

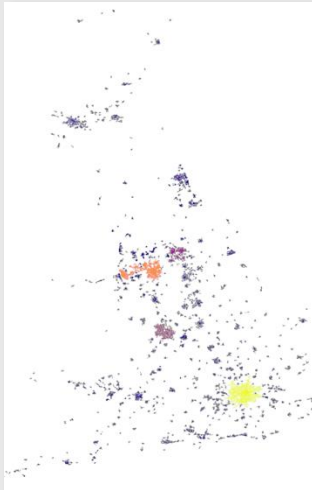
Assessing the Effectiveness of Topological Metrics for Predicting Retail Density and Categorising UK Cities

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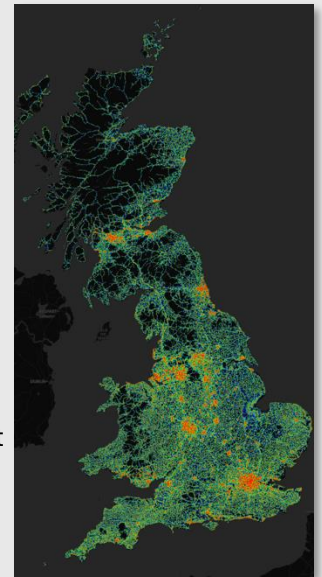
Background and Motivation

This research investigates the relationship between street network topology and retail density in UK cities. The motivation stems from the need to better understand how urban structures influence retail activity, which can guide urban planning and economic development strategies. While topological metrics like centrality have been studied in specific cities, this paper aims to offer a country-wide analysis, focusing on categorising UK cities based on their street networks and exploring how these metrics predict retail success.



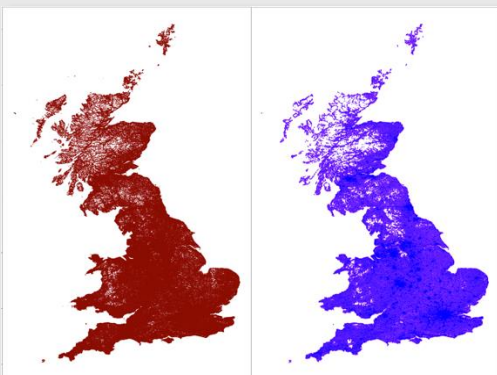
Key Findings

The findings indicate that while centrality measures are useful predictors of retail density in some contexts, they are not universally applicable across all UK cities. Factors like spatial autocorrelation and street network entropy play significant roles, leading to variability in retail density predictions. The research reveals distinct urban clusters, each exhibiting unique relationships between street topology and retail activity.



Data and Methods

The study utilises large datasets from sources like *Ordnance Survey* and *OpenStreetMap*, focusing on topological metrics such as betweenness and closeness centrality. These are calculated using advanced tools like Graph-tool for efficiency. The methodology involves clustering UK cities based on their street network topologies and analysing the relationship between retail density and street attributes through statistical methods and machine learning models.



Value of Research

This research is one of the first to comprehensively assess the relationship between street network topology and retail density across the entire UK. It provides a nuanced framework for understanding urban retail environments and offers valuable insights for urban planners and policymakers, highlighting the need to consider a variety of topological metrics when planning for retail distribution.

