An empirical comparison of the use of distance versus landmark information within the Human-Machine Interface for vehicle navigation systems

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Abstract

Current in-vehicle navigation systems place an emphasis on the use of distances within their turn-by-turn directions (e.g. left turn in 300 metres). Previous work has shown the potential for landmarks (e.g. traffic lights, churches), particularly in relation to *subjective* aspects of system usability, e.g. confidence in navigating. To test the *objective* benefits of landmarks versus distances, road-based trials were conducted in which 28 participants drove unfamiliar routes within an urban area using a simulated navigation system (turn-by-turn directions on both a display and voice) that emphasised either landmarks or distances for the purposes of locating manoeuvres. When using the landmark system, relatively few glances were made towards the navigation display and workload was perceived to be lower, in comparison with the figures attained for the distance system. Furthermore, the duration of glances towards the landmark display was low. Nevertheless, participants made some navigational errors when using landmarks. The results are discussed in relation to the design of future 'landmark-oriented' navigation systems.

Introduction

Electronic GPS-based vehicle navigation systems have been available to drivers within Europe since the mid 1990s, and are being implemented within an increasingly wide range of car makes and models. The design of the Human-Machine Interface (HMI) for such systems has been of interest to Ergonomists and Human Factors researchers largely due to the relative sophistication of the technology and the potential for distraction, high workload, and ultimately, reduced safety (see Srinivasan, 1999 for a review).

The literature in this area is awash with studies concerning information presentation issues, notably the choice of modality (visual, auditory or combination)

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