

Concept and implementation of a fuel efficiency device for truck drivers: Bridging the gap between driver assistance and learning

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Truck fuel consumption is more and more in the focus, for economical but also for environmental reasons. The paper provides theoretical and practical considerations about the design of a fuel efficiency support device for truck drivers with a special emphasis on work integrated learning. In particular the paper presents arguments for the claim that such a device must substantially differ from driver assistance systems in order to achieve its effects, i.e. user acceptance and change of driving behaviour.

State of the art driver assistance systems, considering their functions, fall into two broad categories. First, assistance systems support decision making by delivering (audio or visual) information that decrease uncertainty and help the driver to realize informed decisions (e.g. in the area of navigation). Second, assistance systems strive to make certain tasks or situations simpler but also safer for the driver by either automation (e.g. adaptive cruise control) or indicators that send a signal to the driver when there is a need to respond in a certain way or direction (e.g. shift indicators, collision warning). Instead, the design intention of the planned device is to engage the driver into learning.

The background of the paper is an actual joint project in Northern Germany. Continuous data of driver behaviour and engine performance shall be processed and displayed as feedback with a Human Machine Interface (HMI) in a way that enables truck drivers to adjust their driving behaviour towards higher fuel efficiency *on the job*. Effect studies of training courses, yet the most common form of interventions in the driving behaviour of professional truck drivers, revealed evidence that transfer of training tends to diminish after a relatively short time period, obviously because the relevant behaviours and skills operates in form of implicit knowledge. Therefore, a device in the cockpit that provides continuous feedback, integrated in the natural working context and sensitive to the driving skills of the driver, is seen as a strong improvement.

Some of the topics that are important in this project and that will be addressed in the paper are:

- The quality of learning. Intention of the device is to initiate and moderate learning that lead to a shaping or change of skills most likely in the form of tacit knowledge.
- Another, closely related, question is what kind of expertise must be integrated into the device and how? If one thinks about the well known learning concept of deliberate practice, the device must, among other things, be able to identify actions and action sequences appropriate for feedback, i.e. meaningful units of the driving task. Moreover, the device ideally must possess some tutorial intelligence in order, for example, to reinforce an improvement of driving skills.

- An important topic is also the effects of the device on traffic safety and occupational health and how negative effects can be avoided.

Depending on the progress in the project it is planned to present empirical data from the evaluation of a device prototype in the final conference paper.

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