Project Title: Techniques for Efficient Detection of Rapid Weather Changes and Analysis of their Impacts on a Highway Network

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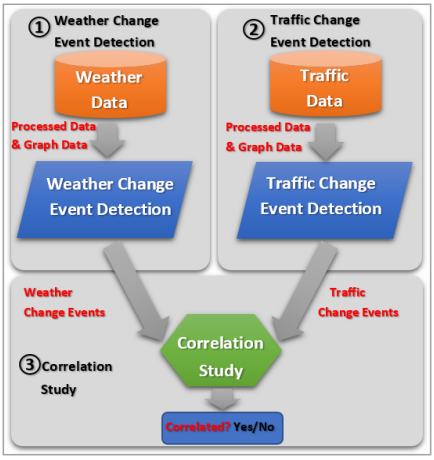
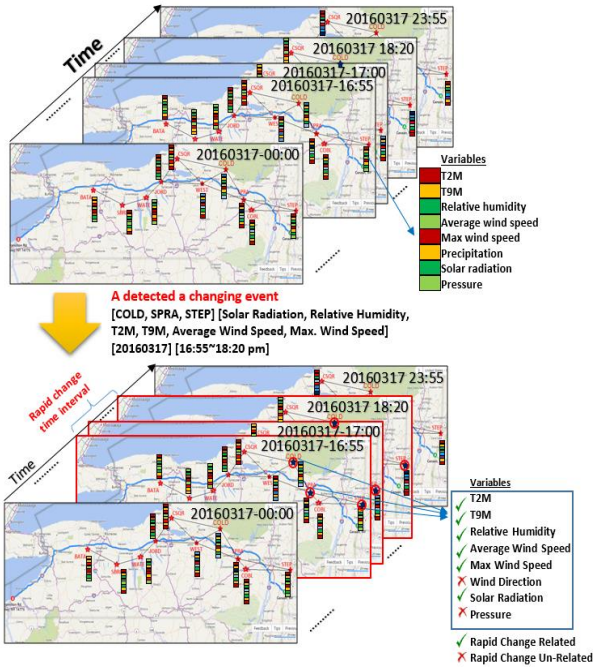
Adverse weather conditions have a significant impact on the safety, mobility, and efficiency of highway networks. Annually, 24 percent of all crashes, more than 7,400 roadway fatalities, and over 673,000 crash related injuries were caused by adverse weather conditions between 1995 and 2005. These safety and mobility factors make it important to develop new and more effective methods to address road conditions during adverse weather conditions.

This project develops techniques for efficiently detecting rapid weather change events and analyzing their impacts on the traffic flow characteristics of a highway network. It is composed of three components, including1) detection of rapid weather change events in a highway network using the streaming weather information from a sensor network of weather stations; 2) detection of rapid traffic change events on the traffic flow characteristics (e.g., travel time) of the highway network; and





3) analysis of correlations between the detected weather and traffic change events.

The proposed approach was applied to a weather dataset provided by New York State Mesonet and a traffic flow dataset, the National Performance Management Research Data Set (NPMRDS), provided by NYSDOT, from Mar. 1, 2016 to Dec. 31, 2016. The empirical results provide potential evidence about the significant impacts of rapid weather change events on traffic flow characteristics of the Interstate 90 (I-90) Highway in the state of New York. The limitations of the proposed approach and the empirical study are also discussed.

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