Title: Driver behavior, critical situations and vehicle condition

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The European Union has set ambitious goals until the year 2020 regarding traffic safety. Targeted and practical measures are indispensable for their implementation. Particularly the dissemination of already available safety functions in vehicles greatly influences the improvement of traffic safety. Periodical technical inspection (PTI) of vehicles makes a major contribution towards preserving the safety level of every vehicle in use throughout its lifespan. For this purpose examination procedures are being generated and adapted to further developed vehicle technologies.

Data collected under real-life traffic conditions serve as a basis since systematical further development of the PTI and the applied inspection technologies requires knowledge as accurate and comprehensive as possible about vehicle safety risks, e.g. degradation, disturbances and failures of safety-related parts and systems.

In this context, accurate and comprehensive knowledge includes answering the following questions:

“When and under which circumstances do these safety risks emerge?”,

“Do they increase in severity and frequency?”,

“What is their influence during different operating states?”

For this purpose vehicles have been equipped with specially developed tachographs. Driving dynamics measures as well as in-vehicle communication are continuously analyzed and detected abnormalities concerning the vehicles condition and components are recorded on a ring memory. An intelligent algorithm detects critical events marked by deviations from the normal driving behavior in the given situation, e.g. an emergency breaking event, excessive steering or ESP activation and stores them permanently. Thus, 30-second-sequences are created which contain necessary information about the critical situation and the circumstances which lead to this event. Additional-ly, GPS-triggered recordings at already known accident black spots offer the opportunity to analyze conditions under which critical situations occur, including vehicle-related data as well as driver behavior.

Taken together, this data is used to analyze changes in the vehicles technical condition during everyday use on the one hand. Knowledge for the evaluation und future design of the technical vehicle inspection can be derived from observations regarding condition, function and effect of components and safety functions. On the other hand, handling properties are also part of the analysis. The primary focus is on critical situations, meaning extreme vehicle motions like under- or oversteering, emergency braking or interventions by the safety system, situations requiring rapid and safe intervention.

This way an extensive data trove is created which offers numerous opportunities for analysis regarding enhancement of vehicle and driver safety.

We would like to present the current stage of data pre-processing and analysis. Special attention is paid to the description of driver-driving-behavior, critical situations and vehicle condition. Additionally, we want to encourage discussion of further potentials the gathered data offers and look forward to creating new ideas and even possibly identifying potential synergies with other external research projects.