

Interaction between driver and infotainment system using a touchpad with haptic feedback

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Abstract

Modern car infotainment systems contain increasingly more functions, which the driver must be able to handle easily even while driving in order to reach the destination stress-free and particularly safely. Therefore, several types of control elements like, for example, rotary push buttons, touchscreens, and/or joysticks, are offered by different car manufacturers. In addition to these control elements, the search for new ways of facilitating the interaction between system and driver still continues. In light of this, the use of a touchpad is proposed as a facile and intuitive, alternative control element. Based on the findings of Hamberger (2010) and Spies et al. (2009, 2010), the development of a new touchpad with haptic feedback is accomplished. The current paper presents the results of a field experiment that compared a touchpad with realistic haptic feedback via sensible and operable elements to a touchpad with haptic feedback via vibration of the touchpad surface in a real driving situation.

Introduction

With an increasing number of features available in modern car infotainment systems, many problems arise in terms of what is required between the human and the device in order to interact efficiently. There are more and more functions integrated into the infotainment system, which the driver must be able to handle with a minimum of distraction using a limited number of control elements even while driving. The various car manufacturers in the world try to solve this problem with different types of control elements like touchscreen, joystick, voice control, rotary push button, etc. A new approach to actualize a facile and intuitive interaction between driver and infotainment system is the usage of a touchpad, like the Audi AG applies it in the Audi A8.

According to Hamberger (2010), an in-car-touchpad offers several potentials. It is familiar to the users because of the accustomed usage with computer touchpads and enables handwriting recognition. Furthermore, a touchpad is a multipurpose control element, which perpetuates the possibility of splitting up display and controls. Thus, the display remains in the ideal field of vision and the touchpad can be positioned in the ideal reaching distance; robustness, optics, and the ease of use, are additional positive arguments. The results of an experiment in a driving simulator prove that a

In D. de Waard, N. Merat, A.H. Jamson, Y. Barnard, and O.M.J. Carsten (Eds.) (2012). *Human Factors of Systems and Technology* (pp. 181 - 187). Maastricht, the Netherlands: Shaker Publishing.