ONE BY ONE

creating pseudo-individual populations to empirically examine scaling issues in agent-based models

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UNIVERSITY of SALZBURG GISCIENCE DOCTORAL COLLEGE Z_GIS FWF

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Context

Methodology

(Preliminary) **Results**

Conclusion & Outlook

CONTEXT

pre-existing models on
residential mobility in respect to the
social cohesion of neighbourhoods exist, but are
found to be

sensitive to scaling in the
temporal,
spatial, and
social dimensions

CONTEXT

The project, which the current research is a part of, aims to
develop a framework which allows
to run such a model repeatedly, with
varying scaling on multiple dimensions (such as space, time, and others).

Of primary concern are
agent-based micro-simulations of social actions.

Interface | Info | Code

Edit | Delete | Add | Button | normal speed | view updates | continuous | Settings...

setup | clu 1981 | clu 1991 | clu 2001 | patch sam...

sprengel | subclu 1... | subclu 1... | subclu 2... | agent sam...

districts | time 11 | count turtles 7583 | count patches 32761 | migrate

densityRedAgen... 80 | densityGreenAge... 80 | densityYellowAge... 80

densityRedAgentsF 5 | densityGreenAgentsF 5 | densityYellowAgent... 5

densityPurpleAgen... 80 | densityGrayAge... 80 | densityBlueAgen... 80

densityPurpleAgentsF 5 | densityGrayAgen... 5 | densityBlueAgentsF 5

radius of similarity: radsim 3

radius of search: radspace 60

spatial weight: omega 0.6

decision to: thresh... 0.35

max of simulation: max_ti... 300

varying the creation of new housing: timescale 5

calculates similar: agent cluster

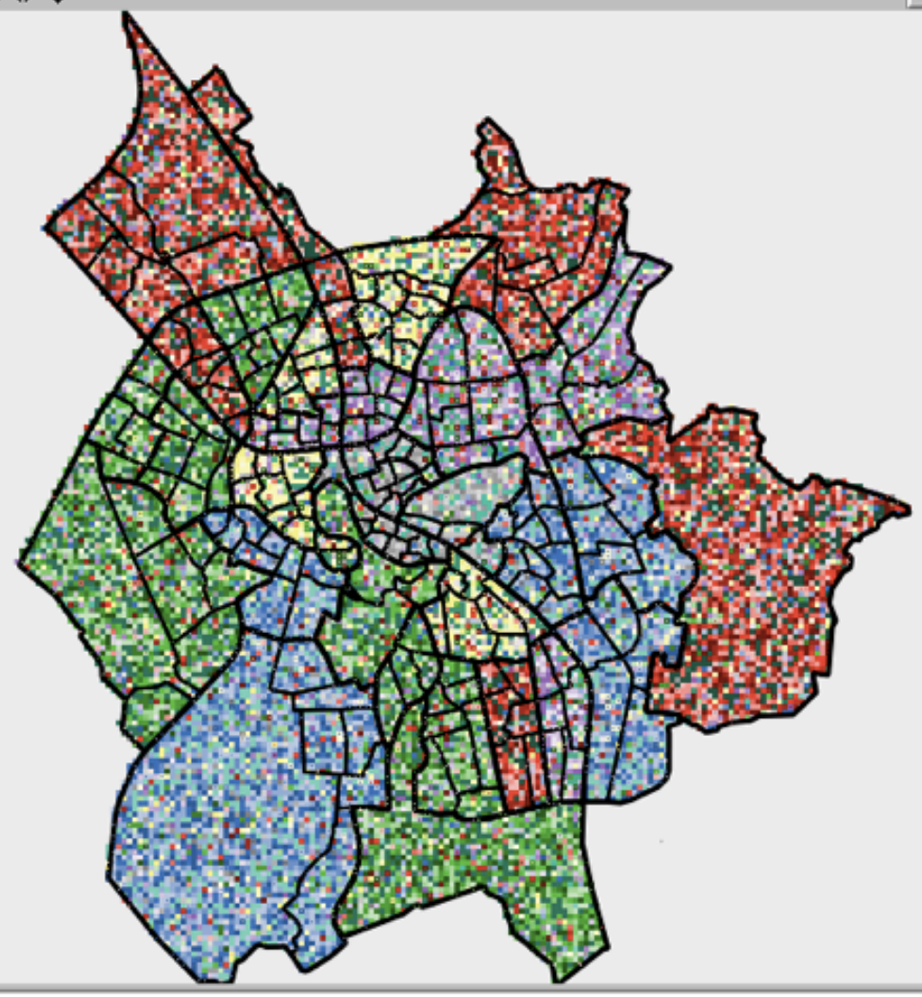
patch relations

2170 / 320 / patches / 0 / time / 20

radius of calculating: radclu 3

sh_value 0.5

ticks: 11 | 3D



counts the number of patch clusters

calc-clu | red 0 | green 0 | yellow 0 | violet 0 | gray 0 | blue 0

patch shares

200 / 0 / cent of sha / 0 / time / 20

red agents: 10 / 0 / 0 / 20

green agents: 10 / 0 / 0 / 10

yellow agents: 10 / 0 / 0 / 10

violet agents: 10 / 0 / 0 / 10

gray agents: 10 / 0 / 0 / 10

blue agents: 10 / 0 / 0 / 20

Command Center | Clear

observer>

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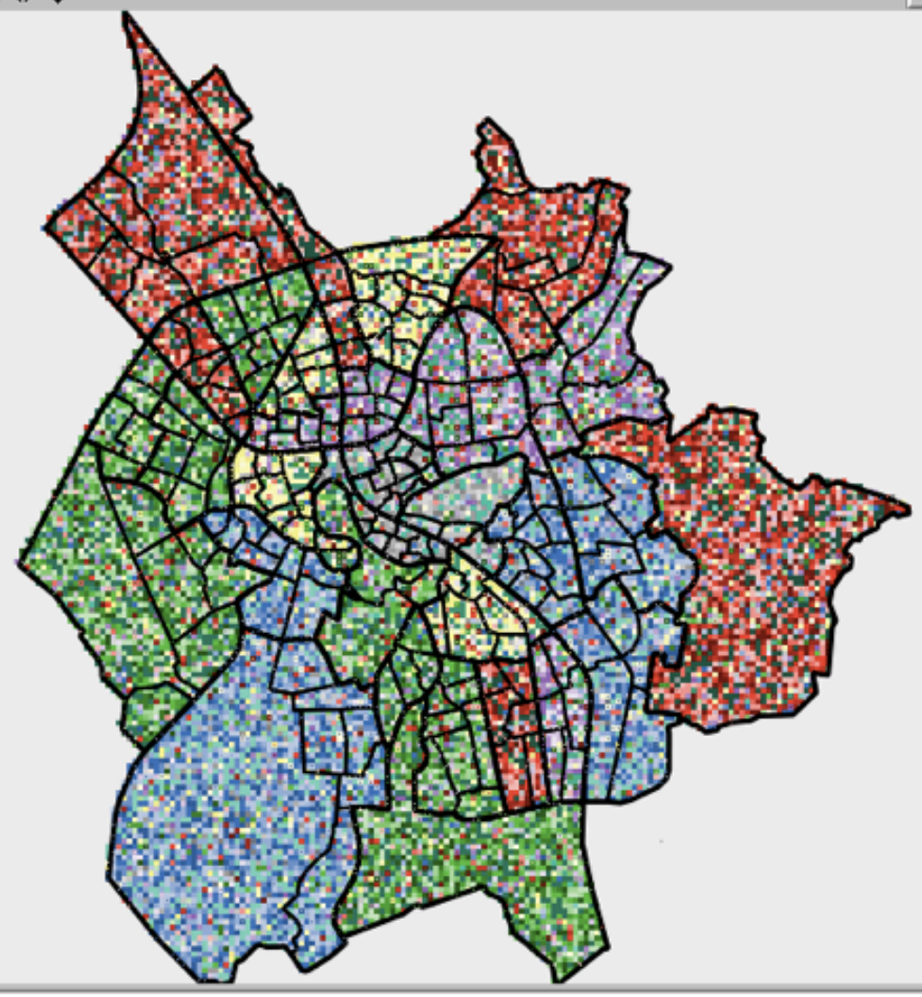

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Command Center | Clear

observer>

MODIFIABLE AREAL UNIT PROBLEM

TEMPORAL

MODIFIABLE AREAL UNIT PROBLEM

SOCIAL

MTUP

MAUP

MSUP

MTUP day, week, month, year, ...

MAUP dwelling unit, building, block, ...

MSUP individual, household, classes of HHs, ...

WORKPACKAGES

data preparation: to be able to stepwise aggregate the model parameters, a data basis with the highest semantically sensible* resolution is needed

socio-economic status? employing a survey, social status is mapped to demographic an socio-economic variables

decision rulesets are refined using data gathered in interview series

a custom modelling environment will be devised

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OBJECTIVES

Create a data basis with the highest sensible resolution on all available dimensions.

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Create a data basis with the highest sensible resolution on all available dimensions,
which is able to represent a population by individuals with socio-economic/demographic data assigned.

The dataset does not necessarily have to have any predictive qualities over "reality".

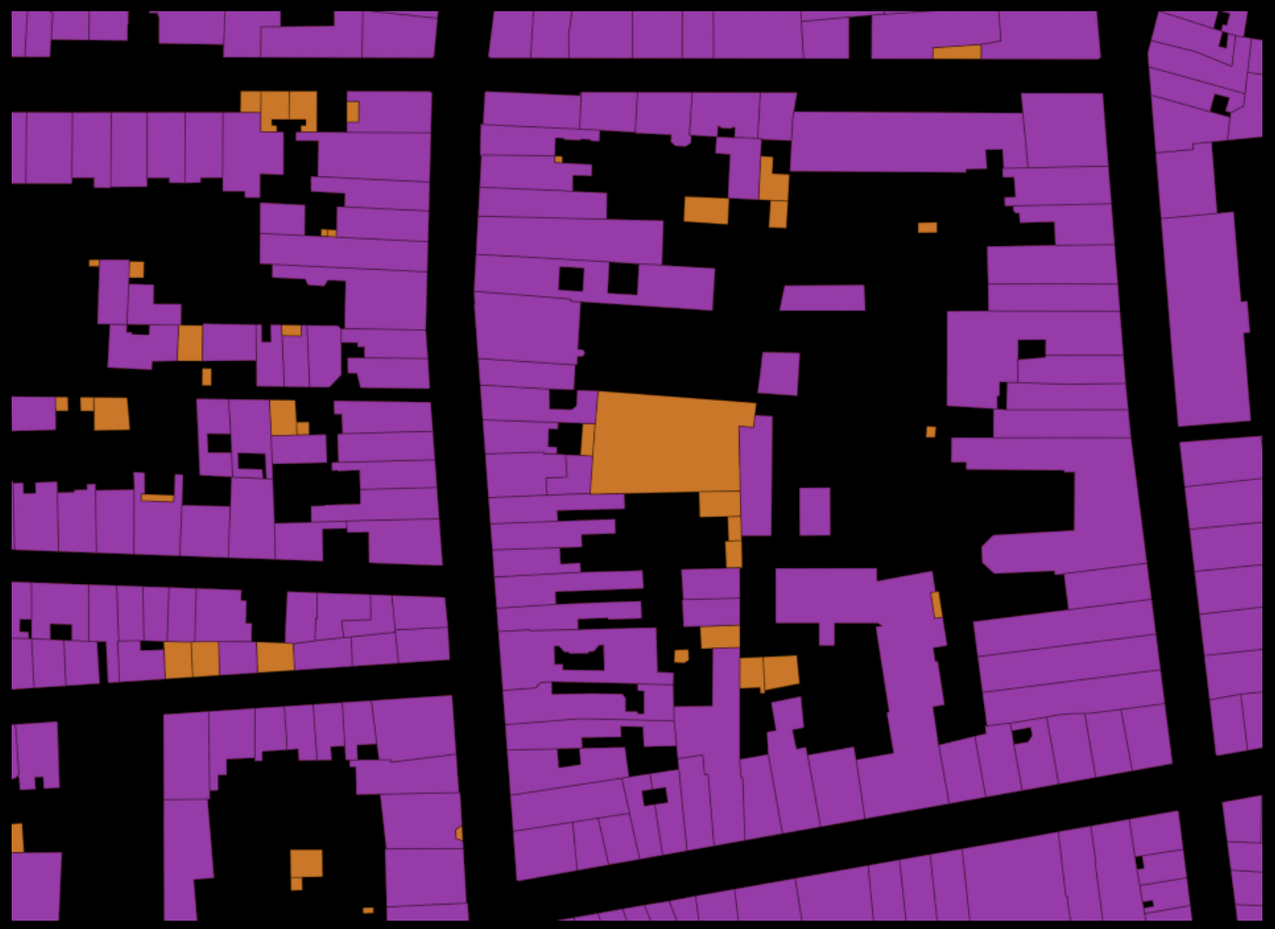
INPUT DATA

census tracts (e.g. INSEE iris)

population grid (e.g. INSEE rayons carroyée)

building polygons (BD_PARCELLES)

PROCESSING (1)



filtering buildings: outliers (built-up area) are discarded

PROCESSING (2)

distributing population: transfer population count from grid to building polygons

PROCESSING (3)

$$\left(\sum_{i=0}^{N} \frac{\frac{1}{d(B_i, SU_i)} \cdot u(SU_i)}{\sum_{j=0}^{N} \frac{1}{d(B_i, SU_j)}}\right) \cdot \frac{1}{u(SU \ni B)} \cdot \frac{p(B)}{\sum_{B_k \in SU_i} p(B_k)}$$

d(x,y) … distance between the centroids of x and y
u(x) … value of u in polygon x
B … building polygon
SU … census tract polygon

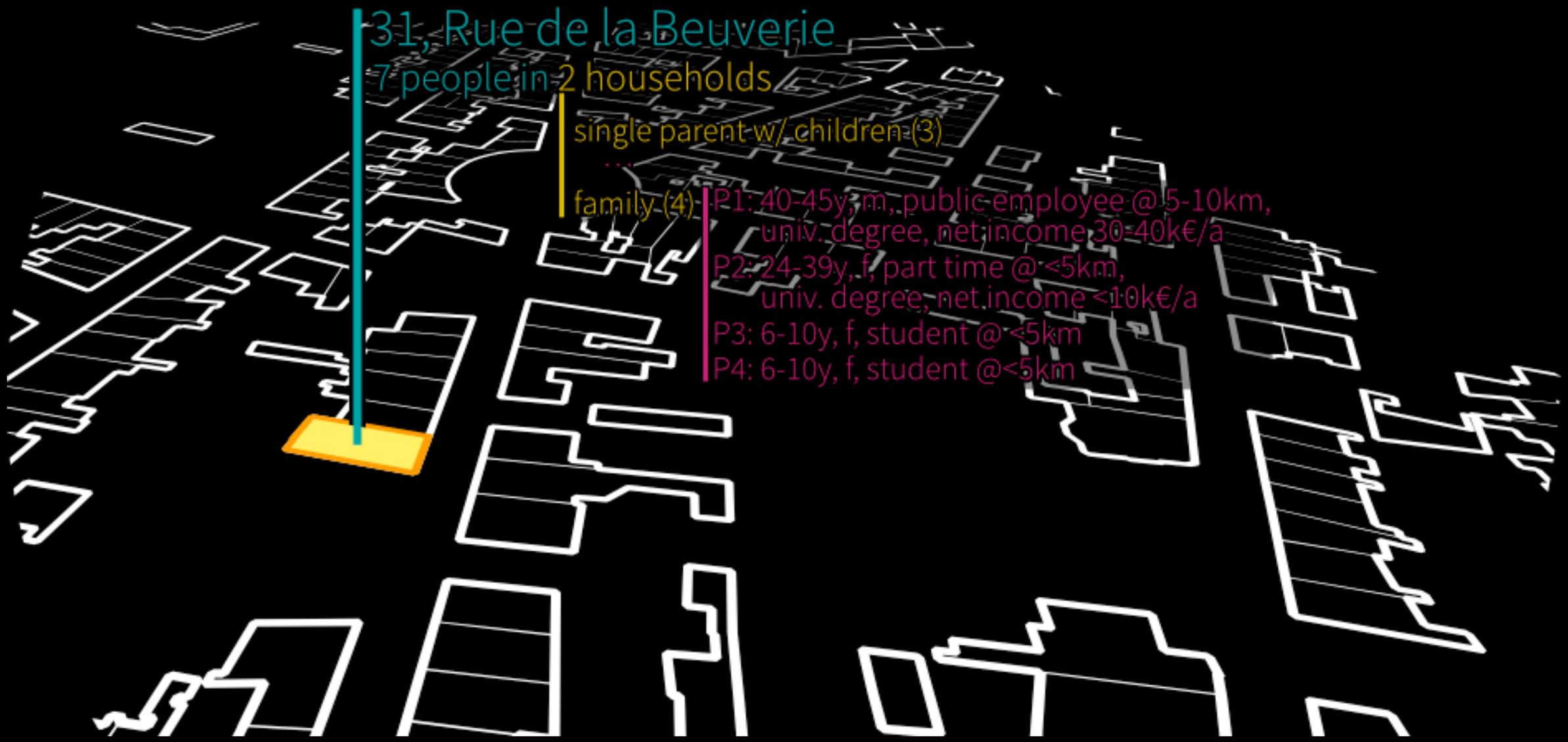
weighting variables from census tracts: transfer population count from grid to building polygons

Identifikationsergebnis

Objekt	Wert
0	btx_batiments_int
rowid_1	0
(abgeleitet)	
(Aktionen)	
c08_act1564	2
c08_act1564_cs1	0
c08_act1564_cs2	1
c08_act1564_cs3	0
c08_act1564_cs4	1
c08_act1564_cs5	0
c08_act1564_cs6	0
c08_actocc1564	2
c08_actocc1564_cs1	0
c08_actocc1564_cs2	1
c08_actocc1564_cs3	0
c08_actocc1564_cs4	1
c08_actocc1564_cs5	0
c08_actocc1564_cs6	0
c08_actocc15p	2
c08_actocc15p_drou	0
c08_actocc15p_mar	1
c08_actocc15p_pas	0
c08_actocc15p_tcom	0
c08_actocc15p_voit	0
c08_coupaenf	0
c08_coupsenf	0
c08_f15p	2
c08_f15p_cs1	0
c08_f15p_cs2	0
c08_f15p_cs3	0
c08_f15p_cs4	0
c08_f15p_cs5	0
c08_f15p_cs6	0
c08_f15p_cs7	1

Help

PROCESSING (4)



building households: aggregate individuals to households, assign households to buildings

CONCLUSION

I was successful in amalgamating different data sources into a pseudo-individual population.

My next steps will be to refine rules, and conceive of a framework for running models in varied scaling

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