Analysing Urban form using big data

A primer for urban data science in python

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The UK's Institute for Artificial Intelligence and Data Science

Center for Urban Studies, Kyiv National University, October 2021

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Background

I am Christina Last, and I use data to understand our built environment.

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Urban Form

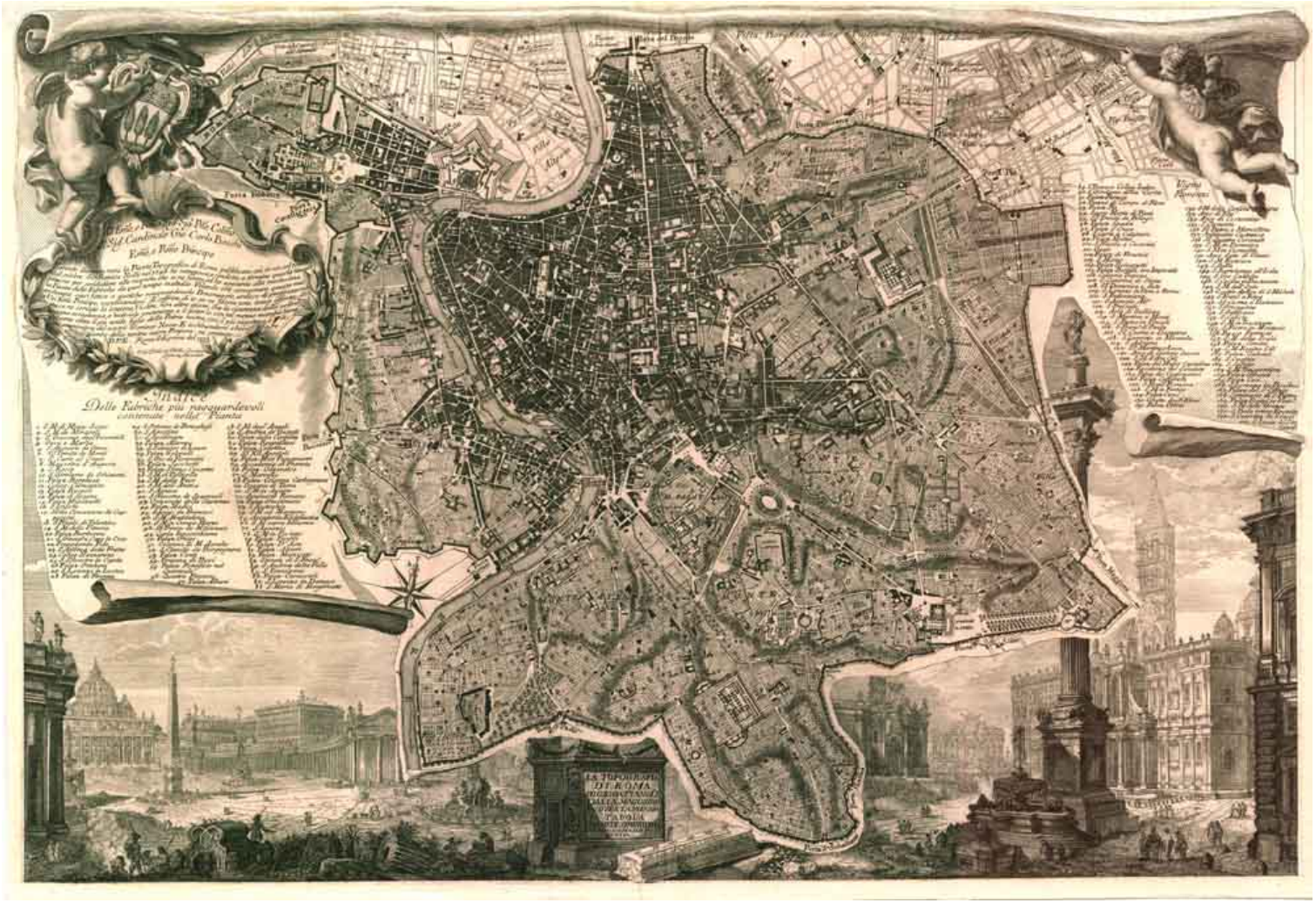

Figure: The Nolli map, 1748, wikipedia

Urban Form

Figure: Map of Rome created for the State of the Map 2019 social event by Adam Rousell and Sabrina Marx using OpenStreetMap data and QGIS.

Urban Form

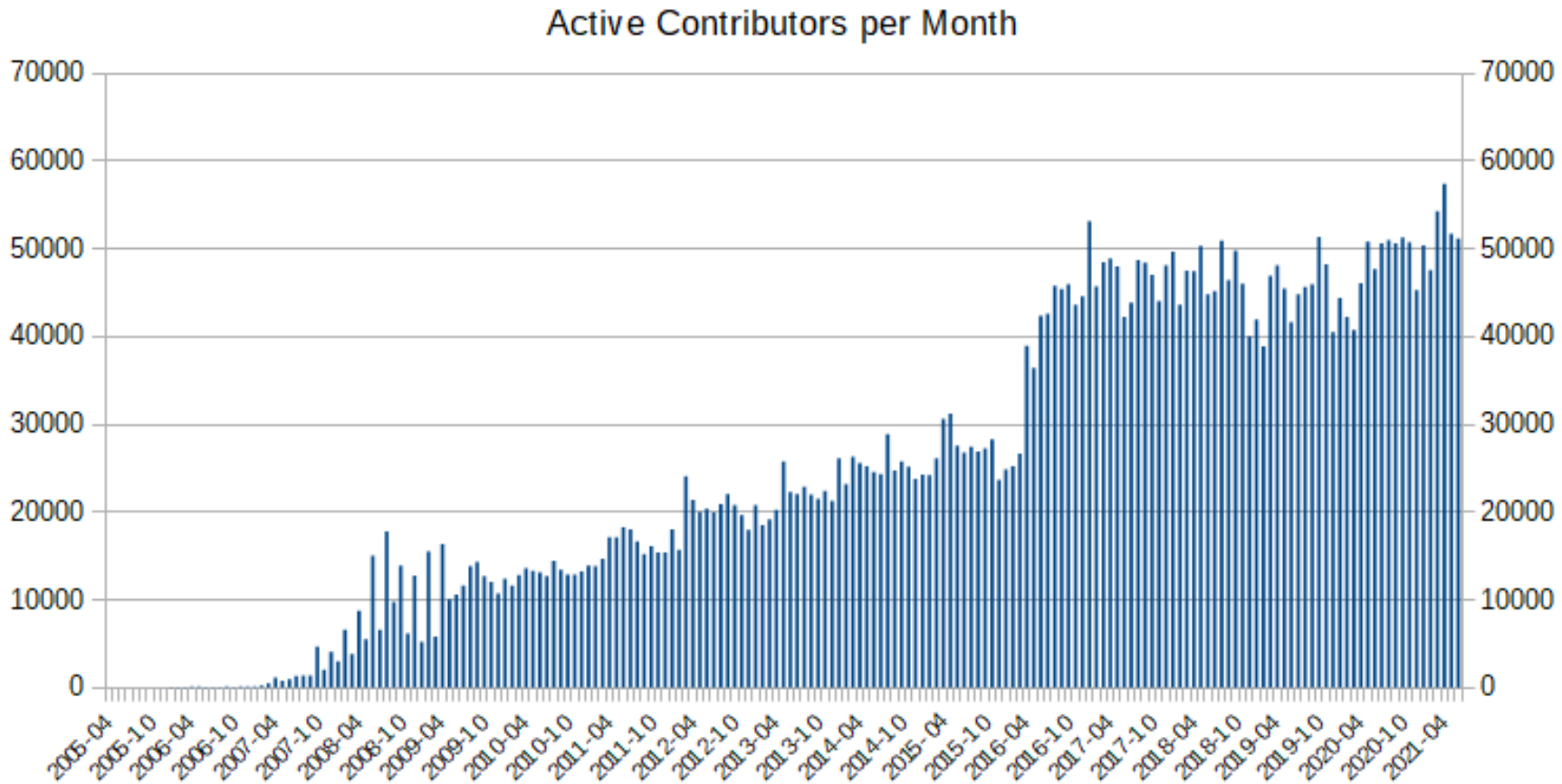

Figure: Contributions to open source mapping has been growing, reaching 100 million contributions this year

In the age of ubiquitous urban data

In the age of ubiquitous urban data
computational toolkits open up a new era of worldwide urban form analysis

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computational toolkits open up a new era of worldwide urban form analysis to integrated quantitative and qualitative perspectives into urban planning.

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Python for urban data science

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User-contributed big data about spatial infrastructure that allow us to examine the physical flows of people, goods, and information through urban space.

Python for urban data science

Figure: Kyiv

Figure: Lviv

Figure: Odesa

Figure: Donetsk

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Figure: Odesa

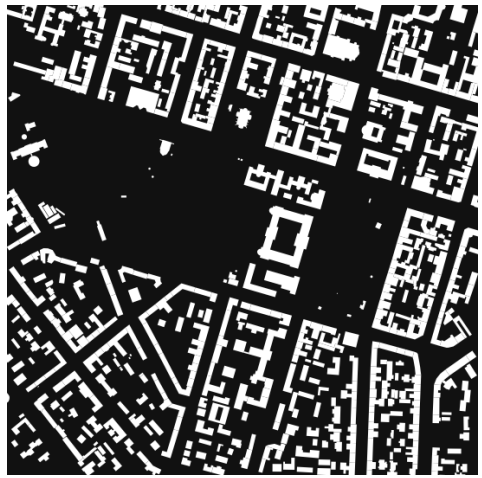

Figure: Donetsk

Python for urban data science

Figure: Kyiv

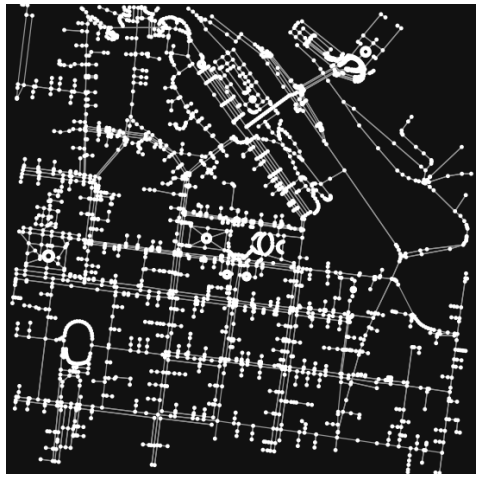

Figure: Lviv

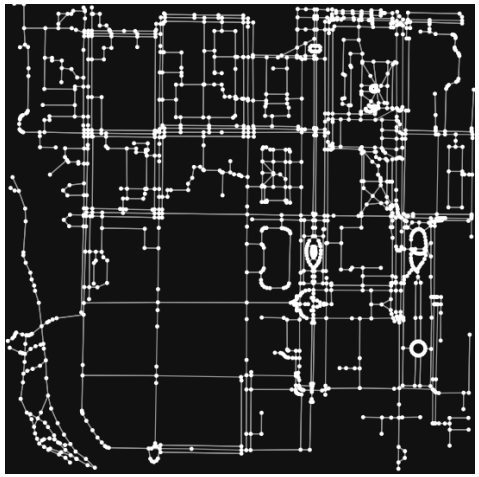

Figure: Odesa

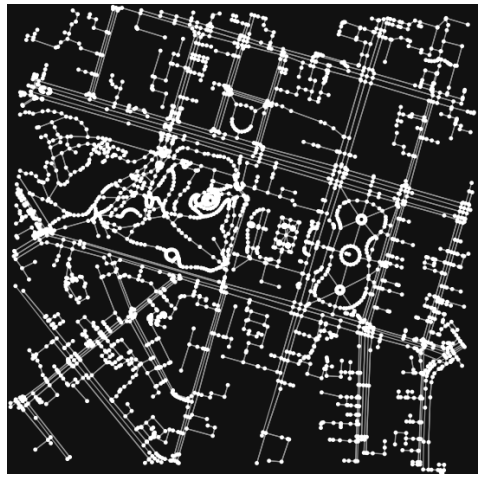

Figure: Donetsk

City Street Network Orientation

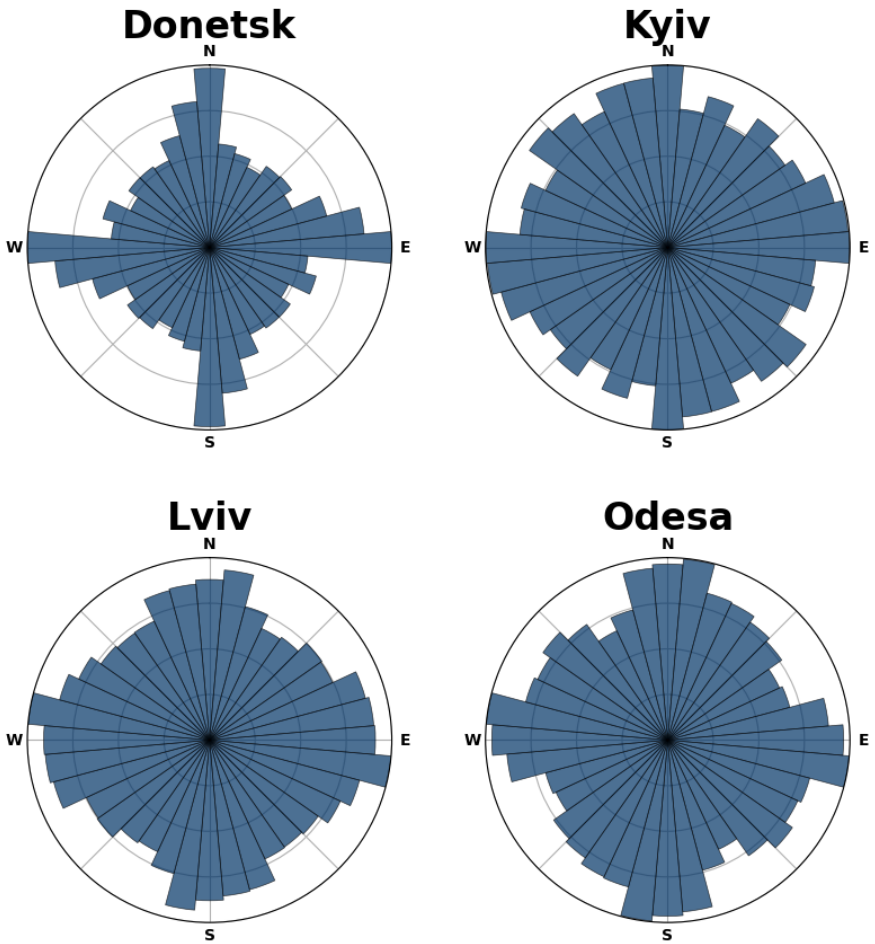

Figure: Rose diagrams of the street orientations in Ukraine's major cities

Through the tools of urban morphology and computer science, spatial information allows us to see how urban planning, design organize and order space [Boe17].

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The rose diagrams compress the complexity of street network orientation to help us understand similarities and differences in the spatial ordering of the city's streets [Boe19].

References

G. Boeing, *Osmnx: New methods for acquiring, constructing, analyzing, and visualizing complex street networks*, Computers, Environment and Urban Systems **65** (2017), 26–139.

_____, *Spatial information and the legibility of urban form: Big data in urban morphology*, Journal of Information Management **56** (2019), no. 102013.