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**A NEW FRAMEWORK OF VEHICLE COLLISION PREDICTION BY COMBINING SVM AND HMM**

**ABSTRACT:**

This paper presents a framework of accident prediction with a new perspective. First, the new framework of Chain of Road Traffic Incident (CRTI) is proposed, in which the observed vehicle movement features are viewed as road traffic system's external “performance” that, in essence, reflect the internal “health states” (safety states) of the system at a specific time. A two-stage modeling procedure of CRTI is then proposed using scenario-based strategy: 1) a support vector machine is utilized to classify leaving lane scene versus remaining in lane scene and 2) Gaussian-mixture-based hidden Markov models are developed to recognize accident versus non-accident pattern CRTI given the classified scene. Moreover, the application procedure of the CRTI framework to online collision prediction is proposed. Finally, a simulation test of a typical vehicle collision scene based on PreScan platform is designed and carried out for model training and validation, and has shown promising results in accident prediction using the proposed framework. The CRTI framework could provide a new foundation for developing early warning/intervention strategies in driver assistance system under complex traffic environments.