

Driver behaviour analysed by image analysis

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Abstract

Driving behaviour is a direct consequence of the stimuli that the driver receives from the road infrastructure, from the surrounding environment and from the environment inside the vehicle. There is consensus that all these factors affect driving behaviour and it has been confirmed by the recent advances in road safety research. Driver perceptions of the road context are the result of analyses based on an unconscious selection of information received from the surroundings. To examine these issues, the present study focused on driver behaviour in relation to both road environment and interaction with other vehicles. This was achieved by calculating a series of characteristic variables such as distance, speed, and relative acceleration to a vehicle ahead from video recordings.

Introduction

The impact of visual behaviour on driving has been well examined and documented over the years (Land, 1992; 1998). Nevertheless, for the road engineer, whose ultimate objective would be the safety of road users, the relationship between driving activity and the physical characteristics of the road context such as geometry, traffic, speed, and visibility, remain insufficiently explored.

Methodology

To perform this study, some videotape recordings of road contexts and eye movements of 30 drivers were made, while sensors tracked variables such as distance covered, speed, longitudinal acceleration and use of the accelerator and brake pedals. A portable GPS was also used to track the driver's position on the road. The results were subsequently further filtered and analyzed in order to extrapolate key parameters and to correlate them appropriately. The aim of this study was to interpret driver visual behaviour to define a number of indicators that would add to the explanation of driving behaviour, and therefore also road safety.

The recordings permitted to recognize head-eye movements and certain postures of the driver associated with specific manoeuvres. The raw data for movements of the head-eye system were compared with road geometry, environmental context and traffic conditions to indicate information overload. The index that quantifies this activity is the Visual Load Index (VLI), which has been described previously

In D. de Waard, G.R.J. Hockey, P. Nickel, and K.A. Brookhuis (Eds.) (2007), *Human Factors Issues in Complex System Performance* (pp. 177 - 183). Maastricht, the Netherlands: Shaker Publishing.