49. SOURABH SUBHOD

CRIME PREDICTION USING ATTENTIVE HIERARCHICAL RECURRENT NETWORKS

Abstract

As urban crimes (e.g., burglary and robbery) negatively impact our everyday life and must be addressed in a timely manner, predicting crime occurrences is of great importance for public safety and urban sustainability. However, existing methods do not fully explore dynamic crime patterns as factors underlying crimes may change over time. Here, a deep neural network architecture that uncovers dynamic crime patterns and carefully explores the evolving inter-dependencies between crimes and other ubiquitous data in urban space is used. Furthermore, this framework is capable of automatically capturing the relevance of crime occurrences across different time periods. In particular, the framework enables predicting crime occurrences of different categories in each region of a city by i) jointly embedding all spatial, temporal, and categorical signals into hidden representation vectors, and ii) capturing crime dynamics with an attentive hierarchical recurrent network. Extensive experiments on real-world datasets demonstrate the superiority of the framework over many competitive baselines across various settings