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Machine Learning Approach to Predict Land Prices using Spatial Dependency Factors

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In real estate models, spatial variation is an important factor in predicting land prices. Spatial dependency factors (SDFs) under spatial variation play a key role in predicting land prices. The objective of this study was to develop a novel real estate model that is suitable for Sri Lanka by exploring the factors affecting the prediction of land prices using ordinary least squares regression (OLS) and artificial neural networks (ANNs). For this purpose, a total of 1000 samples on land prices (dependent variable) were collected from the Kesbewa Division in Colombo metropolitan city, using various web commercials, and explored spatial dependency factors (independent variable) such as distance from the particular land to the nearest main road, city, public or private hospital and school. The real estate model was developed and validated using the SDFs that were calculated using Google Maps and R-Studio. The OLS model showed that SDFs have a significant effect on land pricing ($p < 0.05$), giving a mean squared error of 0.9599 (MSE) and a mean absolute percentage error of 0.107 (MAPE). Single-layer ANN was trained to predict land prices. This trained model showed MSE and MAPE are 0.9054 and 0.0976 respectively.

It could be concluded that the SDFs are suitable to develop the real estate model for the Sri Lankan context since these factors showed a significant effect on land prices. Furthermore, the MSE and MAPE values of the OLS and ANN models proved that the ANN model performed better than the OLS model in this context.

Keywords

spatial dependency factors, ordinary least squares regression, artificial neural networks

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