

Multiple-Model Framework for Assessment of Real-Time Crash Risk

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Abstract

This study is based on real-time models of risk assessment for rear-end and lane-change-related crashes on freeways. These models were developed in recent studies on the basis of historical crash data and corresponding traffic data collected through underground loop detectors on Interstate-4 in Orlando, Florida. In this study the potential of these models was explored for identification of crashes that were not part of the database used to develop the models. These crashes include single-vehicle crashes that might result from evasive actions taken by drivers to avoid vehicles in front (i.e., a rear-end crash) or in a neighboring lane (i.e., a lane-change-related crash). In addition, traffic data corresponding to rear-end and lane-change-related crashes reported on the short form (because they did not involve any injuries or loss of life) also were subjected to the models. The results indicate that the models satisfactorily identify single-vehicle crashes (other than rollovers) as well as the short-form crashes. The study also demonstrates virtual real-time application of these models over complete traffic data collected for a month. A careful analysis of the models' output on these data sets is used to make critical inferences about their expected performance in a real-time application scenario. The proposed real-time application framework for these models not only is expected to improve traffic safety but also could yield significant enhancement in traffic operation by eliminating some of the incident-related congestion.