

Dissecting Big Trajectory Data to Analyse Road Network Travel Efficiency

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Abstract : Digital innovation has played a crucial role in managing smart transportation. For this, big trajectory data collected from traveling vehicles, such as taxis through installed global positioning system (GPS)-enabled devices can be utilized. It offers an unprecedented opportunity to trace the movements of vehicles in fine spatiotemporal granularity. This paper aims to explore big trajectory data to measure the travel efficiency of road networks using the proposed statistical travel efficiency measure (STEM) across an entire city. Further, it identifies the cause of low travel efficiency by proposed least square approximation network-based causality exploration (LANCE). Finally, the resulting data analysis reveals the causes of low travel efficiency, along with the road segments that need to be optimized to improve the traffic conditions and thus minimize the average travel time from given point A to point B in the road network. Obtained results show that our proposed approach outperforms the baseline algorithms for measuring the travel efficiency of the road network.

Keywords : GPS trajectory, road network, taxi trips, digital map, big data, STEM, LANCE

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