

## Exploring the Spatial Relationship between Built Environment and Ride-hailing Demand: Applying Street-Level Images

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**Abstract :** The explosive growth of ride-hailing has reshaped residents' travel behavior and plays a crucial role in urban mobility within the built environment. Contributing to the research of the spatial variation of ride-hailing demand and its relationship to the built environment and socioeconomic factors, this study utilizes multi-source data from Haikou, China, to construct a Multi-scale Geographically Weighted Regression model (MGWR), considering spatial scale heterogeneity. The regression results showed that MGWR model was demonstrated superior interpretability and reliability with an improvement of 3.4% on R2 and from 4853 to 4787 on AIC, compared with Geographically Weighted Regression model (GWR). Furthermore, to precisely identify the surrounding environment of sampling point, DeepLabv3+ model is employed to segment street-level images. Features extracted from these images are incorporated as variables in the regression model, further enhancing its rationality and accuracy by 7.78% improvement on R2 compared with the MGWR model only considered region-level variables. By integrating multi-scale geospatial data and utilizing advanced computer vision techniques, this study provides a comprehensive understanding of the spatial dynamics between ride-hailing demand and the urban built environment. The insights gained from this research are expected to contribute significantly to urban transportation planning and policy making, as well as ride-hailing platforms, facilitating the development of more efficient and effective mobility solutions in modern cities.

**Keywords :** travel behavior, ride-hailing, spatial relationship, built environment, street-level image

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