Detecting near-crash events in car driving

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Abstract

Naturalistic driving studies permit the study of driving behaviour during every day driving. Such studies have a long duration and rare events such as near-crashes and even crashes do occur during the period of the study. This fact gives an opportunity to study events that are otherwise difficult to find. However, the vast amount of data recorded within these naturalistic driving studies demands a huge amount of manual work to identify safety critical events. This paper is about the development and validation of a method, based on critical jerk, to identify safety critical events during car driving. The method was compared with one of today's most used method, which is based on the longitudinal acceleration measure.

Both methods were applied on near-crash data from the 100-car naturalistic driving study previously carried out by the Virginia Tech Transportation Institute (VTTI). The data included a total of 637 near-crashes. The results from the analyses showed that the critical jerk method performed approximately 60 per cent higher overall success rate than the method based on the longitudinal acceleration measure. The conclusion is that the critical jerk method is capable of detecting situations interpreted as hazardous by the driver and may also be used for assessing high risk drivers.

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