

PROACTIVE REAL-TIME TRAFFIC SAFETY IMPLEMENTATION STRATEGY ON FREEWAYS

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ABSTRACT

Reactive traffic management strategies such as incident detection are becoming less relevant with the advancement of mobile phone usage. Freeway management in the 21st century needs to shift focus toward proactive strategies that include anticipating incidents such as the crashes. “Predicting” crash occurrences would also be the key to traffic safety. A two-step approach to identify freeway locations with high probability of crashes through real-time traffic surveillance data is presented here. For this study historical crash and corresponding traffic data from loop detectors were gathered from a 58-km (36-mile) corridor of Interstate-4. Following an exploratory analysis two types of logistic regression models, i.e., simple and multivariate, were developed. The simple models were used to deduce time-space patterns of variation in crash risk while the multivariate model was chosen for final classification of traffic patterns. As a suggested application for the simple models, their output may be used for preliminary assessment of the crash risk. If there is an indication of high crash risk then the multivariate model may be employed to explicitly classify the data patterns as leading or not-leading to crash occurrence. A demonstration of this two-stage real-time application strategy is also provided in the paper.