# Distance Measure Based on Spatiotemporal Coexistence of Residents and Its Application to Urban Analysis

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**Abstract**  Distance measures, such as the Euclidean distance, network distance, and travel time, have been used in various urban models, such as models for transportation, land use, and human behavior. In this paper, we propose a novel distance measure based on the spatiotemporal distribution of residents, which is called the "Distance Measure based on Spatiotemporal Coexistence of Residents (DM_SCORE)". It is defined as the square root of the Jensen-Shannon Divergence, and can be calculated using person-trip survey data. We discuss the difference between the DM_SCORE and other distance measures, and apply it to urban models for the population density function, the spatial interaction model, and the spatial cluster analysis. The results of numerical analyses using actual data from Tokyo metropolitan area demonstrate that the DM_SCORE can be of great value in urban models.