



Studying Urban Gentrification in London with a GWR approach

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Gentrification

- **Gentrification** – the increasing attraction of a certain area to high income people.
 - Gentrification refers to a process of class succession and displacement in areas broadly characterised by working-class and unskilled households (Atkinson, 2000).
- What's the problem?
 - Usually results in **rises of house prices**.
 - Involves **displacement** of previous residents because they cannot afford the prices.
 - Capitals cluster to certain areas but **others lack investment**.

Inequality



A gentrifying urban area (COE, 2020)



A neighbourhood in Philadelphia (The Pew Charitable Trusts, 2018)

Study purpose

- This study is a continue of a previous one.
 - Previous study used spatial lag model to investigate the spatial pattern of house over-price and under-price across London.
 - It used three independent variables (median income, PTAL, percentage of elderly population)

REGRESSION

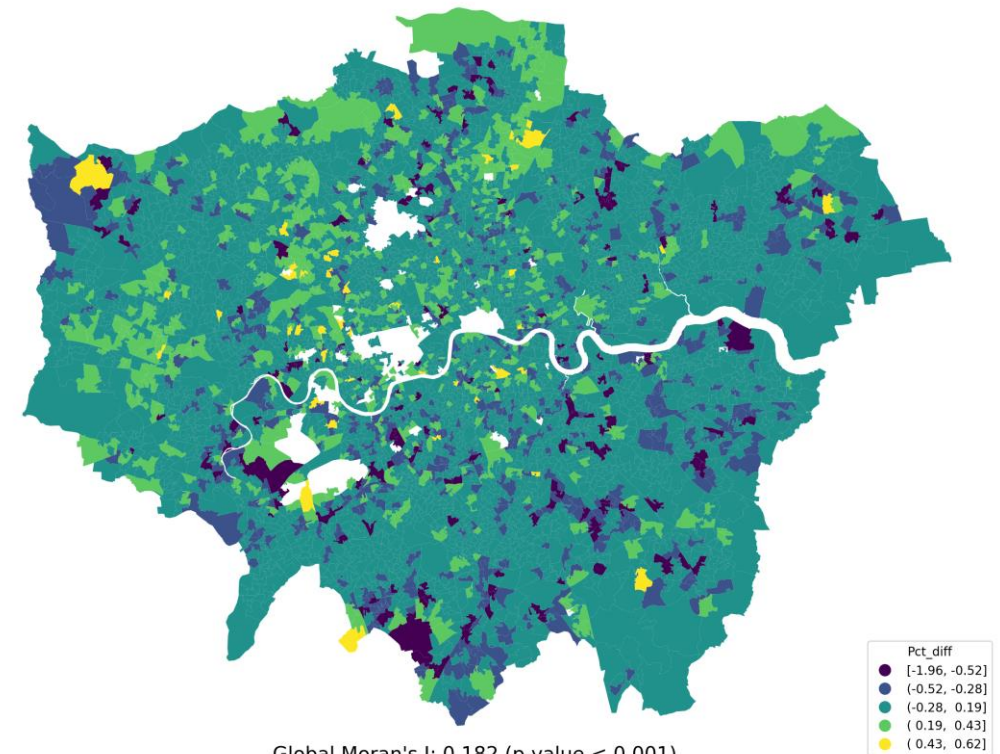
SUMMARY OF OUTPUT: MAXIMUM LIKELIHOOD SPATIAL LAG (METHOD = FULL)

Data set	:	unknown		
Weights matrix	:	unknown		
Dependent Variable	:	1000MedianHP	Number of Observations:	4730
Mean dependent var	:	310.5917	Number of Variables	5
S.D. dependent var	:	146.9705	Degrees of Freedom	4725
Pseudo R-squared	:	0.6999		
Spatial Pseudo R-squared	:	0.5882		
Sigma-square ML	:	6484.311	Log likelihood	-27544.801
S.E of regression	:	80.525	Akaike info criterion	55099.601
			Schwarz criterion	55131.910

Variable	Coefficient	Std. Error	z-Statistic	Probability
CONSTANT	-311.3758673	8.7968011	-35.3964884	0.0000000
MedianIncome	0.0116159	0.0002769	41.9559617	0.0000000
PTAL_average	6.6722176	0.8394464	7.9483549	0.0000000
Pct_elderly	53.3794916	27.0072868	1.9764848	0.0480999
W_1000MedianHP	0.4888238	0.0144326	33.8693786	0.0000000

===== END OF REPORT =====

summary for the spatial lag model

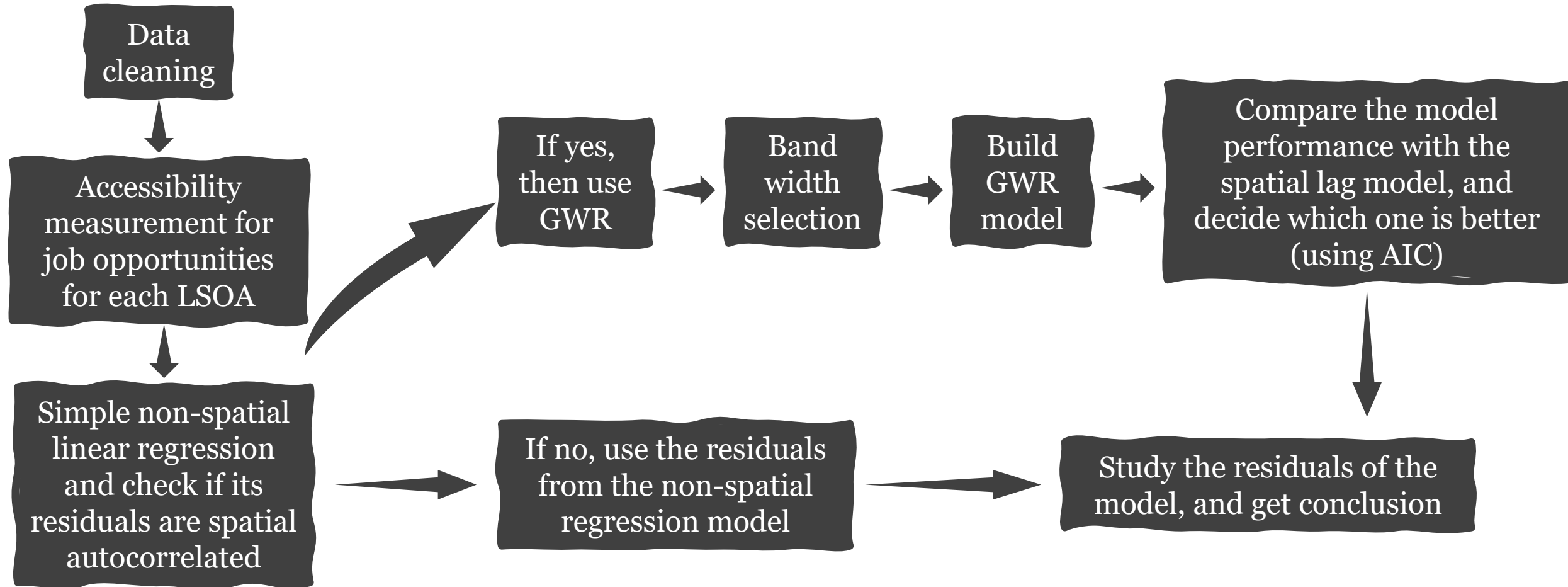


Spatial distribution of residuals for the spatial lag model

Study purpose

- Problems with the previous study:
 - Spatial lag model does not consider spatial non-stationarity (Fotheringham *et al.*, 1998).
 - The independent variables do not include a measure of job opportunity, which is considered a very important factor in studying gentrification. (Meltzer and Ghorbani, 2017)
- The **aim** of this study is to improve the previous conclusions on London's overpriced and underpriced areas on housing.
- This study plans to **use Geographically Weighted Regression** to model the house price in London.
 - **Accessibility measurement** for job will be added to the independent variables for better performance of the model.

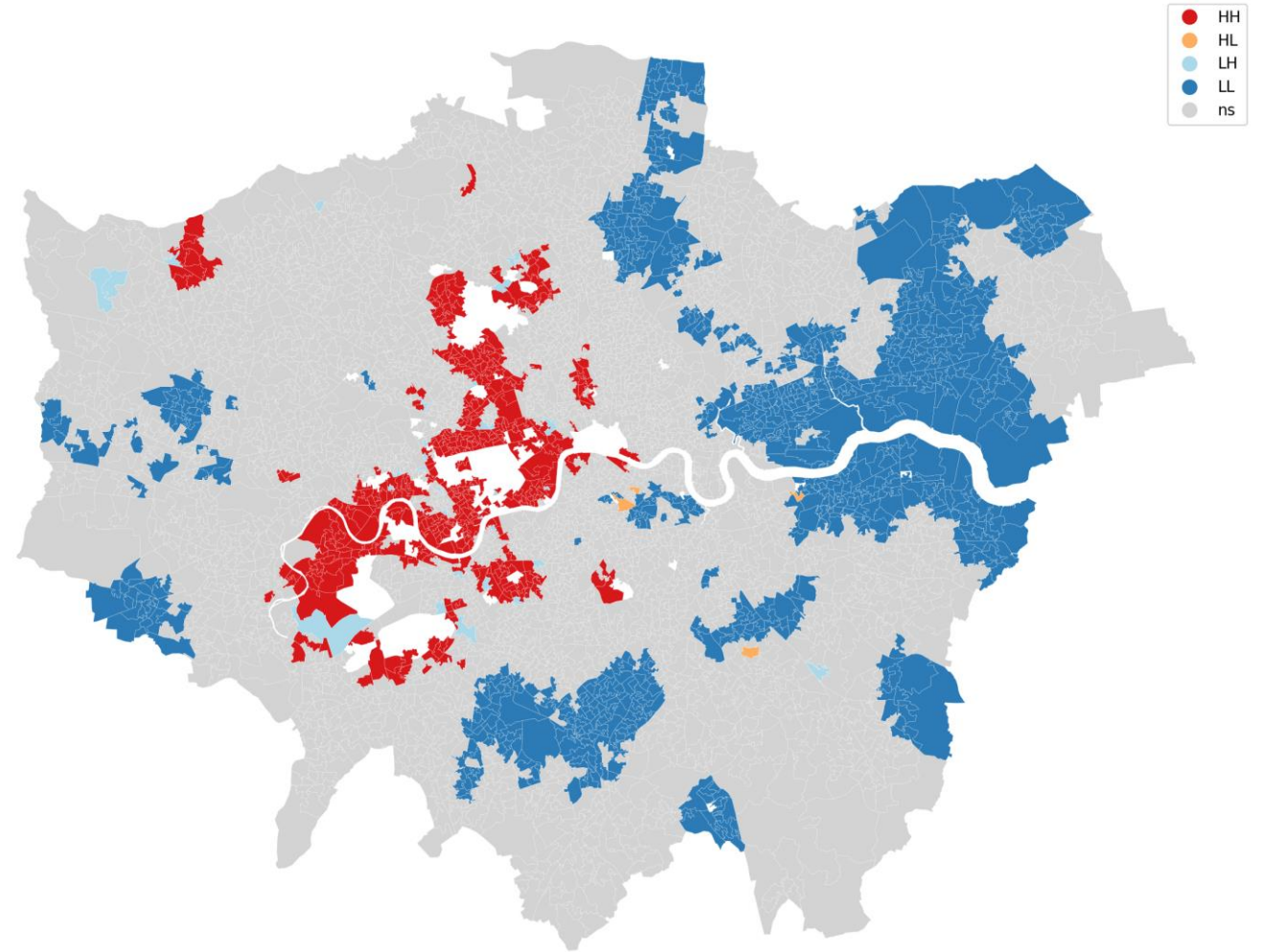
Methods - workflow



House price spatial distribution

- Obvious clustering
- Spatial method is needed

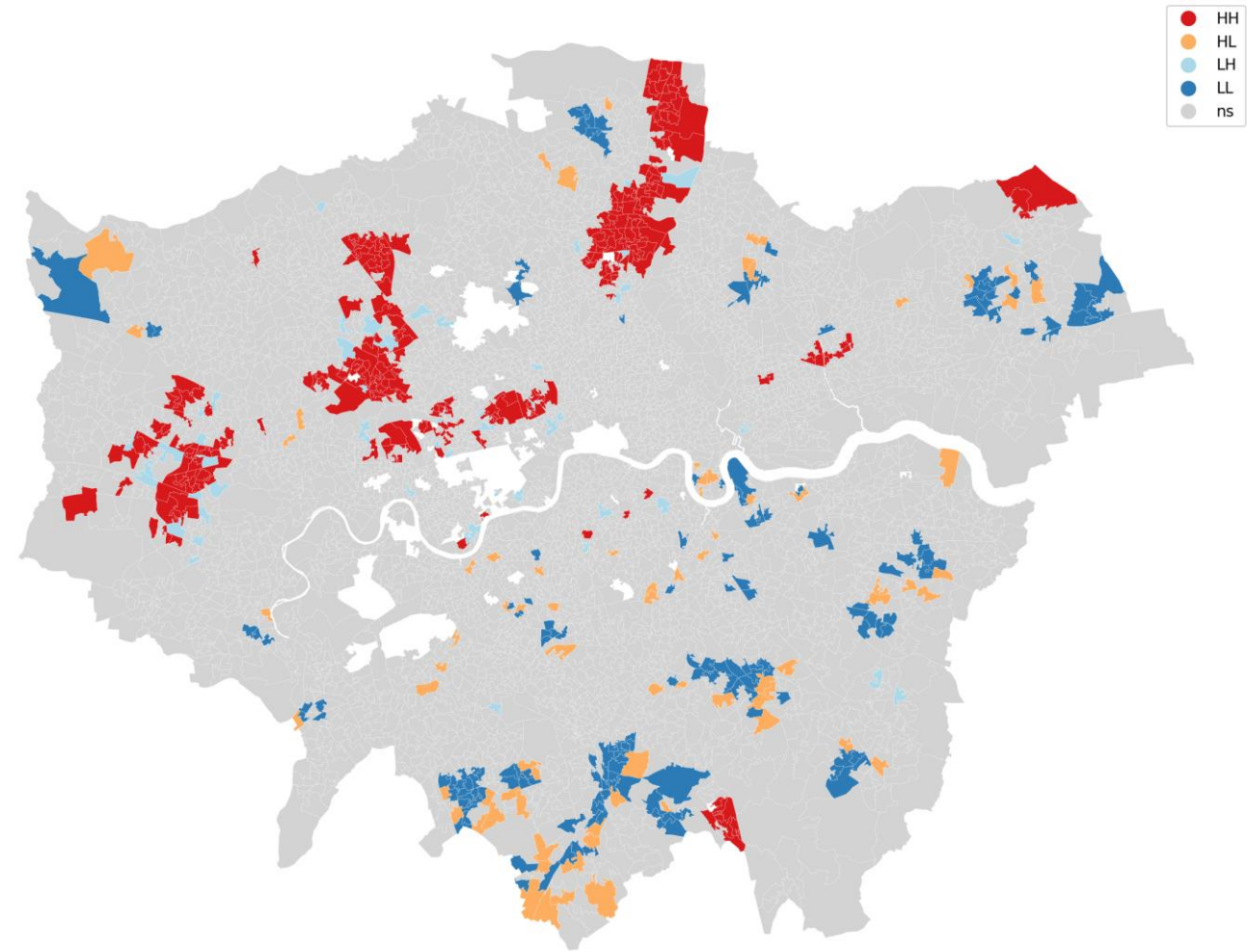
LISA Cluster Map for 1000MedianHP



Expectations

- Job accessibility should be correlated with house price.
- Residuals of the simple linear regression should be spatial autocorrelated.
- GWR model should have better performance (smaller AIC) than other models (spatial lag and non-spatial).
- There should be a similar pattern to the previous study (as shown in the map), with some improvements of the estimation.

LISA Cluster map for Pct_diff



Thank you!

- Reference

- Atkinson, R. (2000) Measuring Gentrification and Displacement in Greater London. *Urban Studies*, 37, 149-165.
- Council of Europe (COE). (2020). Intercultural Cities Newsroom: Gentrification in the Intercultural City - How to Manage and Prevent. [Online] Available from: <https://www.coe.int/en/web/interculturalcities/-/gentrification-in-the-intercultural-city-how-to-manage-and-prevent> [Accessed 23 Nov 2021]
- Fotheringham, A.S., Charlton, M.E. and Brunsdon, C. (1998) Geographically weighted regression: a natural evolution of the expansion method for spatial data analysis. *Environment and planning A*, 30(11), 1905-1927.
- Meltzer, R. and Ghorbani, P. (2017) Does gentrification increase employment opportunities in low-income neighborhoods?. *Regional Science and Urban Economics*, 66, 52-73.
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