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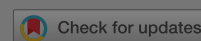
Articles

An estimation of housing vacancy rate using NPP-VIIRS night-time light data and OpenStreetMap data

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HVR estimation model, thus realizing the estimation of HVR in 31 Chinese provincial

cities with different development levels (Tier 1–Tier 3). The results showed the average HVR of Tier 2 cities (0.204) was higher than that of Tier 1 cities (0.189) and Tier 3 cities (0.233). The model was proven more accurate (root mean square error of approximation (RMSE) = 0.022) when compared with previous models. To explore the reasons causing different HVRs in these provincial cities, the relationship between HVR and typical socio-economic factors – gross domestic product (GDP), population, and housing price – was also revealed. Through correlation verification and built of a regression model, HVR was found positively correlated with housing price (0.409), however, negatively correlated with population (−0.829) and GDP (−0.356). The research is an indication of the applicability of using data derived from NPP-VIIRS NTL sensors in reflecting HVR and an exploration to distinguish socio-economic factors influencing HVR in different cities. The model we proposed can potentially provide guidance for urban planners to formulate better land-use plan and rental measures.

Author Contributions

Wang Luyao and Fan Hong conceived and designed the main idea and experiments; Wang Luyao and Wang Yankun performed the experiments; Wang Luyao wrote the paper.

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