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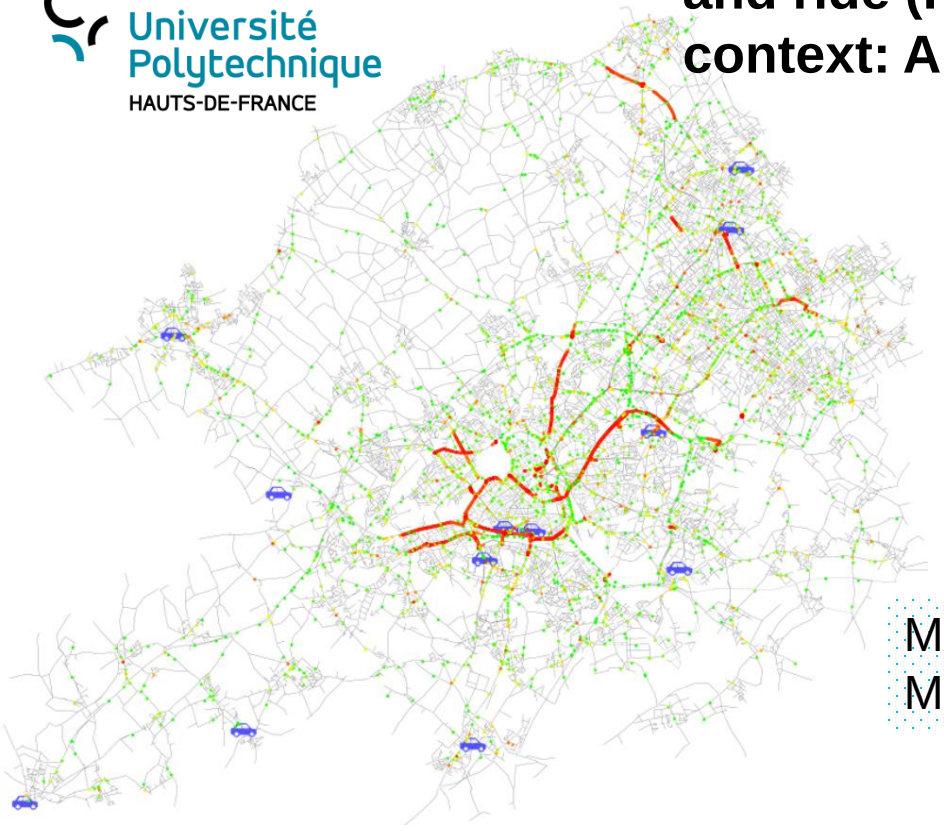
Agent-based of assessment of the use of park and ride (P+R) facilities in an urban intermodal context: An application to the Lille metropolis



Azise Oumar Diallo, Guillaume Lozenguez, Arnaud Doniec, René Mandiau

MATSim User Meeting (MUM) 2021
March 22, 2021

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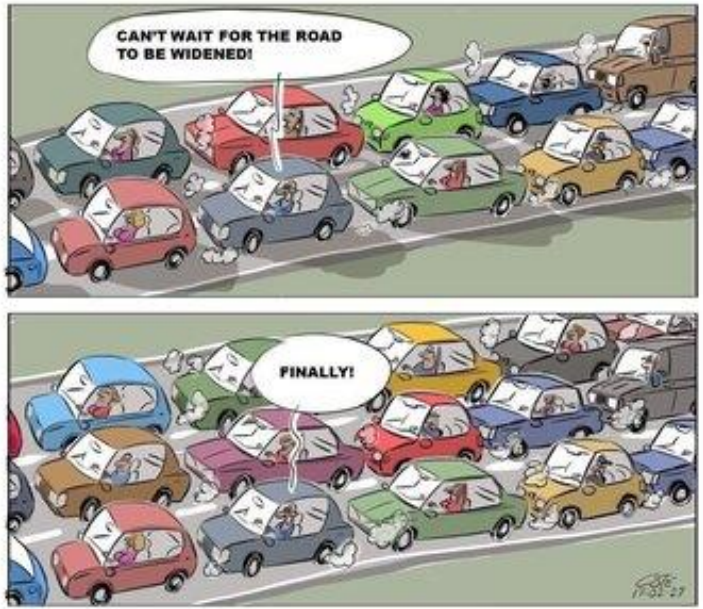
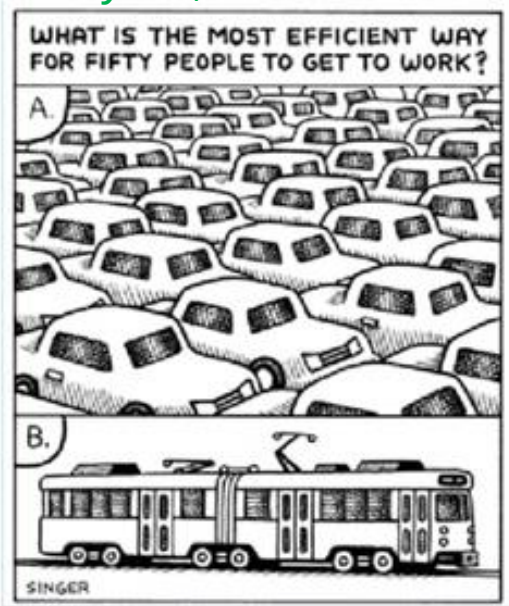
Intermodality, one of the solutions to the transport negative consequences?

Not a solution!

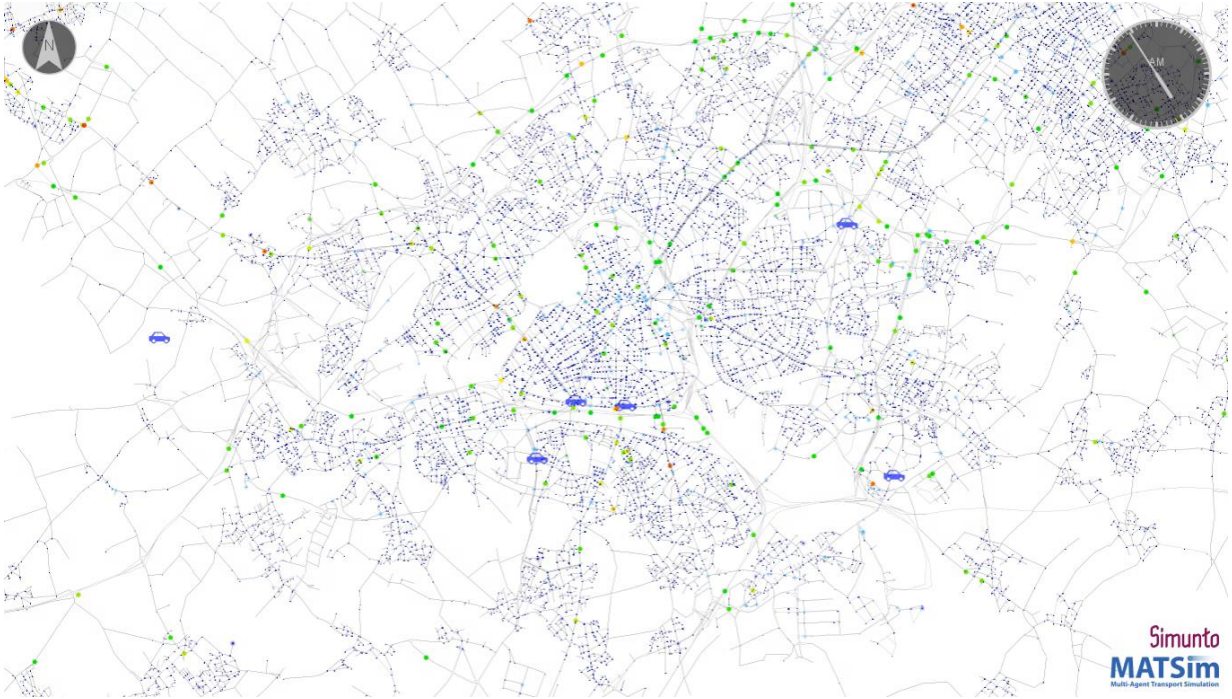


May be, one solution!



https://www.transportation-planning.com/quotes.html

Why a ABM?



- ✓ Individual behavior
- ✓ Individual daily plan
- ✓ Application of decisions to some agents (or group)
- ✓ Emergence of phenomena (e.g., congestion, replanning)
- ✓ People daily trip analysis

Which ABM sofware to simulate intermodal mobility behaviors?

MATSim
Multi-Agent Transport Simulation

SUMO
SIMULATION OF URBAN MOBILITY

aimsun.

PTV VISSIM
the mind of movement

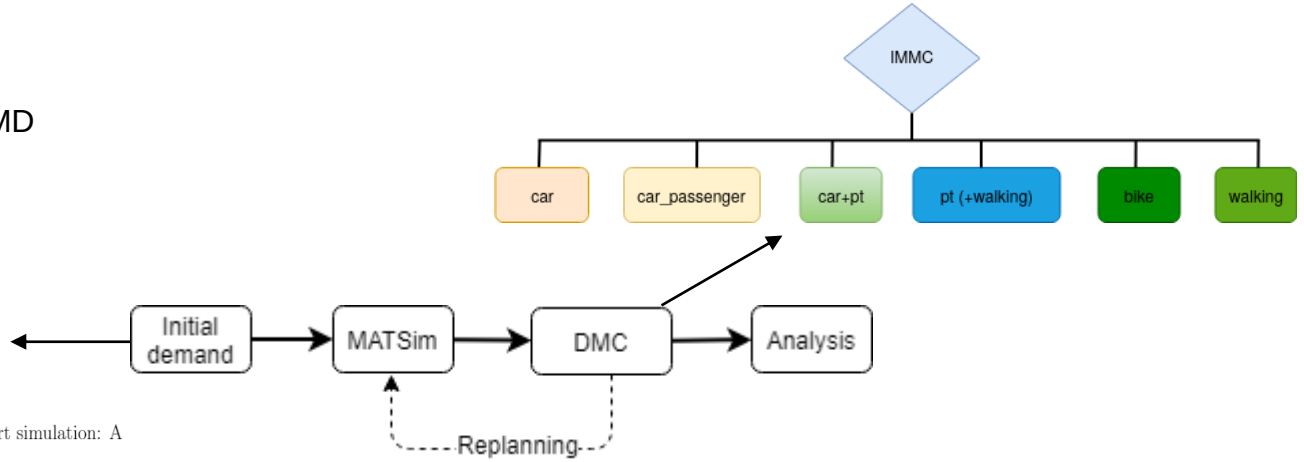
- ✓ Criteria evaluation
- ✓ Scoring function
- ✓ MATSim *vs* SUMO
- ✓ MATSim 👍

Diallo, A., Lozenguez, G., Doniec, A. and Mandiau, R.
Comparative Evaluation of Road Traffic Simulators based on Modeler's Specifications: An Application to Intermodal Mobility Behaviors.
In Proceedings of the 13th International Conference on Agents and Artificial Intelligence (ICAART 2021) - Volume 1, pages 265-272
ISBN: 978-989-758-484-8 ISSN: 2184-433X

Generation of the simulation scenario

Specific travel survey (EMD 2016), OSM and GTFS

Pipeline developed by Hörl and Balac



***eqasim* framework (Hörl and Balac)**

Open data travel demand synthesis for agent-based transport simulation: A case study of Paris and Île-de-France

Sebastian Hörl[a,b,*], Milos Balac[a]

[a] *Institute for Transport Planning and Systems, ETH Zurich*
[b] *Institut de Recherche Technologique SystemX, Palaiseau 91120, France*

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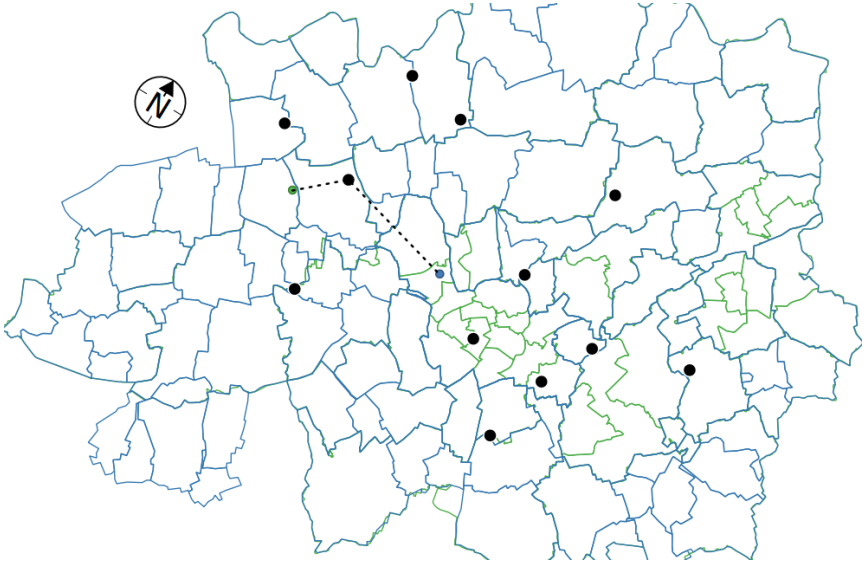
The 12th International Conference on Ambient Systems, Networks and Technologies (ANT) March 23 - 26, 2021, Warsaw, Poland

Agent-based simulation from anonymized data: An application to Lille metropolis

Azise Oumar Diallo[a,*], Arnaud Doniec[a], Guillaume Lozenguez[a], René Mandiau[b]

[a] *CERI Systèmes Numériques, Institut Mines-Télécom (IMT) Lille-Douai 59653 Villeneuve d'Ascq Cedex, France*
[b] *LAMIH UMR CNRS 8201, Université Polytechnique Hauts-de-France 59300 Valenciennes Cedex 9, France*

Routing of *car+pt* trips through the P+R lots



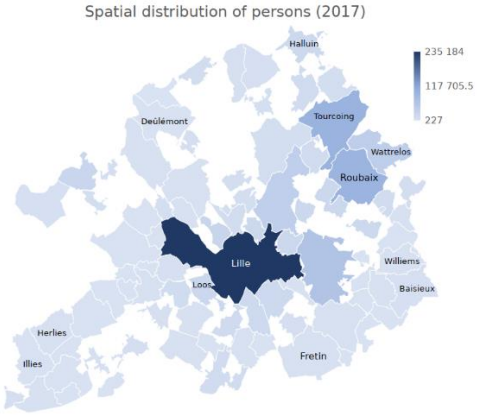
1) Find the closest P+R facility from agent's home

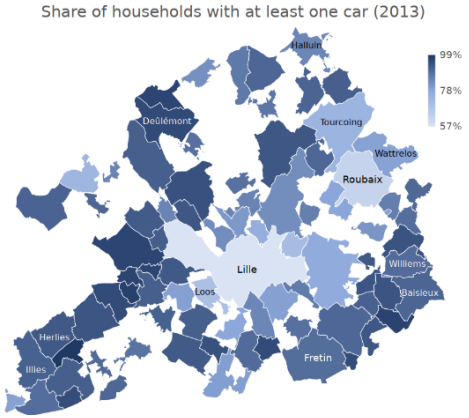
2) Car Routing between the home and the P+R

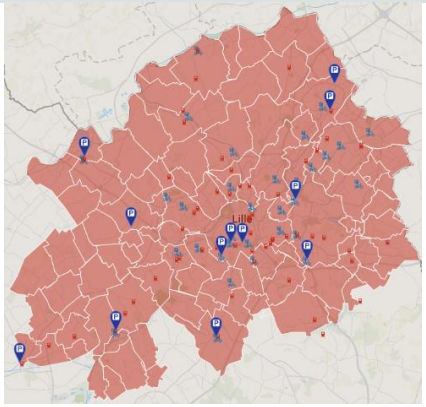
3) P+T Routing between the P+R and the destination

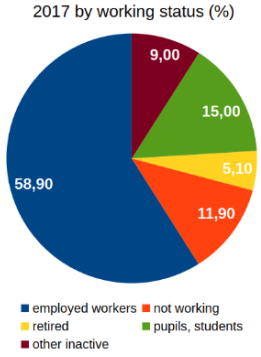
4) For the return, same way by starting with the P+T trip.

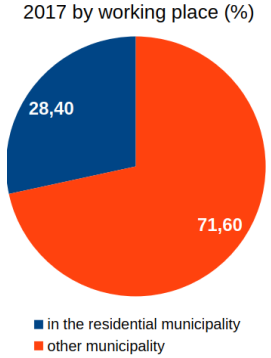
Presentation of the MEL

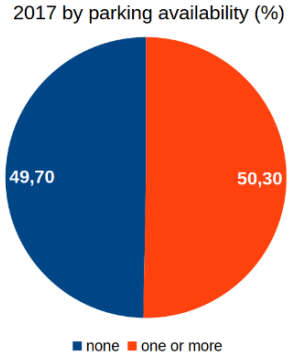


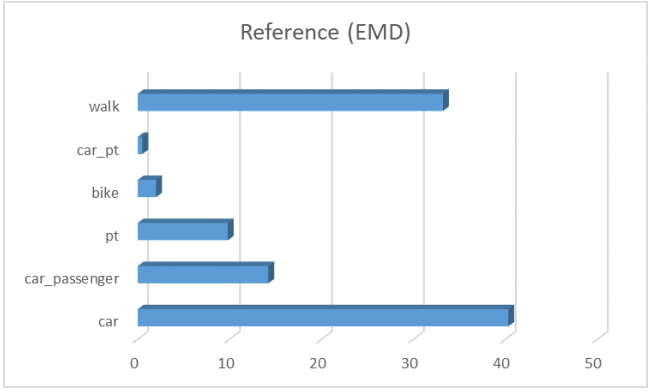












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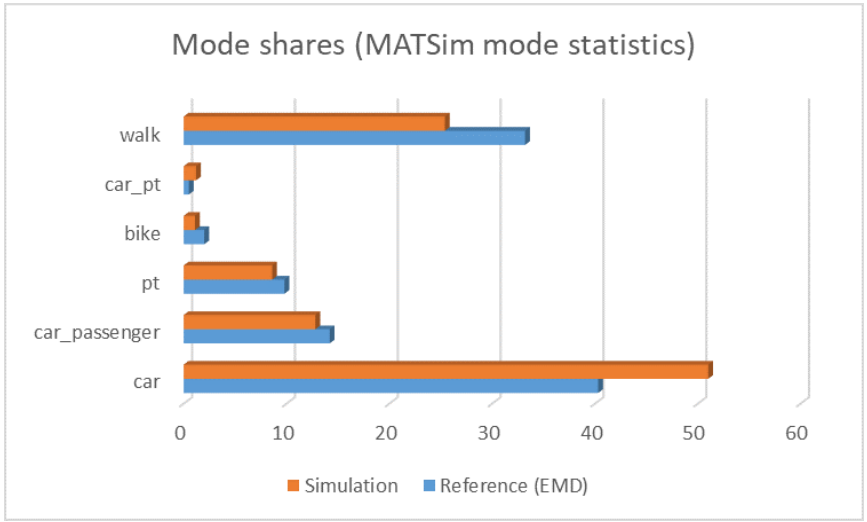
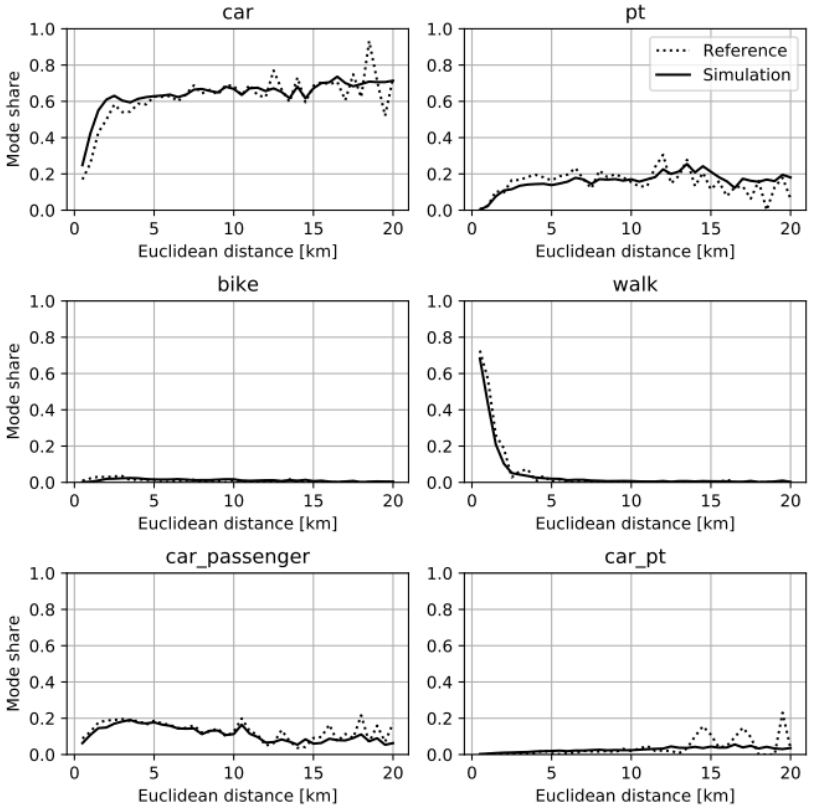
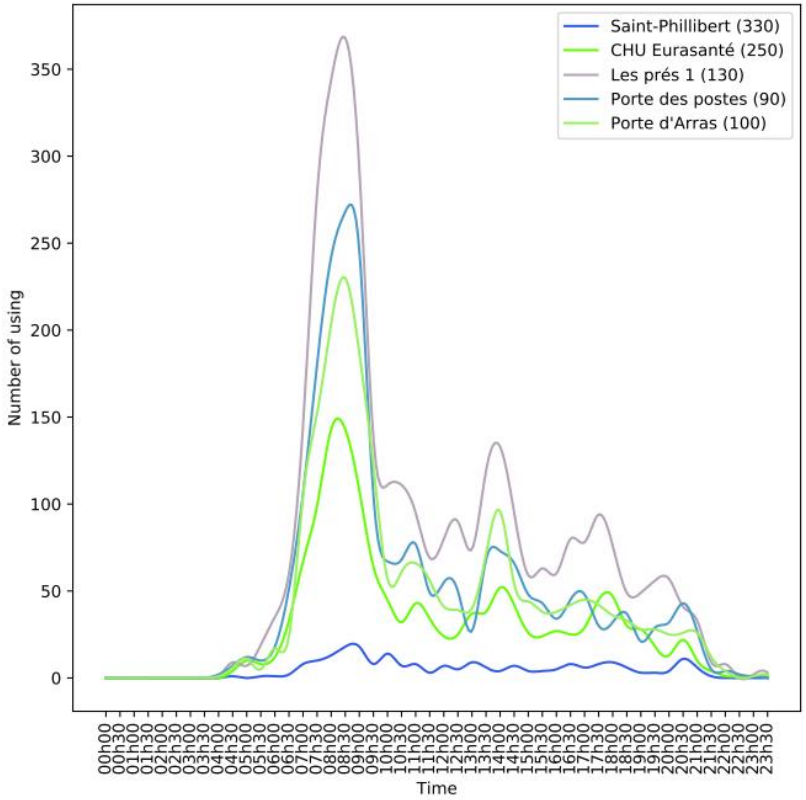
Calibration and validation

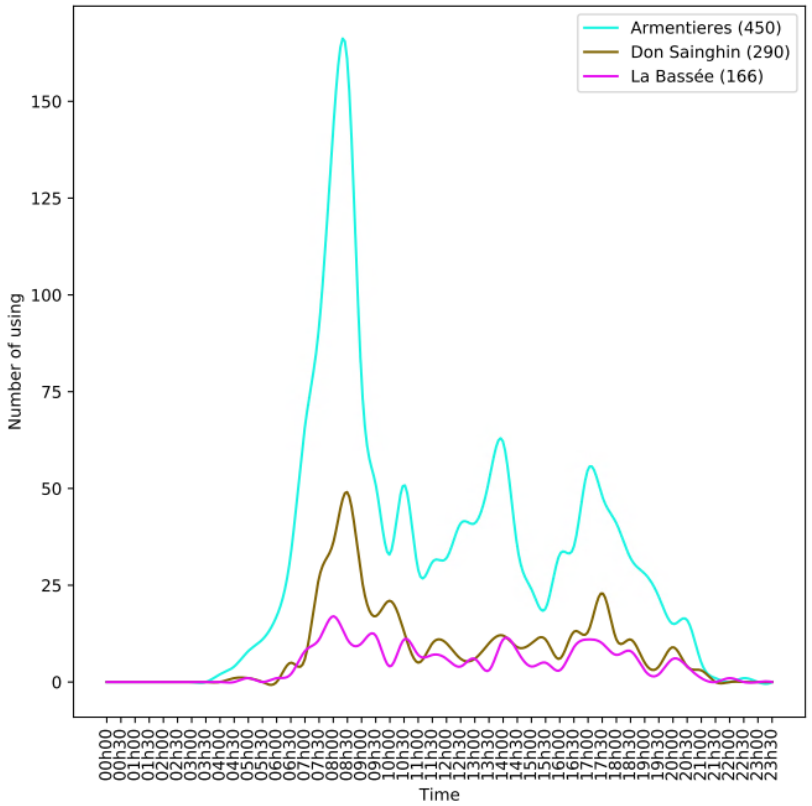
- ✓ 20% of population of the MEL (744 544 trips)
- ✓ 100 iterations
- ✓ 10% agents for mode change (replanning)



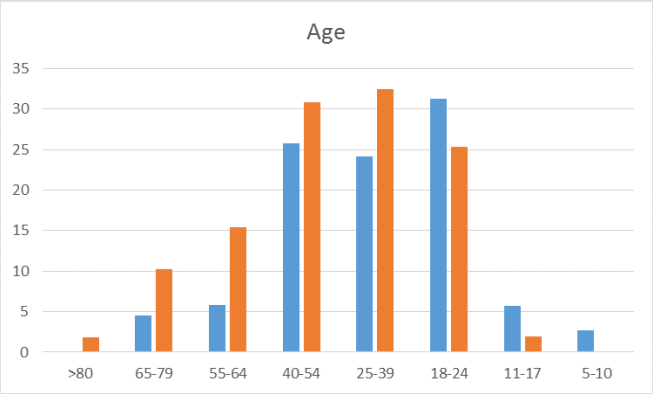


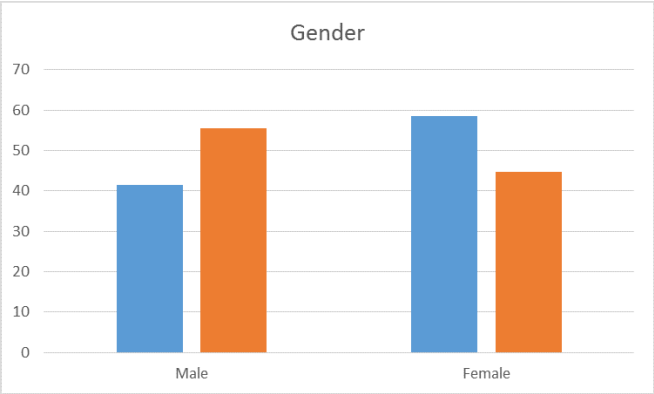
Assessment of the use of the P+R in the MEL

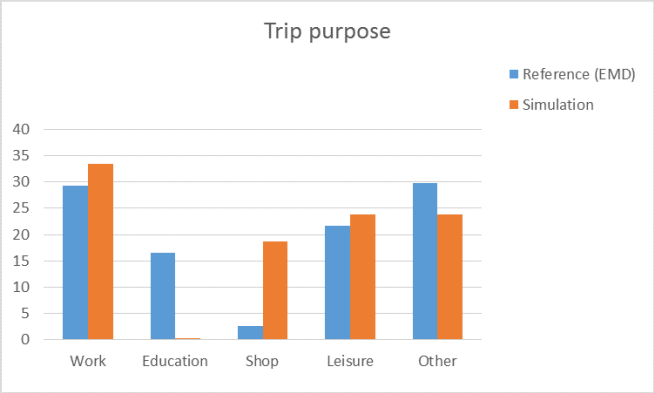




Profile of the users of the P+R in the MEL







- On going work…
- First interesting results
- Need real data on P+R use (validation, calibration)
- Need more investigation and development (collaboration)

- Optimization of the locations and the number of P+R
- Road pricing in the urban center
- PT tarification

- Thank you to French Ministry of industry and the Hauts-de-France region for funding this work
- Thank you to Sebastian and Milos!
- Thank you to TU Berlin for the MATSim Advanced class

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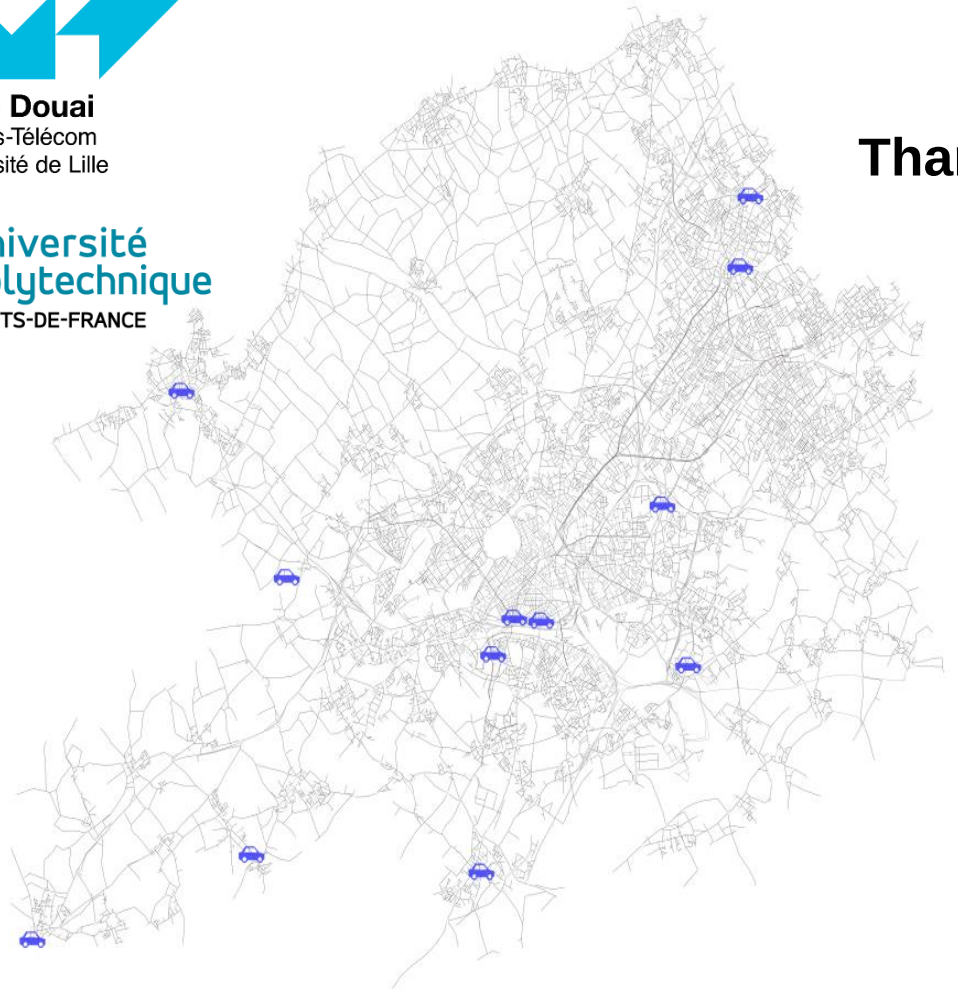

Thank you!

Questions?

Contributions?