



Measuring Spatial Housing Market Inequalities in Madrid Using New Forms of Data

Gladys Elizabeth Kenyon

PhD candidate at the University of Liverpool

Geographic Data Science Lab

Supervised by Prof Dani Arribas Bel, Dr Caitlin
Robinson, Dr Elisabetta Pietrostefani, Dr Olga
Gkountouna



Context: Access to affordable and good quality housing increasingly difficult, particularly in city centres

- Financialization of the housing market, affordability crisis
- Madrid highly segregated city between socio-economic groups
- Financial crisis in 2007 had a particularly negative effect on the economy due to inter dependence on the housing market
- Rising house prices and growing inequalities in cities
- Housing is a mediator and driver of wealth inequality
- Gentrification and Evictions
- Climate change, UHI effect, heatwaves
- Access to homeownership increasing social problem in Madrid and other European cities



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Problem: Evidencing spatial inequalities in housing difficult due to a lack of data



Lack of fine grain spatial-temporal data on housing characteristics and prices in Spain



Housing listings data and satellite imagery potential to evidence spatial differences in housing and neighbourhoods at a granular spatial scale



How can we define housing submarkets to show inequalities when these exist across scales and variables? MAUP



More evidence needed on spatial disparities to inform policy and tackle spatial inequality

Methods: Geographic Data Science

GIS and Cartography

Spatial statistics (LISA, Spatial Gini)

Machine learning feature extraction
(GeoAI)

Hedonic modelling

Results:

- Increasing intra-urban house price inequality between neighbourhoods and districts
- Differences in the built environment which are related to housing price clusters, novel approach to segmentation using satellite image features
- New local evidence on summer energy and access to air conditioning, also related to income and housing prices

Intra-urban house prices in Madrid following the financial crisis: an exploration of spatial inequality

[GE Kenyon](#), [D Arribas-Bel](#), [C Robinson](#)... - npj Urban ... , 2024 - nature.com

In this paper we explore the temporal dynamics of spatial inequality in housing prices for Madrid, the capital city of Spain. Spatial inequalities are a concerning feature of urban areas ...

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Extracting Features from Satellite Imagery to Understand the Size and Scale of Housing Sub-Markets in Madrid

[GE Kenyon](#), [D Arribas-Bel](#), [C Robinson](#) - Land, 2024 - mdpi.com

The following paper proposes a novel machine learning approach to the segmentation of urban housing markets. We extract features from globally available satellite imagery using an ...

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The Price of Cool In Madrid: Assessing Spatial Inequalities In The Value and Presence of Air Conditioning Using A Hedonic Approach

Gladys Kenyon, Caitlin Robinson, Elisabetta Pietrostefani

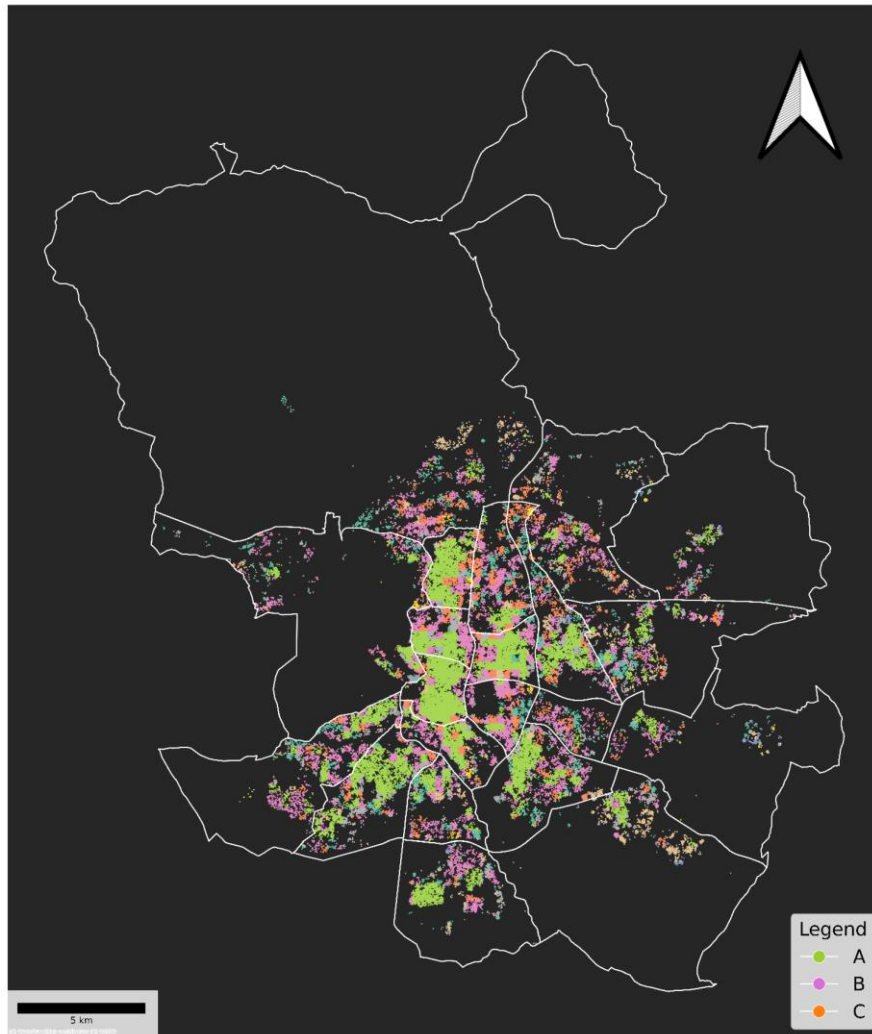


Figure 1: Cluster labels for the smallest patch size (30 × 30 pixels) using 100 features and 25 clusters

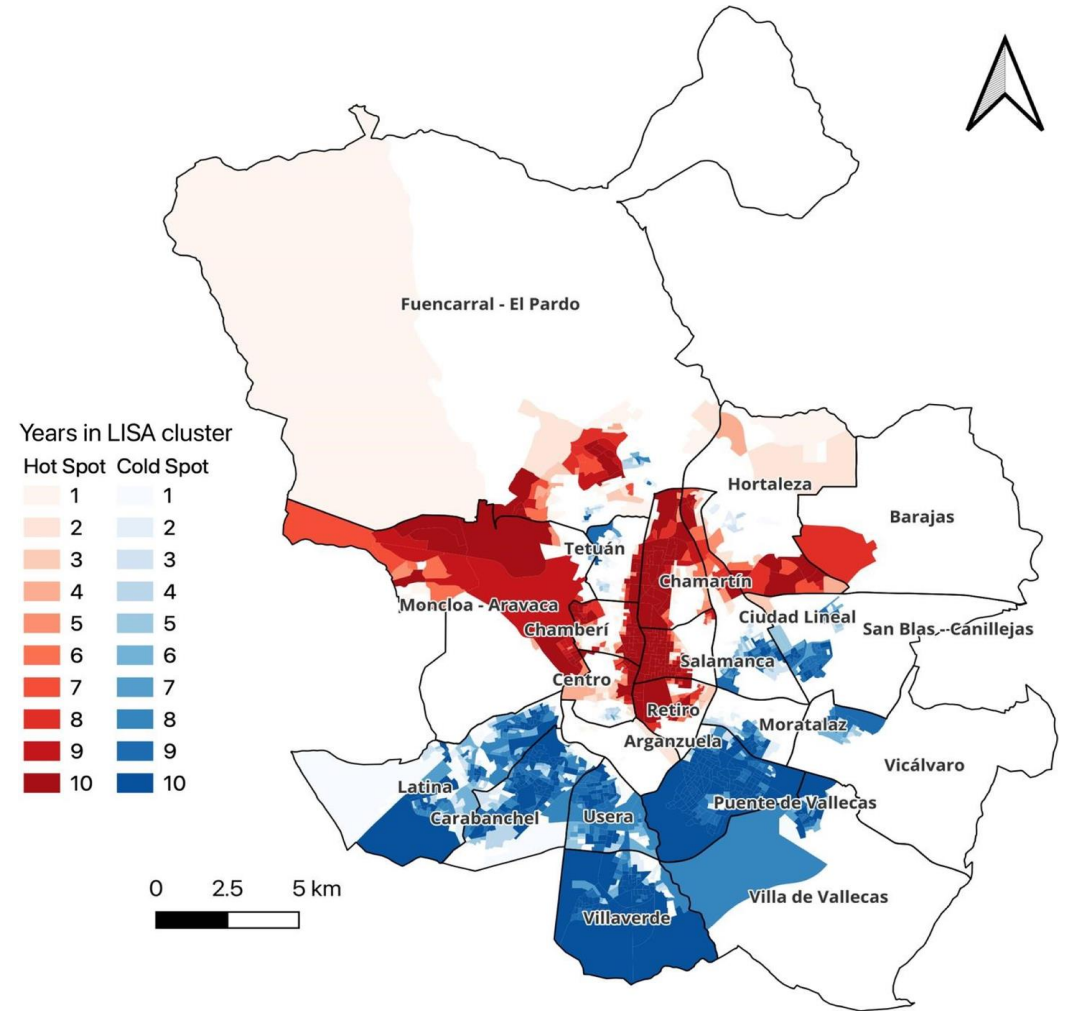


Figure 2: High-high and low-low LISA neighbourhood house price clusters in Madrid (2010–2019)

Questions: Data Science for Social Good?

Many dimensions to the housing affordability crisis and ways in which housing mediates social inequality

How can this evidence about housing market inequality be used for social good?

How can we work with local communities to ask the right questions and support findings with qualitative evidence of people's experiences?

Is data enough to get the full picture?