An Exploratory Spatial Pattern Analysis Using a Traffic Congestion Data-Mining Approach with an Online Map Service

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Traffic congestions incur significant social-economic costs and infringe the quality of life for urban people. To approach these social problems, it is necessary to understand where, when, and how congestions occur. However, it is very expensive to collect traffic data in a large-scale metropolitan area. Therefore, this study explored a method to use Web-based mapping service data mining technology to collect traffic congestion information. With the spread of smartphones equipped with GPS, companies like Google can collect real-time traffic data. The raw data, however, is not publicly available. Thus, we collected multiple snapshots of online traffic maps with python programming and web crawling techniques, and then RGB values of each pixel were analyzed to extract traffic information. The data was used to compute various statistics and analyze spatio-temporal patterns. Results revealed congestion patterns, durations, frequencies, and severity. This study showed that online map datasets can be an invaluable resource to analyze spatio-temporal patterns traffic information when they were coupled with big-data handling and GIS techniques.

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