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AN IMMERSIVE AUGMENTED REALITY SYSTEM TO STUDY THE EFFICIENCY OF DYNAMIC EXIT SIGNAGE

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Abstract

Every year, many disasters occur to buildings causing their destruction and leading to huge casualties. One way of preventing casualties is by evacuation drill activity. Although accurate evacuation drills could enhance the efficiency of the process during the real event, these drills are not fully effective

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because participants miss the sense of being stressed or under pressure while in action. Several gaming concepts have been introduced to train the participants on how to cope with and evacuate effectively during an emergency. For instance, Augmented Reality (AR) and Virtual Reality (VR) interfaces could provide virtual content to enhance the effectiveness of evacuation drills. However, accurate representation of different evacuation scenarios and its impact analysis during emergency using the above technologies are still debatable, mainly due to immersion quality. Thus, this study proposes an Immersive Augmented Reality (IAR) application that is mainly the amalgamation of AR and VR in realizing fast and safe evacuation during on-site building emergencies. A virtual dynamic exit signage system is also developed in the proposed "Smart Evacuation application". This work evaluated the efficiency of a virtual dynamic exit signage and also a proposed "Smart Evacuation" system by analysing on-site emergency evacuation processes. By setting up various scenarios imitating real life disasters, this research analysed the time taken and level of stress of the occupants during the evacuation of a chosen site. The proposed "Smart Evacuation" achieved 33.82% better performance compared to normal evacuation thus indicating a faster and safer evacuation © 2022. IIUM Engineering Journal. All Rights Reserved.

Author keywords

Dynamic exit signage ; Evacuation; Fire building; Immersive augmented reality

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