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Keywords: Housing, 2SLGBTQIA+ Older Adults, Aging-in-Place, co-habitation, Toronto age-inclusivity

SPATIAL-TEMPORAL IMPACT OF BUILT ENVIRONMENT ON WOMEN'S SAFETY IN MUMBAI

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Urban environments frequently witness incidents of sexual violence against women, posing a significant threat to public safety and societal sustainability. Crime Prevention Strategies through Environmental Design (CPTED) to create gender-inclusive cities has been a focus of urban planning. However, due to the lack of data on violence against women and its relations to street-level environment in some large geographical urban areas, the influence of the built environment on such crimes remains largely unaddressed. Furthermore, the spatial-temporal relationship between the macro and micro characteristics of the built environment and sexual violence is still largely unknown.

This research employs Street View Images (SVI), Computer Vision (CV), and Machine Learning (ML) to measure the eye-level street features of Mumbai streets. It addresses the deficiency of street environment data, and provides more environmental variables not previously considered, thereby enhancing the model predictive capabilities for crime rates. In order to more accurately capture the correlations between environmental variables and crime events, this paper divided the macro built environment variables with functional differentiation into four parts: crime defense sites, crime attraction sites, crime generation sites, and crime neutral sites. Then, the data on sexual violence against women are classified into four time periods. Four Geographically Weighted Regression (GWR) models were constructed to capture the geospatial non-stationary of criminal behavior across different periods, and temporal variations in correlations were captured by comparing coefficients across different periods. Meanwhile, this study takes socioeconomic variables as the baseline model, constructs regression models based on micro street view variables, macro built environment variables, and both of them, respectively, to compare the

performance of the models, and analyzes the spatiotemporal changes in the explanatory ability of the explanatory variables in the two groups.

The study reveals that both macro and micro-built environment variables play complementary roles in explaining sexual violence. Specifically, the complexity of street facades, general stores, and fire stations can provide territoriality and surveillance, thereby reducing the incidence of gender-based violence. Maternity homes, casinos, cyber-cafes, and public toilets have been identified as potential hotspots for gender-based violence. In addition, the temporal differences in the same urban variables cannot be ignored. The effects of some variables (e.g., schools, trees, worship) on violence against women varied over time and space, with differences observed between day and night and between southern downtown and northern suburbs. The results of these studies yield several planning and management recommendations.

The results of this study can help planners address the problem of violence against women by improving the built environment and implementing effective management strategies. The consideration of time factors will also help planners optimize resource allocation with maximum efficiency. At the same time, this study demonstrates the potential of leveraging multi-source data and artificial intelligence tools to analyze the correlations between macro- and micro-scale built environment and gender-based violence, providing a practical and scalable method to study women's safety issues in other regions.

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Keywords: Sexual Violence, Gender-inclusive Urban Planning, Spatial Heterogeneity, Machine Learning, Crime Prevention Strategy Through Environmental Design (CPTED)

The ABCs of DEI in ACDs: Fostering Belonging in Arts and Cultural Districts

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