A Spatio-Temporal Graph Learning Framework for Tourism Activity Forecasting: An Empirical Study

Abstract:

Modeling human mobility and tourism activity in urban environments has become an important problem in spatial data science and intelligent transportation systems. In this work, we outline a spatio-temporal graph learning framework for predicting activity levels at tourism-related Points of Interest (POIs) and establish baseline results for future GIS-enhanced graph models.

The approach represents POIs as nodes in a spatial graph constructed from geographic proximity and models temporal dynamics of user check-in activity using historical observations. Spatial dependencies between locations are captured using graph neural network representations, while temporal patterns are modeled through sequential feature aggregation.

Experiments conducted on the publicly available NYC Foursquare check-in dataset show that temporal models provide strong forecasting baselines, while spatial-only graph convolution does not outperform temporal models in the current setup.

These findings highlight the strong role of temporal dependencies in tourism activity forecasting and suggest that richer spatial representations are needed for graph-based models to provide consistent gains.