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Generating a Pseudo Resident Registration Register by Using Open Data

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Dominik Visca received his master`s degree in Geoinformatics from the Mainz University of Applied Sciences, Germany in 2021. He is currently a research associate working in the project RAFVINIERT at the University of Applied Sciences Mainz focusing on data processing and information tools for spatial planning.

His research interests include digitization, open data as well as spatial data infrastructures and geo-government.



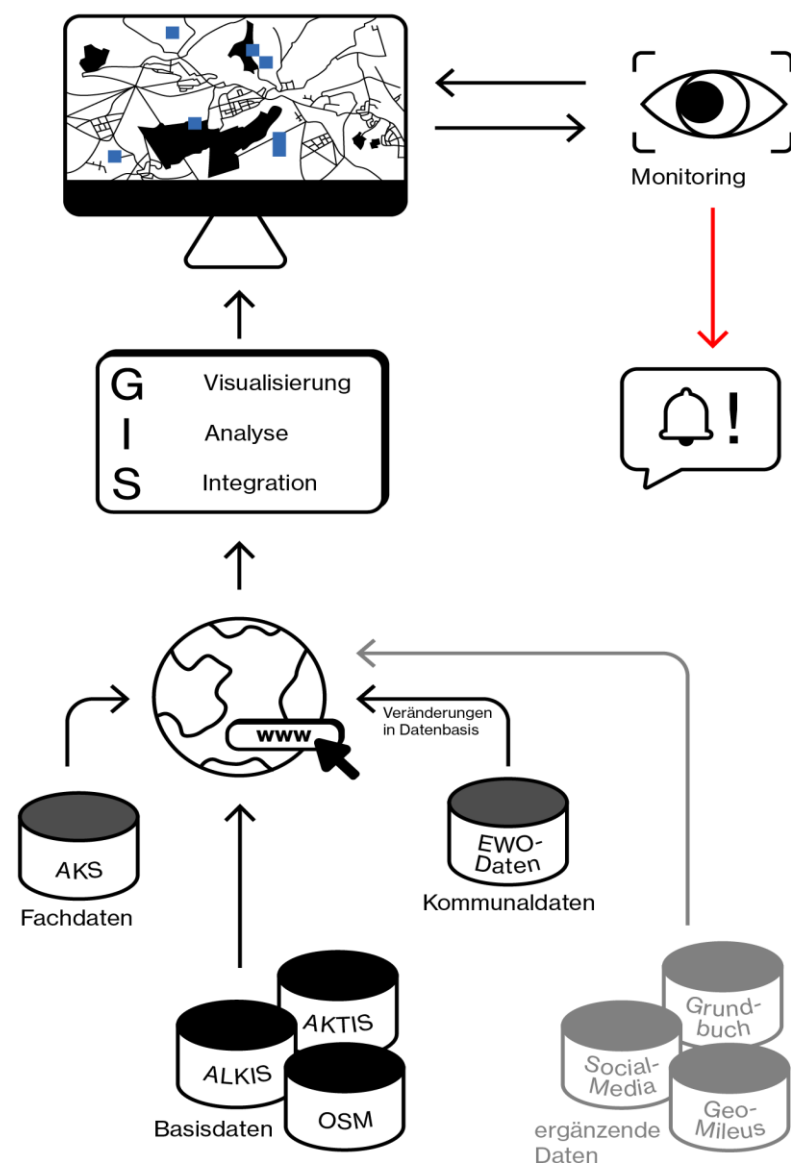
Max Hoppe received his master`s degree in Human Geography from the Johannes Gutenberg University Mainz, Germany in 2018. He is currently a research associate working in the project RAFVINIERT at the University of Applied Sciences Mainz focusing on transfer and communication with project partners.

His research interests include new governance arrangements in rural areas due to processes of the digital transformation.



RAFVINIERT

Raumintelligenz für die integrierte Versorgung von Seniorinnen und Senioren in ländlichen Quartieren



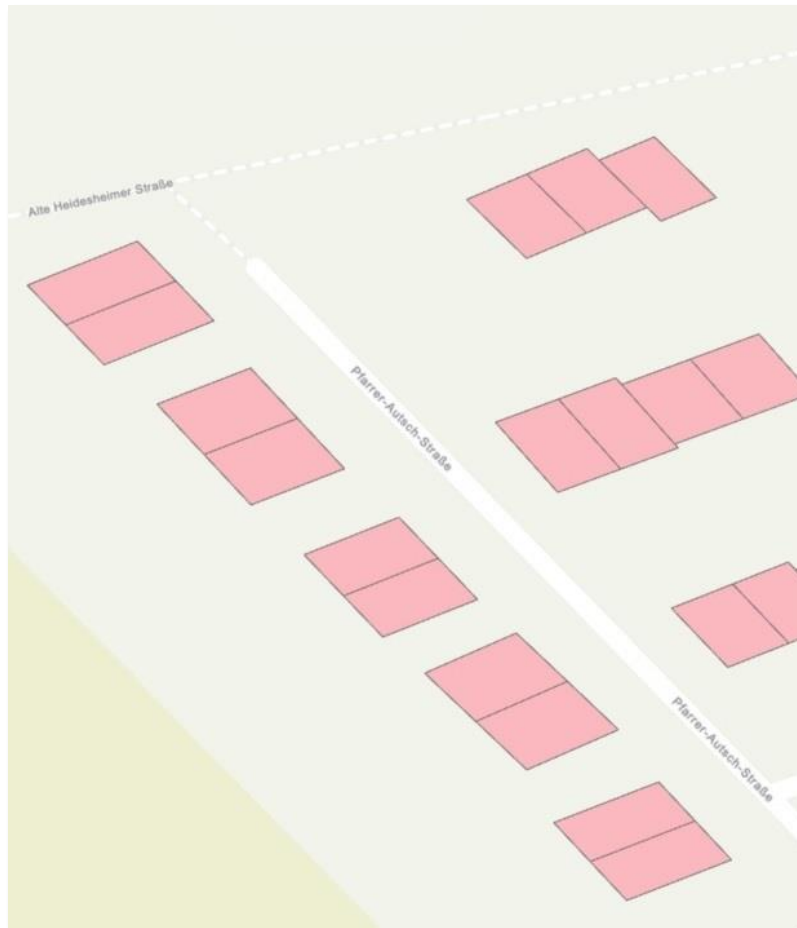
RAFVINIERT: Spatial intelligence for the integrated care of senior citizens in rural neighborhoods

Goal: Tools for small-scale monitoring of single-family neighborhoods with regard to demographic shifts and supply planning based on these processes

Precondition: Identification & integration of heterogeneous data and relevant indicators

Focus: Information platform for planners in rural municipalities

Why generating a Pseudo Resident Registration Register?



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- **Resident registration registers** provide information on the address, date of birth, gender, move-in and move-out dates of residents subject to registration
- **Demographic characteristics and trends** can be analyzed on the basis of this data
- The **geocoding** of addresses allows a spatial reference below the municipality level
- In **combination** with other data, issues beyond demographics can be targeted

Why then not just use Resident Registration Registers of Municipalities?



- **Resident registration registers** do not focus on research, but on the registration of residents in communities
 - Access and organization is challenging because of data protection regulations
- **Municipalities in rural areas** usually do not have an own office for statistics or a statistics department
 - Due to lack of manpower: additional effort in terms of dealing with **data protection** regulations (especially anonymization of data) in order to enable access

Relevance and the Impact of Open Data as a fit-for-purpose Solution



Relevance: Data availability and depth of content/topics of official statistics are usually less given at the municipal level in rural areas than at the county or regional level; data are mostly aggregated at the municipal level

Goal: Generating datasets that reflect information from resident registration registers and thus allow analyses below the municipal level, while complying with all data protection regulations

Sources: Grid cell-based results of the 2011 Census in Germany and geodata from OpenStreetMap.

OpenStreetMap



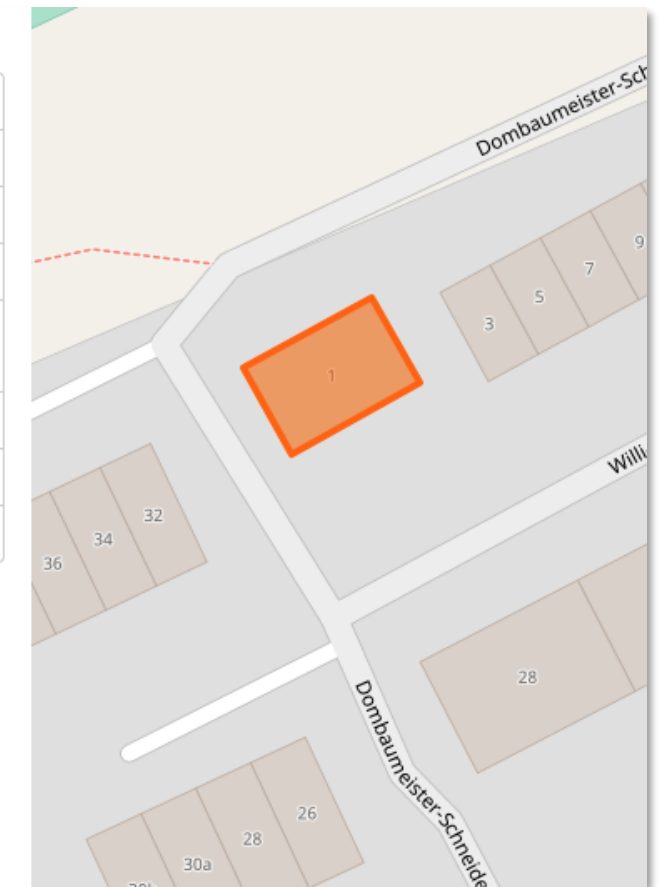
- Free VGI project
- OSM attributes in tags on e.g. building polygons
- Addresses are a central component for building reference
 - Filtered by residential buildings
- Building type *building* as assignment element
- Additional attributes as supporting assignment elements

Tags

addr:city	Mainz
addr:country	DE
addr:housenumber	1
addr:postcode	55128
addr:street	Dombaumeister-Schneider-Straße
building	detached
building:levels	1
roof:levels	1

Nodes

- ▼ 5 nodes
- [957931446](#)
- [957931368](#)
- [957931442](#)
- [957931274](#)
- [957931446](#)



2011 Census Germany



- Data set with, among other things, demographic information
- Tabular form, aggregated at the municipality level
- After amendment of the BStatG since 2015 also in parts as 1km and 100m grid
- Available in 100m grid among others
 - General population numbers
 - Demographic information (age, marital status, gender, religious affiliation, etc.)
 - Household or family composition
 - Building features



Gitterzellenbasierte Ergebnisse

Bevölkerung im 100 Meter-Gitter

- ✚ Datensatzbeschreibung zur Tabelle "Bevölkerung im 100 Meter-Gitter" (xlsx, 85KB, nicht barrierefrei)
- ✚ Download-Tabelle "Bevölkerung im 100 Meter-Gitter" im CSV-Format (zip, 105MB, nicht barrierefrei)

✚ Datensatzbeschreibung zur Tabelle "Demographie im 100 Meter-Gitter" (xlsx, 94KB, nicht barrierefrei)

- ✚ Explanatory notes on "Demographie im 100 Meter-Gitter" (PDF, 108KB, nicht barrierefrei)
- ✚ Download-Tabelle "Demographie im 100 Meter-Gitter" im CSV-Format (zip, 315MB, nicht barrierefrei)

Familien und Haushalt im 100 Meter-Gitter

- ✚ Datensatzbeschreibung zur Tabelle "Familien im 100 Meter-Gitter" (xlsx, 93KB, nicht barrierefrei)
- ✚ Download-Tabelle "Familien im 100 Meter-Gitter" im CSV-Format (zip, 68MB, nicht barrierefrei)

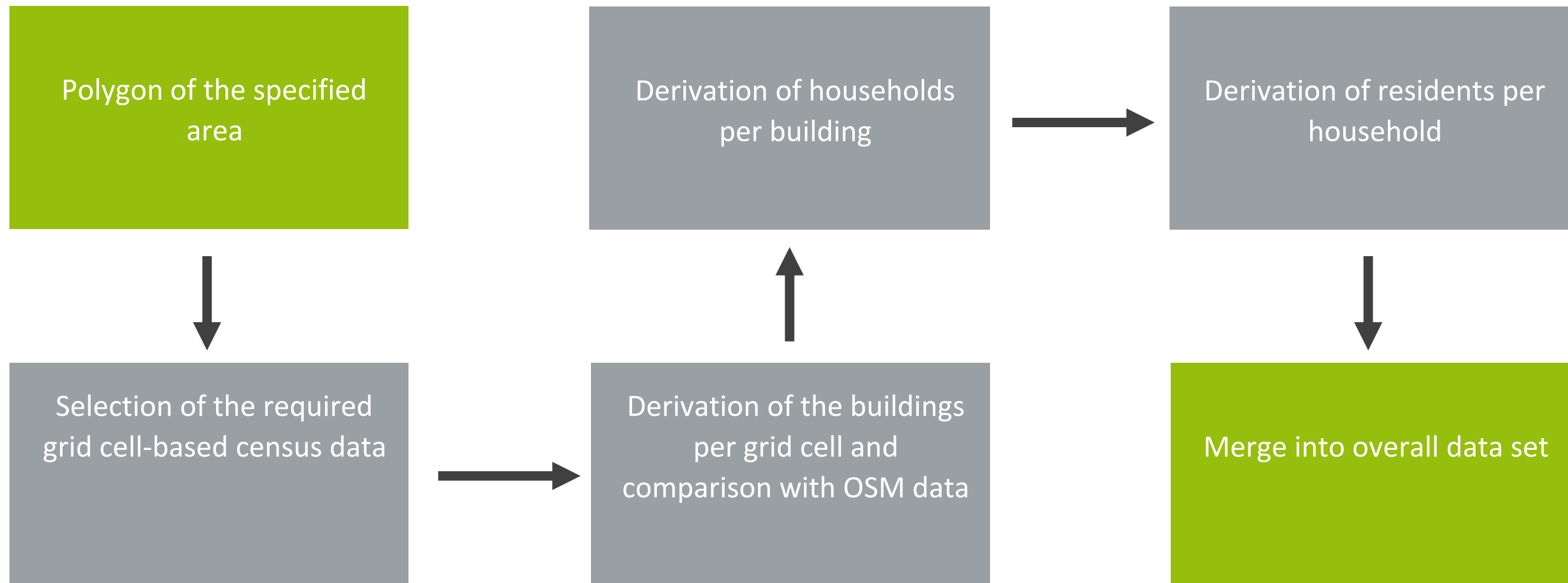
✚ Datensatzbeschreibung zur Tabelle "Haushalte im 100 Meter-Gitter" (xlsx, 91KB, nicht barrierefrei)

- ✚ Download-Tabelle "Haushalte im 100 Meter-Gitter" im CSV-Format (zip, 86MB, nicht barrierefrei)

Wohnungen und Gebäude im 100 Meter-Gitter

- ✚ Datensatzbeschreibung zu den Tabellen "Wohnungen im 100 Meter-Gitter" und "Gebäude im 100 Meter-Gitter" (xlsx, 98KB, nicht barrierefrei)
- ✚ Download-Tabelle "Wohnungen im 100 Meter-Gitter" im CSV-Format (zip, 256MB, nicht barrierefrei)
- ✚ Download-Tabelle "Gebäude im 100 Meter-Gitter" im CSV-Format (zip, 114MB, nicht barrierefrei)

Method



Method



Building

Type of building

Detached single house, single-family house: semi-detached, multi-family house: 3-6 apartments

Number of households

1, 2, 3-6, 7-12, >= 13

Household

Type of household

Single person household, couple with child(ren), shared house

Number of household members

1, 2, 3, 4, 5, >= 6

Resident

Demographic information

Age or age group

Gender

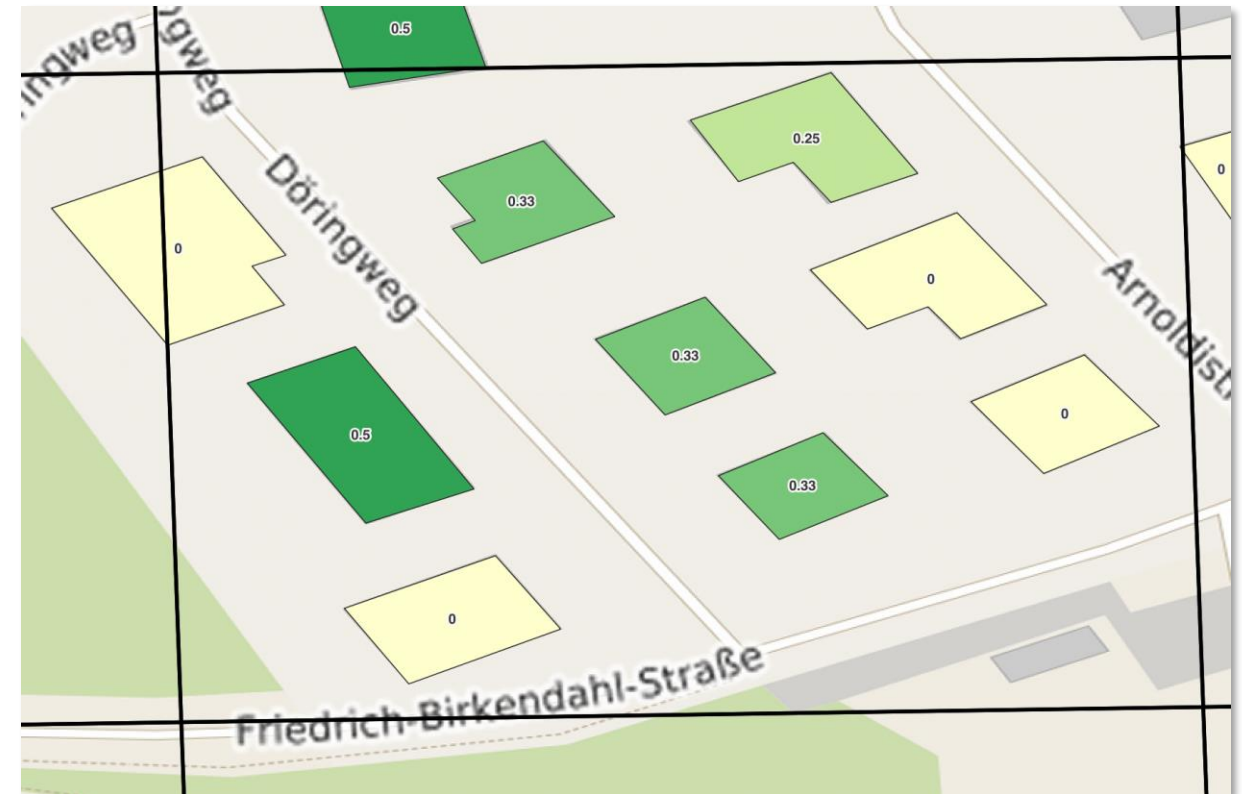
Marital status

Nationality

etc.

Result

- Georeferenced data set with demographic indicators
- Enables exemplary large-scale, building-related visualization

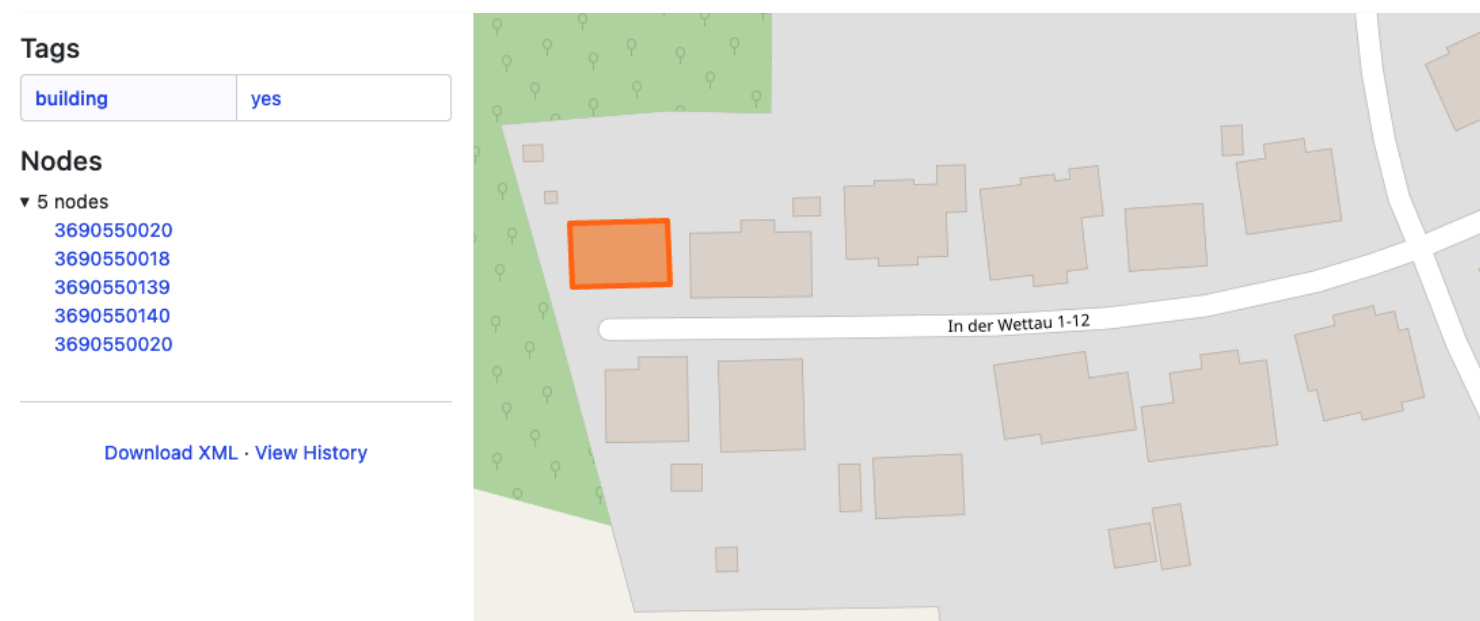


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Visualization "Percentage of children per building"
(darker = higher percentage)

Evaluation

- Dependence on OSM completeness and correctness



Result

- Census anonymization

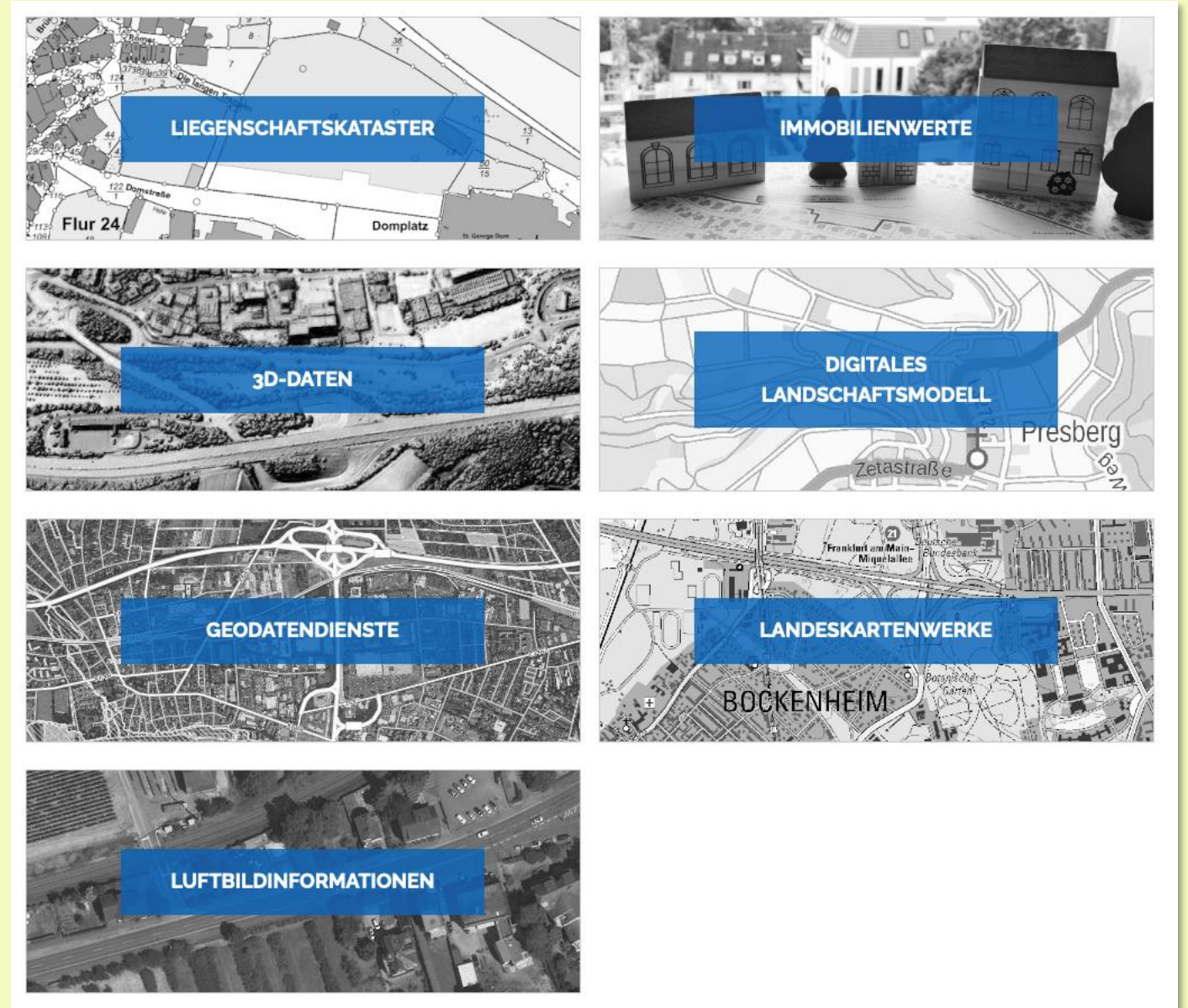


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Visualization of apartments per building (red = 1, blue = 2, gray = not specified).

Outlook

- Open Data initiatives of the federal states in Germany as an alternative to OpenStreetMap
- e.g. Hesse since February 1, 2022
- Georeferenced address points for building reference
- 3D and ALKIS data as a basis for assignments



Outlook

- Currently surveys for the 2022 census
- Due to the amendment of the BStatG, further grid cell-based results are to be expected (e.g., education)
- Data probably not available until the end of 2023



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