Exploration and validation of a transport microsimulation model

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The MATSim (Multi-agent Transport Simulation) framework

Flexible open-source library for transport microsimulation:

- Finest granularity (time, space, agents), scalable (country-level, millions of agents)
- Multimodal (includes public transportation with schedules)
- Activity-based (generalized adaptive scoring for agents daily plans)

Potential policy applications for the current crisis:

- Impact of changes in commuting patterns on transportation
- Indicators on physical contacts within transportation (basis of the EpiSIM epidemiological model)
- Test of policies to limit these (flatten peak hour, higher level of service, alternative modes)

Model exploration and sensitivity analysis

Model validation and application requires:

- Coupling with a synthetic population generator (SPENSER model, already on DAFNI)
- Heterogenous data integration: street network, public transportation, commuting flows
- Calibration, exploration and spatial sensitivity analysis *[Raimbault et al., 2019, JASSS, 22(4)]*

Integration within DAFNI:

- High intra-model (high number of agents) and DOE computational burden
- Numerical experiments and calibration with the OpenMOLE software *[Reuillon et al., 2013, Fut. Gen. Comp. Sys., 29(8)]*