David Andres Mayorga Puente

Enrico Ronchi, Jonathan Wahlqvist (Lund University)

Flashing lights at road tunnel emergency exit portals: A Virtual Reality study with low-cost Head Mounted Displays

Abstract

Previous studies have provided detailed recommendations regarding the design of flashing lights at emergency exit portals in road tunnels. Theory of Affordances have assisted safety designers fixing characteristics such as color, flashing rate, type and number of lights in emergency systems. A systematic evaluation through experiments has, additionally, provide stronger support to define these characteristics.

The present project replicates the Virtual Reality (VR) experiment on the design of flashing lights from Ronchi and Nilsson (2015) conducted in a Cave Automatic Virtual Environment (CAVE) with the usage of low-cost VR equipment in order to create a cross comparison between VR technologies and provide stronger support to VR as a research method in several fields of application. The main motivation to perform this comparison arises from premises such as technological advances and accessibility that Head Mounted Displays (HMD) offer nowadays. A HMD powered by a mobile device was, therefore, tested with the purpose of defining if it is a system immerse enough to provide the results offered by more robust technologies.

After facing changes and limitations regarding image performance, the results obtained in the cross comparison, which show a high level of similarity (93.33%), justify the usage of low-cost HMD as a research tool in Human Behavior in Fire. Additional justification is reached since the results were also found to be cost-effective and easily obtained.