Optimization of Parking Prices using MATSim

Milos Balac

IVT
ETH Zurich

Institut für Verkehrsplanung und Transportsysteme
Institute for Transport Planning and Systems

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ETH

Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Motivation

Source: Tages Anzeiger - http://www.tagesanzeiger.ch/

Parking in MATSim

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- ▶ Otherwise, each parking space is evaluated based on the distance and cost.

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$$U_{walking} = \beta_{walking} * distance \qquad (3)$$

Optimization of the parking prices

Parking price optimization procedure:

1: **for** each parking set **do**
2:    **if** occupancy <0.85 **then**
3:       price $-= 0.25$
4:    **else**
5:       price $+= 0.25$
6:    **end if**
7: **end for**

This is executed before the start of each iteration.

Scenario - Zurich area

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Parking supply:

- ▶ Around 50,000 on-street parking spaces.
- ▶ Around 16,000 spaces in parking garages.
- ▶ More than 200,000 private parking spaces.

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▶ White zones - limited time; 1 - 4 chf per hour.

▶ Garages - unlimited time; 0.5 - 4.5 chf per hour

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- ▶ Hourly scenario - Prices are optimized on an hourly level.

Parking spaces are grouped on a street block level.

Validation - Using garage counts

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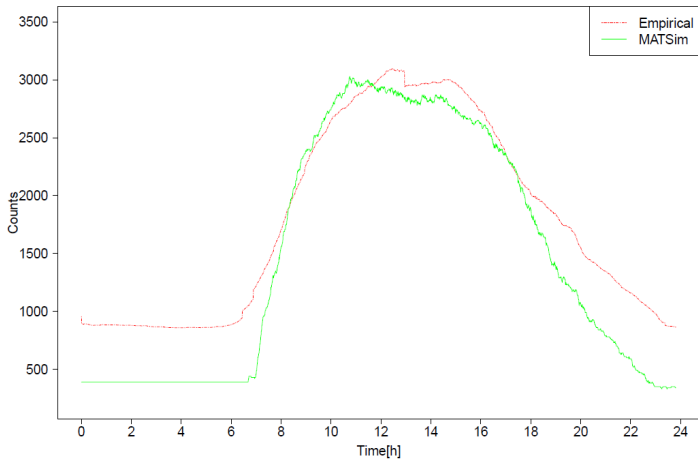
MATSim - Distance to parking location

Scenario	Base	Daily	Hourly
On-street mean [m]	229	212	158
On-street standard deviation [m]	228	234	176
Garage mean [m]	201	301	239
Garage standard deviation [m]	143	214	172

Parking Ocuupancy
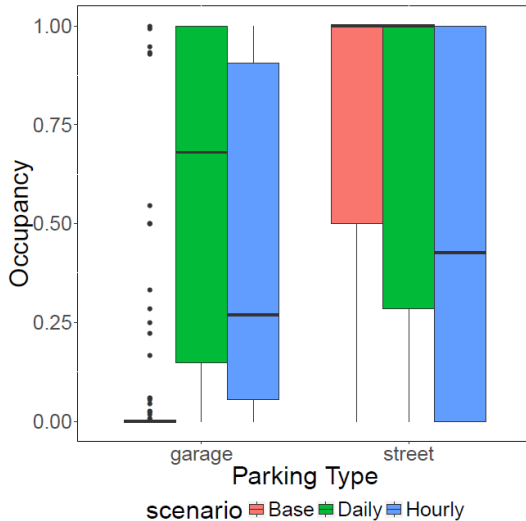
Base: on-street occupancy at 6am
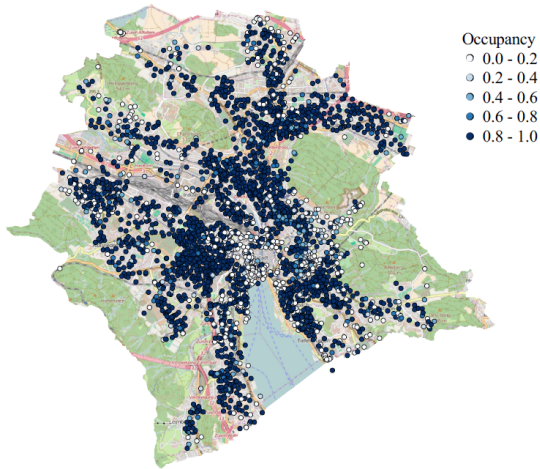
Occupancy
- ○ 0.0 - 0.2
- ● 0.2 - 0.4
- ● 0.4 - 0.6
- ● 0.6 - 0.8
- ● 0.8 - 1.0

Daily: on-street occupancy at 6am

Occupancy
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Hourly: on-street occupancy at 6am

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- 0.0 - 0.2
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- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0
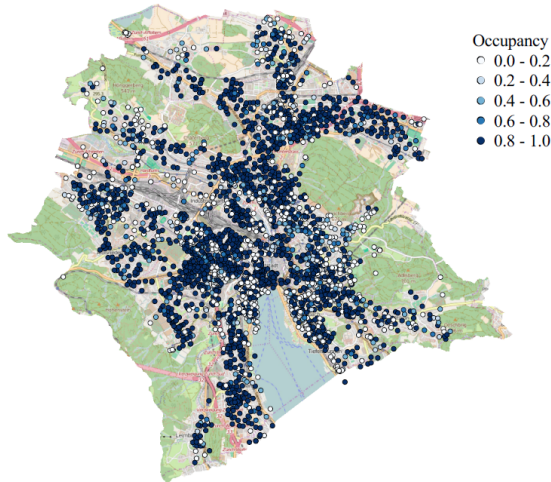
Base: garage occupancy at 6am
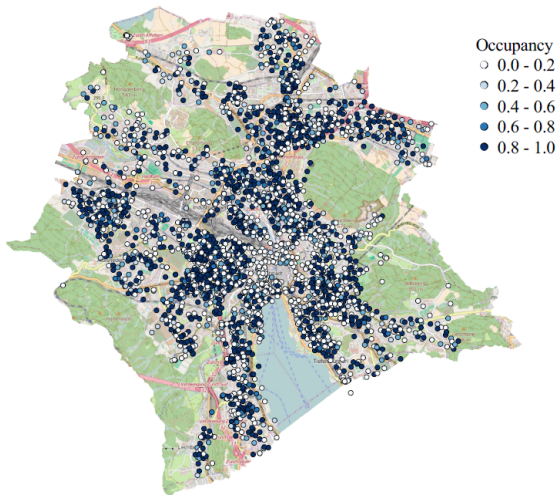
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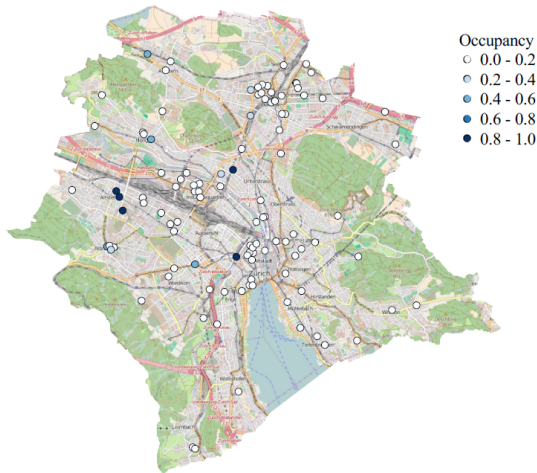
Daily: garage occupancy at 6am

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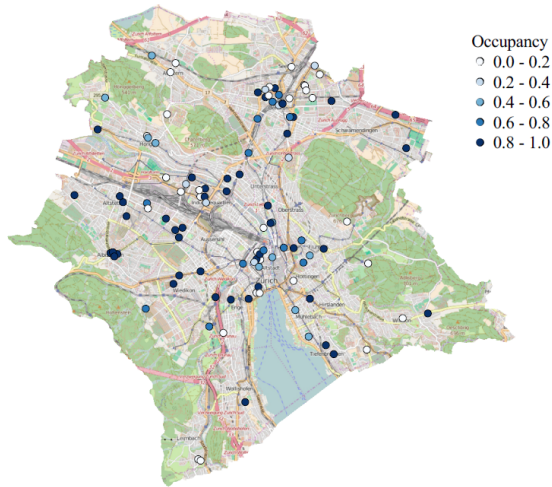
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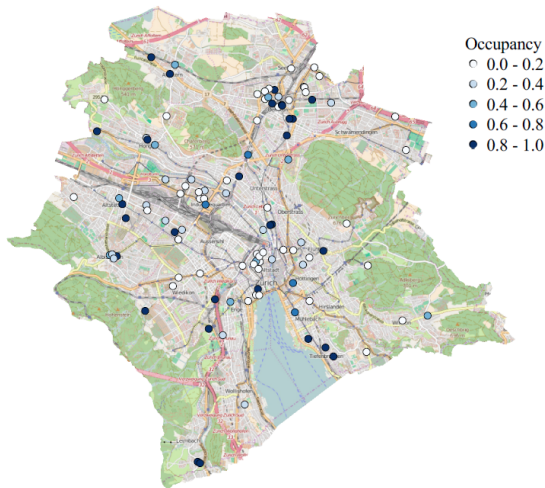
On-street parking prices
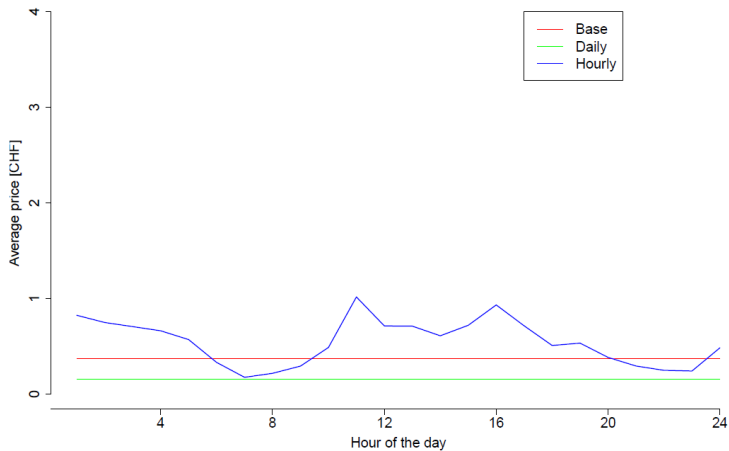
Garage parking prices
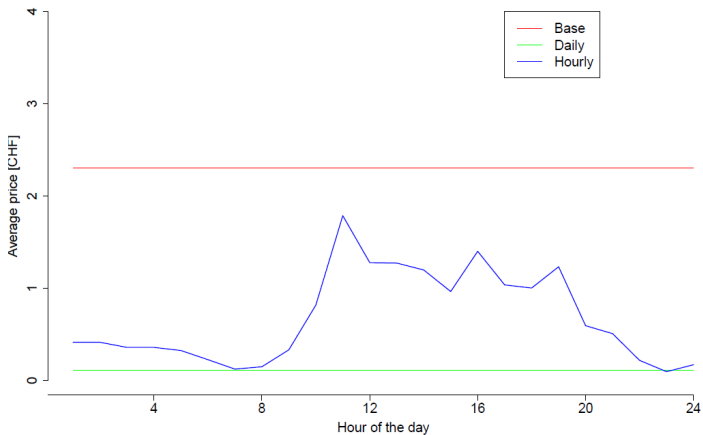
Turnover

Revenue	Base	Daily	Hourly
Total [CHF]	29,832	16,472	77,844
On-street [CHF]	13,439	2,836	22,535
Garage [CHF]	16,392	13,635	55,308

Towards the improved parking choice model

Information gathered in the blue zones:

- Time of the day at the start of the segment.

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Information gathered in the blue zones:

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- ▶ License plates.

Towards the improved parking choice model

Information gathered in the blue zones:

- ▶ Time of the day at the start of the segment.
- ▶ Start address of the segment.
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- ▶ License plates.
- ▶ Type of permit.

Towards the improved parking choice model

Information gathered in the blue zones:

- ▶ Time of the day at the start of the segment.
- ▶ Start address of the segment.
- ▶ End address of the segment.
- ▶ License plates.
- ▶ Type of permit.
- ▶ Approximate number of empty spaces in the segment.

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4. Collection was carried out after 9pm in July.
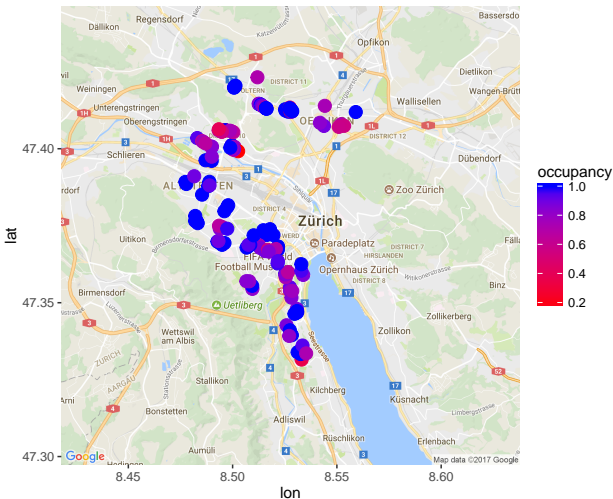
Gathered parking data - Permits
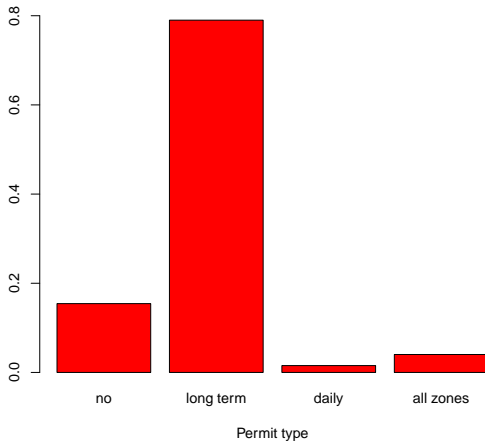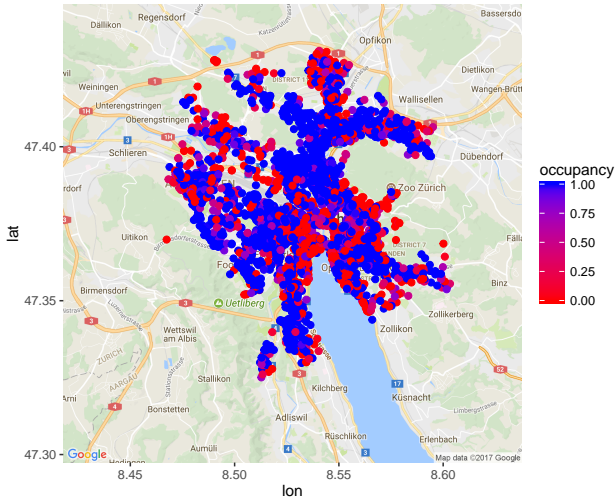
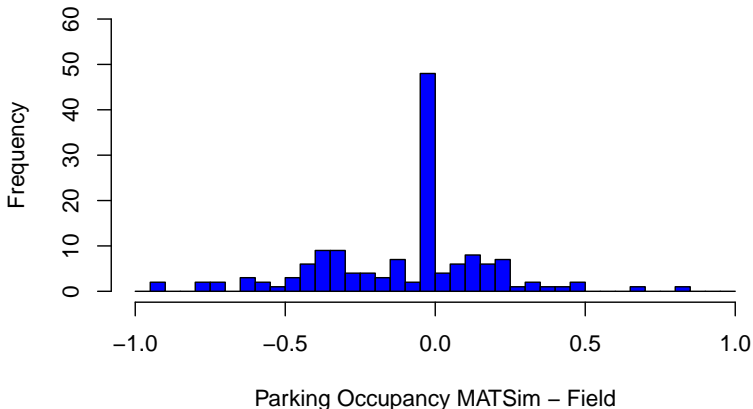# Gathered parking data - Parking occupancy
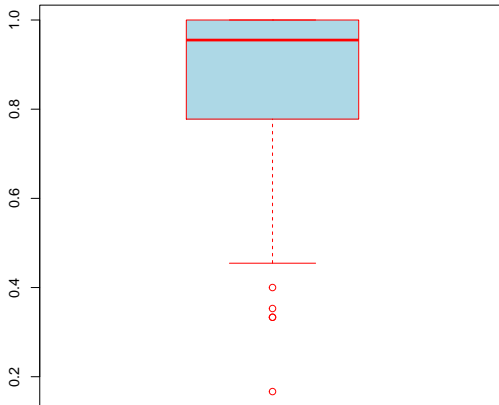
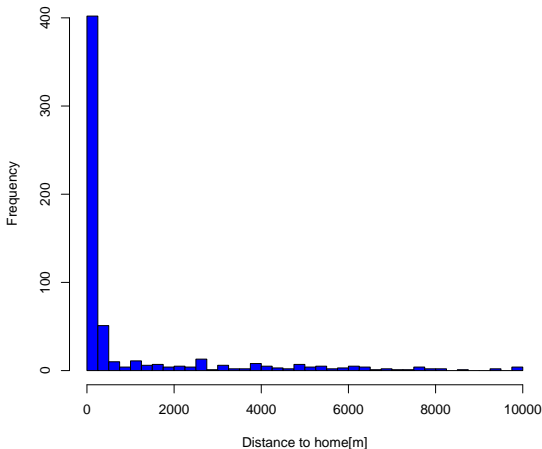Parking space occupancy

Gathered parking data - Parking occupancy

Same time of the day in MATSim - all on-street
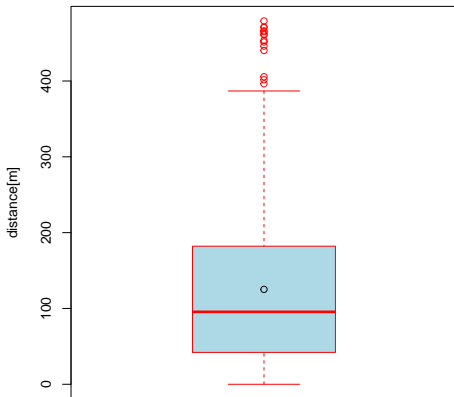
MATSim VS Gathered data - Occupancy

Gathered parking data - Distance to parking

If we only include distances below 500m.

Parking distance

Questions & Comments