Network Tomographic Techniques to Improve Traffic Monitoring

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ABSTRACT
Traffic monitoring aims at collecting road traffic conditions for multiple purposes, such as city development planning, vehicular flow management, and optimal traffic signal pattern definition. Currently, real-time traffic data are typically gathered by means of statically positioned field sensors, radio-frequency identification readers, and cameras that are placed in selected intersections. This paper proposes a traffic monitoring framework, based on Unmanned Aerial Vehicles, which exploits network tomography techniques to improve the efficiency, efficacy and flexibility of the monitoring system. UAVs can be dynamically repositioned according to the traffic dynamics. Network Tomography infers the traffic of individual road segments from end-to-end travel delays. Extensive simulation on synthetic and real traffic traces on the city map of San Francisco show the benefit of our approach in comparison to standard techniques.