Conference Interactive Program

TRB 90th Annual Meeting (January 23-27, 2011)

Event Number: 472
Event Title: Surrogate Measures in Safety Analysis
Event Date: Jan 25 2011 9:30AM- 12:00PM
Event Location: Marriott, Salon 2
Event Description:
Event Agenda:

Real-Time Crash Risk Estimation: Are All Freeways Created Equal? (11-1645)

Underground loop detectors have been recently used by many researchers to investigate the links with real-time crash risk and the traffic data. An issue that has been raised but not explicitly addressed in these studies is how the results from one freeway might transfer to another. This study attempts to look at the relationship between crash risk and real-time traffic variables from a freeway corridor (I4 eastbound in Orlando, FL) and attempts to apply the models to three other freeway corridors (I-4 westbound, and I-95 north and southbound). Traffic data used in the study were collected using loop as well as radar detectors already installed on these freeways. The traffic information was collected for crash as well as random non-crash cases so that a binary classification approach may be adopted. The Random Forest based models provide a list of significant variables based on the mean average reduction in the Gini indices to the overall forest classification. The period between 5-10 minutes before and 10-15 minutes before the crash were taken into consideration to allow for the model to be developed so as to facilitate the issuance of warning in advance. Average occupancy of upstream station and average speed and coefficient of variation of volume for downstream stations were observed to better the classification trees. Application of multilayer perceptron neural network models showed that while the model developed for I-4 corridor works reasonably well for the I-4 westbound data the performance is not as good for the I-95 sections. It indicates that the same model for crash risk identification may only work for corridors with very similar travel patterns. Keywords: Real-time crash risk, transferability, freeway safety, random forest, neural network.

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