, changing fuel prices or new mobility trends.

Agent-based travel demand models can give answers to the questions:



… do people move from one location to another?

These models require a virtual representation of the study area

Essential input data:

Spatial reference units
- traffic analysis zones

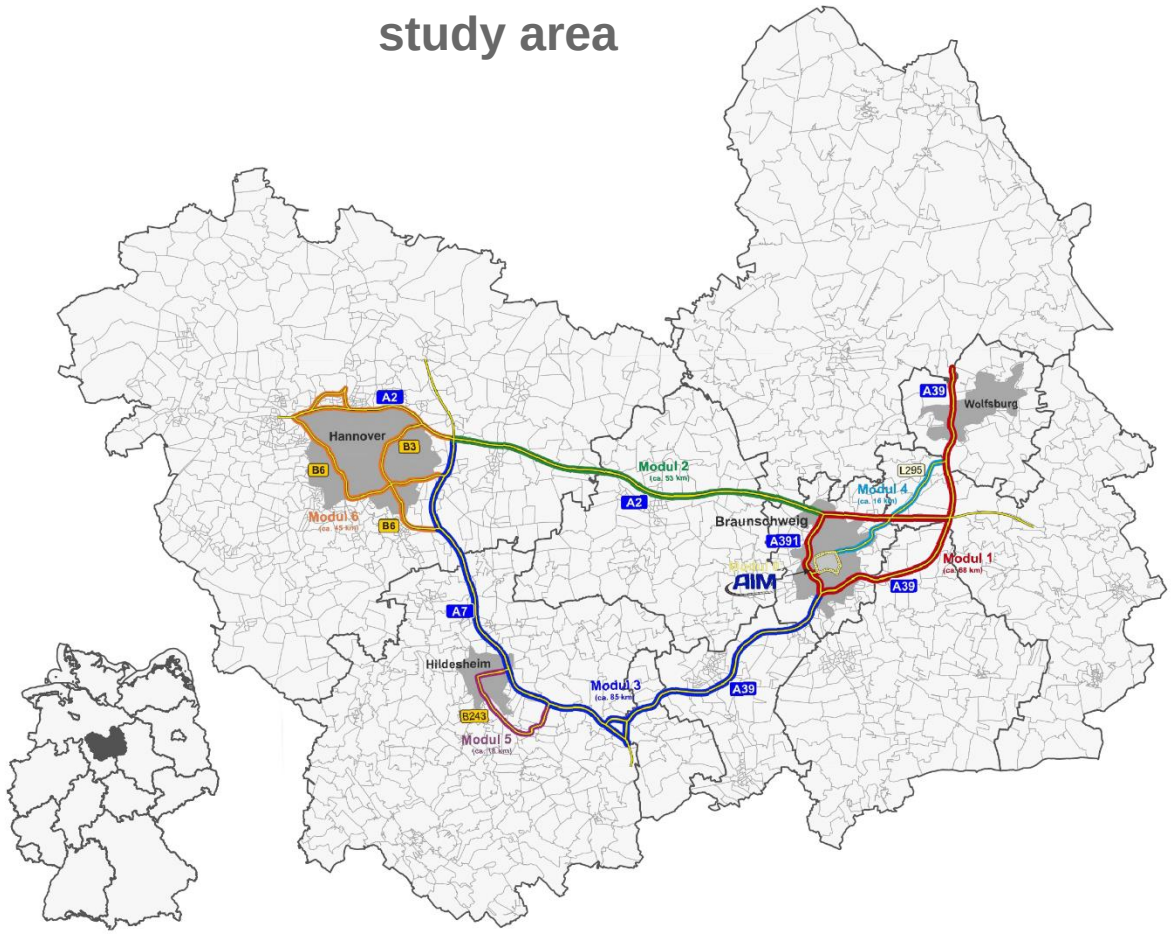
Spatially structured data
- synthetic population
- locations for activities

Transport offer data
- accessibility measures
- transport network

Travel behavior data

Case study: Region Test Bed Lower Saxony, Germany

- With the Test Bed Lower Saxony, a research infrastructure for automated and connected vehicles is being created.
- The test field includes sections of various highways, but also parts of federal and country roads. Furthermore, it also integrates the roads of the Application Platform for Intelligent Mobility (AIM), which is in operation within the city center of Brunswick. In total, the test field will cover more than 280 road kilometers after completion.
- The study area is located in the federal state of Lower Saxony, including 6 districts and 3 independent cities. The area is subdivided into 2807 traffic analysis zones.



Baseline scenario: Synthetic population for the study area

people
2.4 million

households
1.3 million

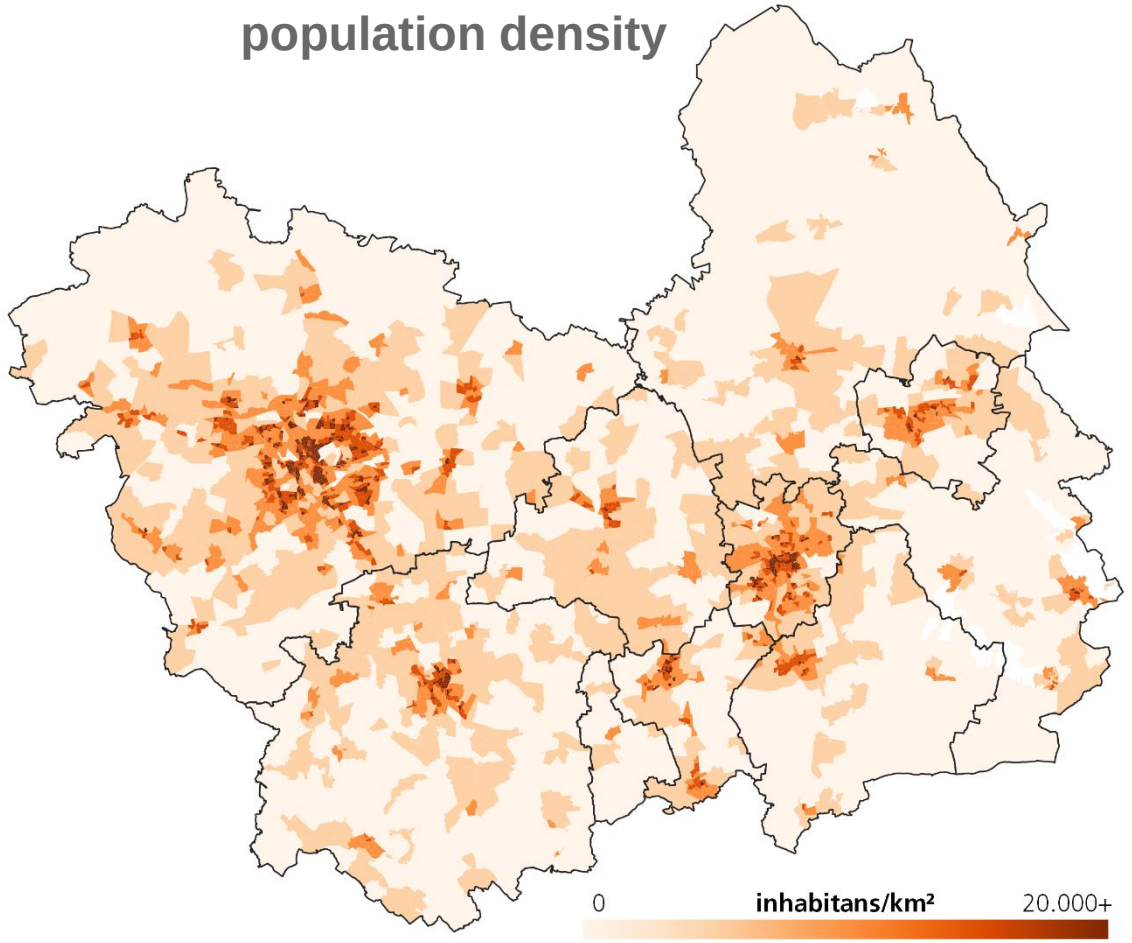
vehicles
1.3 million

mobility options

driver‘s license
88 %

bicycle owner
84 %

season ticket
23 %



Baseline scenario: Locations for activities

work
110 thousand

education
4 thousand

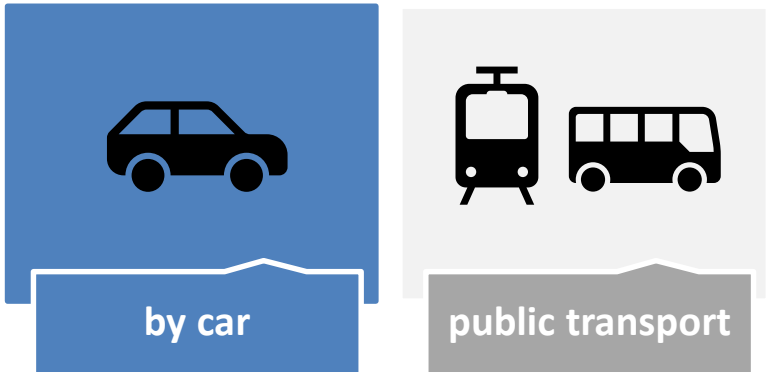
shopping
13 thousand

activities

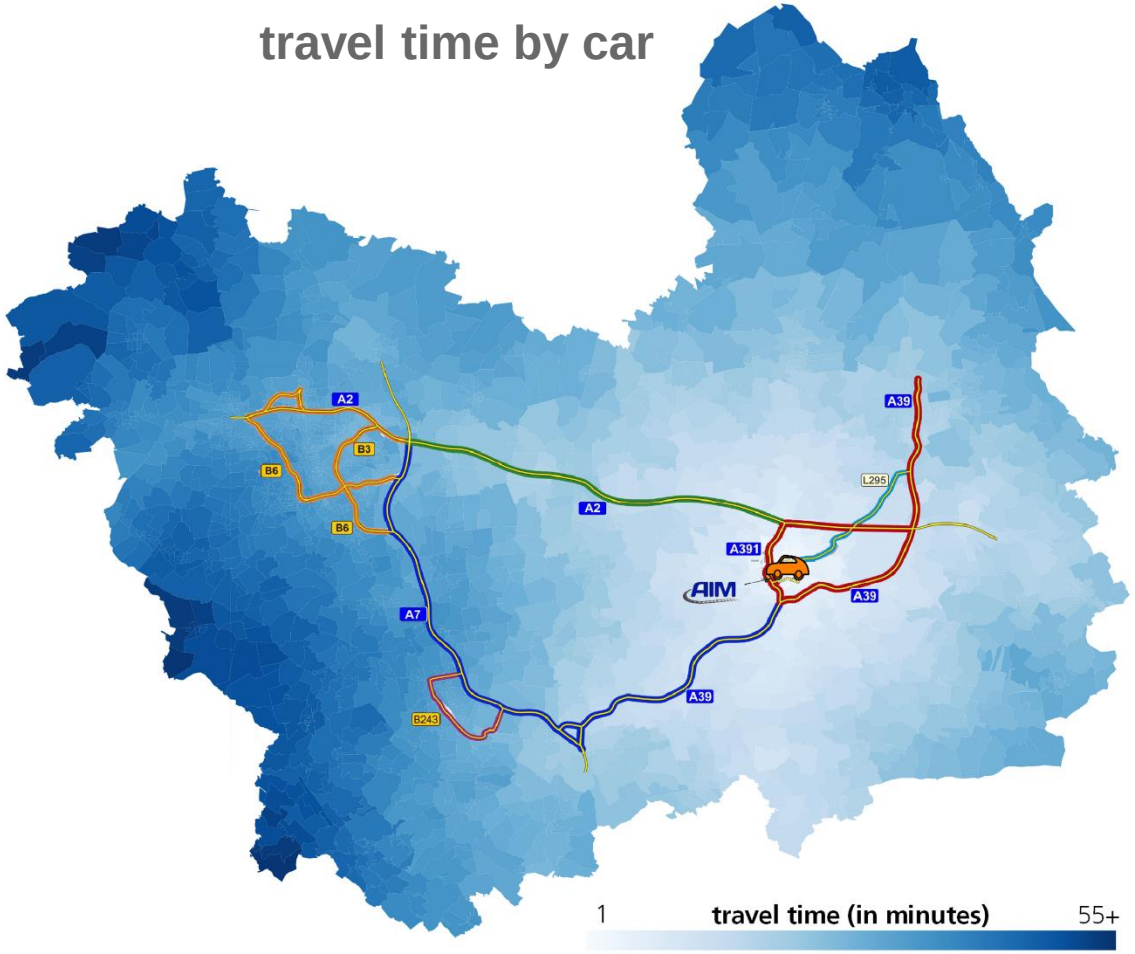
leisure
57 thousand

errands
33 thousand

Baseline scenario: Accessibility measures for different modes



modes



Conclusion and future work

- A virtual representation of the related study area is an essential input for agent-based travel demand models.
- The quality of the virtual representation has a strong influence on the quality of the simulation results.
- The required virtual representation is often not available. Instead, it has to be created from a variety of data sources.
- The data preparation and maintenance can be very time-consuming and expensive, depending on the level of detail and the availability of data for the study area.
- Upcoming work will focus on the simulation of different scenarios in the field of autonomous driving.
- For this purpose, the study area covering the Test Bed Lower Saxony in Germany will be used in the travel demand model TAPAS.
- TAPAS was recently made available as open source and can be found at: https://github.com/DLR-VF/TAPAS

Thank you!

If you have any question, please send an email to:

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