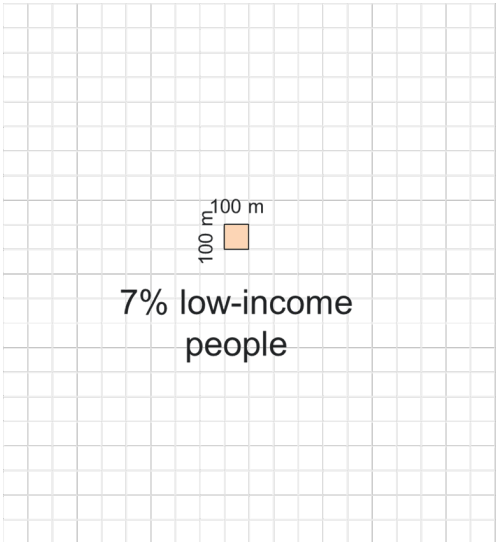
Group assignment 1:

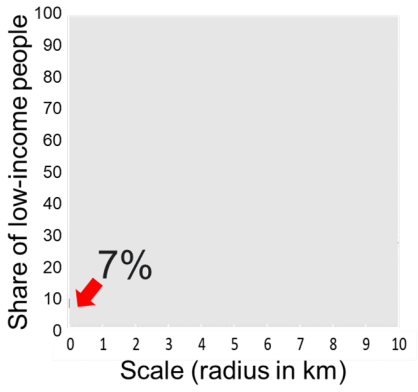
Scaling up the multiscale: Analysis of multiscale sociospatial contexts for the full population of Europe?

Ana Petrović

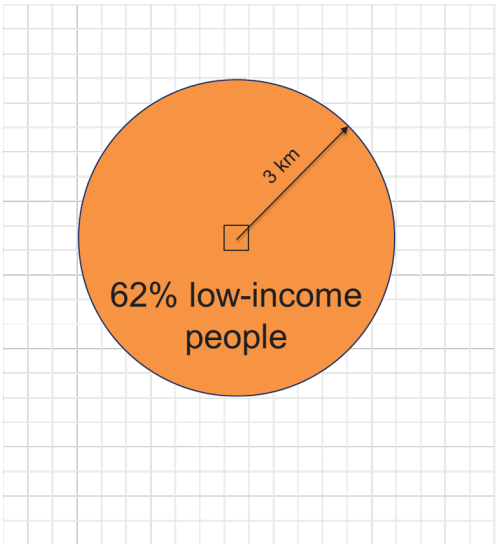
Research question:
How can we compute multiscale measures of population to analyse sociospatial contexts at various scales for the full population of Europe?

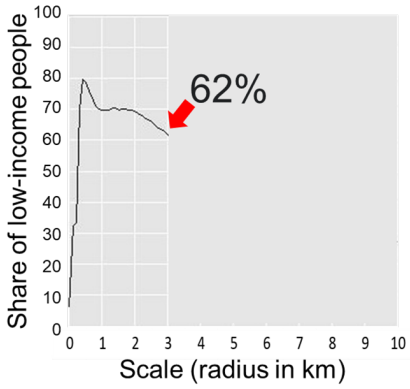
Description:
The neighbourhood and the social and built environment in which people live may impact individual outcomes, such as school results, employment, and health and wellbeing. One of the main challenges in research linking urban environments to people is the measurement of the sociospatial contexts. Traditionally, context is measured at a single spatial scale, for example by identifying the characteristics of an administrative neighbourhood in which people live. Researchers and policy makers increasingly acknowledge that measures of spatial context should be multiscale to embrace various urban contexts to which people are potentially exposed (Petrović et al., 2019). The Netherlands has excellent and unique register data, enabling the creation of such spatial context variables, which can then be used in models to estimate how they impact individual outcomes. Using individual level register data from Statistics Netherlands (CBS), we have developed a methodology to create multiscale measures of population (Petrović et al., 2018) and examined how the multiscale contexts affect individual outcomes (Petrović et al., 2021).



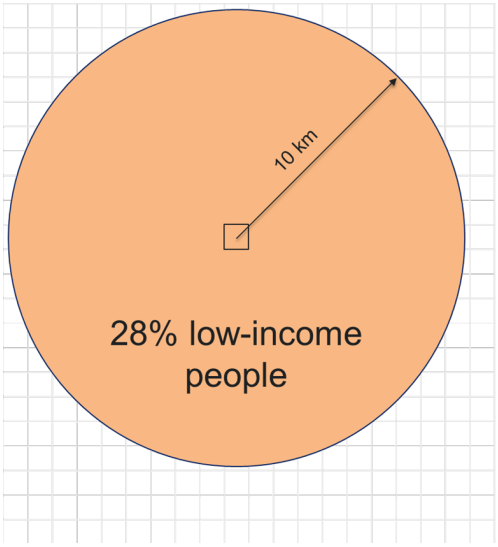


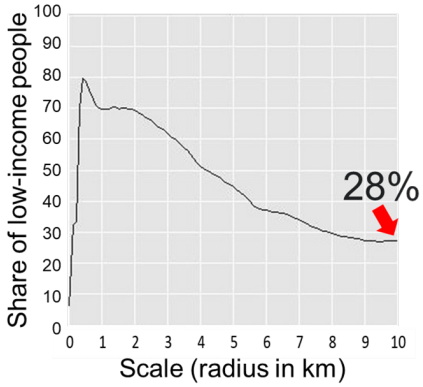
(see Petrović, van Ham, & Manley, 2018)





(see Petrović, van Ham, & Manley, 2018)





(see Petrović, van Ham, & Manley, 2018)

Figure 1: Exposure to spatial contexts at 101 scales

The construction of these spatial contexts is extremely computationally complex and standard computers cannot deal with the computational demands effectively.

Scalability challenge:
Based on the developed method applied on the register data from the Netherlands, think about the following question:

How can we compute multiscale measures of population to analyse sociospatial contexts at various scales for the full population of Europe?

Consider, for example, the following aspects:

1. data availability and quality
   → See for inspiration: Data for Integration (D4I) of the European Commission https://knowledge4policy.ec.europa.eu/migration-demography/data-integration-d4i_en#mapsofmigrantcommunities

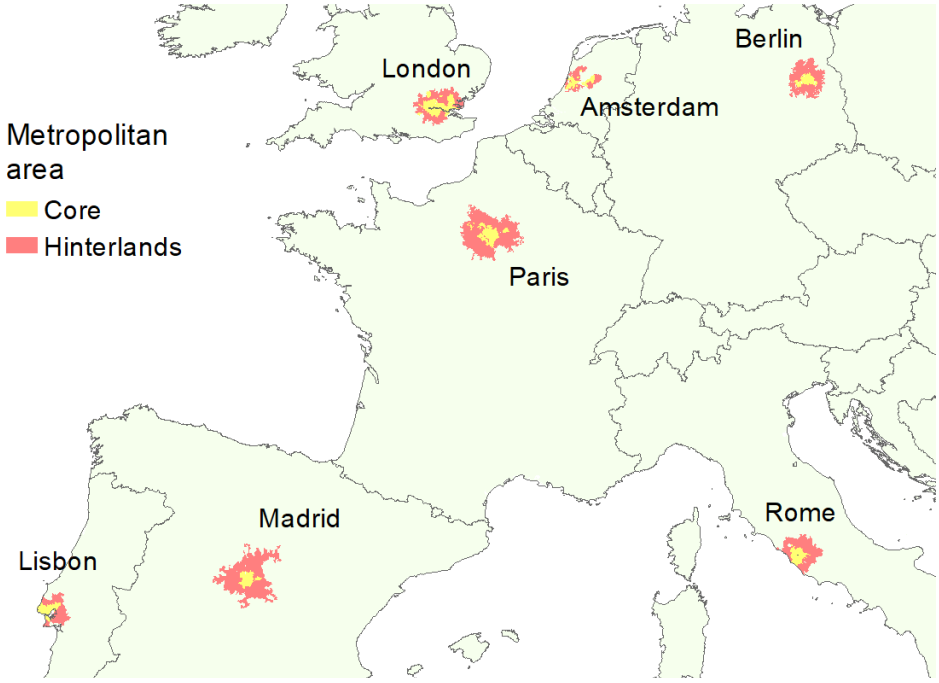


Figure 2: Metropolitan areas of seven European capitals (Petrović et al., under review)

2. computational infrastructure
   → See for inspiration: OSSC project 'Effects of spatial contextual characteristics on personal income'
   https://odissei-data.nl/en/2018/10/effects-of-spatial-contextual-characteristics-on-personal-income-tudelft-ossc/

3. multiscale approach (relevant/feasible spatial scales)

4. accuracy vs. feasibility.

References:

Petrović, A., van Ham, M., & Manley, D. (2021). Where Do Neighborhood Effects End? Moving to Multiscale Spatial Contextual Effects. Annals of the American Association of Geographers, 1-21 (open access).

Petrović, A., Manley, D., van Ham, M. (2019). Freedom from the Tyranny of Neighbourhood: Rethinking Socio-Spatial Context Effects. Progress in Human Geography (IF: 7.54), 44(6), 1103-1123 (open access).

Petrović, A., van Ham, M., Manley, D. (2018). Multiscale Measures of Population: Within- and between-City Variation in Exposure to the Sociospatial Context. Annals of the American Association of Geographers (IF: 3.30), 108(4), 1057-1074 (open access).

Petrovic, A., van Ham, M., Manley, D., Tammaru, T. (under review). Examining the Five Dimensions of Segregation. A Multiscalar Perspective from Seven European Capitals.

Group assignment 2:

Analysis of land use change in the Netherlands

Daniele Cannatella

Objective:
The objective of this assignment is to analyse land use / land cover change patterns and dynamics in the Netherlands using GIS techniques.

Assignment:
You will work with an urban dataset specific to the Netherlands, survey land use changes and generate visualisations to understand the urban development patterns of the country as a whole. Considering the sheer size of country-level spatial-temporal data, the scalability challenge is the storage, analysis and visualisation of the data.

Steps to consider in the workflow:

1. Dataset selection: choose an open dataset that includes historical land use / land cover information (e.g., Corine Land Cover, ESA CCI Land Cover Maps, etc.)
2. Data preparation (cleaning and pre-processing) and validation
3. Survey and analysis of land-use changes
4. Interactive visualization (maps, graphs, charts)

Group assignment 3:

Comparative urban riverspace delineation

Claudiu Forgaci

Research question:
How can the spatial delineation of urban riverspaces be scaled up to large cross-case analysis?

Description:
As urbanism research engages in understanding integrated urban riverspace transformations (Forgaci, 2018), advanced digital workflows to capture detailed cross-case patterns of riverside urban spaces remain scarce. At the same time, the increasing availability of open spatial-temporal big data presents an opportunity to analyse urban riverspaces at large (Forgaci, 2020), enabling integrated local spatial analyses and global comparative analyses, which have been hindered by data- or workflow-related difficulties.

Scalability challenge:
Building on a previously developed GIS-based delineation method (Figure 1, Forgaci, 2018, pp.88-9), workshop participants are asked to think about: how open spatial-temporal big data (e.g., OpenStreetMap, or Sentinel satellite imagery for high-resolution satellite imagery) can be leveraged for the delineation of a large number of cases (e.g., all European cities); and how a wide variety of thematic data (e.g., flood, traffic, biodiversity) can be integrated with the spatial-temporal big data for integrated local analyses. Please consider: the incompleteness, inconsistency, and heterogeneity of local spatial-temporal data; and the need for an integrated, interdisciplinary, and multi-scalar approach.

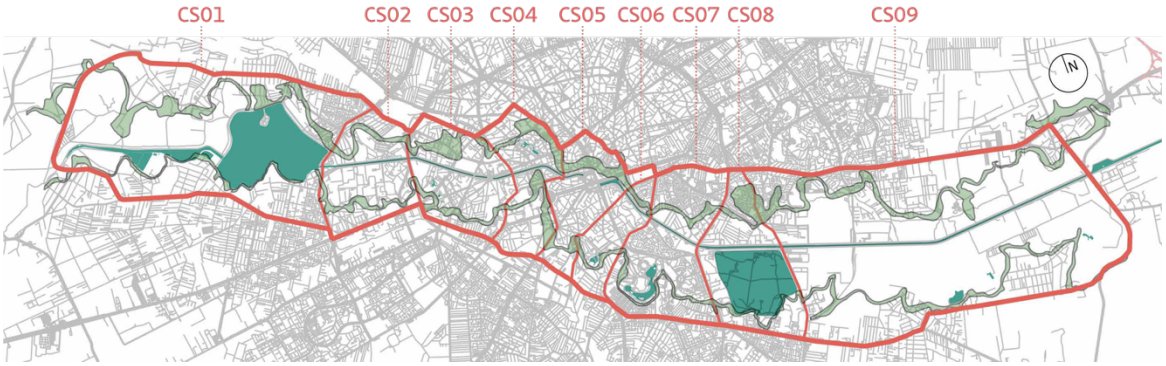


Figure 1. Example: the delineation of URC Dâmbovita and its segments – delineation in red (Forgaci, 2018).

References:

Forgaci, C. (2018). *Integrated Urban River Corridors: Spatial Design for Social-Ecological Integration in Bucharest and Beyond* [Delft University of Technology]. https://doi.org/10.7480/abe.2018.31

Forgaci, C. (2020). Smart and resilient cities: How can big data inform spatial design and planning for urban resilience? *Contesti. Città, Territori, Progetti*, *1*, 62–71. https://doi.org/10.13128/contest-12035