Enabling a Driver-specific "Real-Time Road Safety" Assessment through an "Extended Floating Car Data" and Visualization System

K. Kyamakya, J. C. Chedjou, Fadi Al Machot, Alireza Fasih
Transportation Informatics Group, Institute of Smart Systems Technologies, University of Klagenfurt (Austria),
Email: kyandoghere.kyamakya@uni-klu.ac.at, jean.chedjou@uni-klu.ac.at

Abstract— This paper does in a first step discuss the necessity of a "real-time road safety assessment" capability. Since traditional road safety has mainly been an offline and post-event business, the fundamental question here is that of exploring ways/concepts and technologies for enabling a form of real-time and driver-context-specific road safety assessment before fatal events such as accidents happen. The motivation is evident, as it is well known that "prevention is better than cure". Concerning "fatal events" this paper also proposes a nuance and an extension of the concept. It does suggest a full range of event categories ranging from "hard fatal events" like a real accident to "soft fatal events" such as stress situation, some abrupt braking or just a lack of ergonomy of certain parts of the road traffic network in time and space. Due to the fact that a majority of traffic accidents are attributable to how drivers behave in response to the driving environment (mainly to the driver's inattentiveness), a key challenge is therefore that of setting up a cost-effective non-intrusive system that will be capable of measuring (a) the driver status or better what we've called in this paper "extended ergonomics status" of drivers, and (b) a car driver information system capable of assessing and then of visualizing for both car drivers (real-time) and researchers (both real-time and offline) the safety as well as the fuel-consumption related attributes of all major road segments in both urban areas and intercity roads and highways. This car driver information system will be embedded in an extended floating car data concept that will involve both intelligent mobile terminals in the cars and some central server systems. The two measurements systems (a) and (b) listed above are the core of a system architecture (actual development status: work-in-progress) providing real-time data that may be used for a spatio-temporal real-time road safety assessment. Appropriate algorithms for that purpose are to be developed in a future sub-sequent research. The availability of such precious real-time data does in fact open a new research avenue for road safety. Real-time safety assessment that may be coupled to eco-driving considerations will enable a real-time recommender system for driver assistance and/or car navigation.

Keywords: Real-time assessment of Road Safety; Driver status monitoring; extended floating car data; real-time safety and eco-driving aware driver assistance recommender system for car navigation.