

Design and implementation of Driver Drowsiness Warning Systems

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Abstract

Fatigue or drowsiness behind the wheel is found to be definitely a major factor in accident causation. Countermeasures are necessary, but not all the available countermeasures are equally effective. Recently, promising electronic devices have been developed with the specific aim to let the car monitor the driver with respect to developing impairment as a consequence of drowsiness. In one of the EU-projects of the 5th Framework (AWAKE, IST-2000-28062) prototypes of such “intelligent vehicles” are being developed. In a series of pilot verification tests the different modular components (electronic devices), integrated in a hierarchical manager module are studied and tested to their effectiveness, reliability, acceptance and effects on driver behaviour. The outline of this project, in particular the human machine interfacing (HMI) is elaborated.

Introduction

For at least half a century, road vehicle transport is associated with accidents, putting traffic (accidents) in most “civilised” countries in the top series of mortality. On the one hand, looking at the nature of these accidents, the association with driver fatigue and / or drowsiness is obvious. On the other hand, there is overwhelming evidence that driver drowsiness is associated with relatively easily detectable decrements in performance, such as measured in reaction time, perception, psychomotor coordination, decision-making and information processing (Brookhuis, 1998, Brookhuis et al., 2003). Since fatigue and / or drowsiness may eventually lead to either decreased attention, which can diminish driver capacity to a dangerous level, or even sleep, which could lead directly to serious accidents, it is clear that electronic monitoring of driver impairment as a consequence of driver drowsiness potentially saves lives and costs.

Electronic driver decision support

The prevention or reduction of traffic accidents requires countermeasures that have to be specifically devised and introduced to prevent those behaviours contributing to