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Enhancing the functionality of augmented reality using deep learning, semantic web and knowledge graphs: A review

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ABSTRACT

The growth rates of today's societies and the rapid advances in technology have led to the need for access to dynamic, adaptive and personalized information in real time. Augmented reality provides prompt access to rapidly flowing information which becomes meaningful and "alive" as it is embedded in the appropriate spatial and time framework. Augmented reality provides new ways for users to interact with both the physical and digital world in real time. Furthermore, the digitization of everyday life has led to an exponential increase of data volume and consequently, not only have new requirements and challenges been created but also new opportunities and potentials have arisen. Knowledge graphs and semantic web technologies exploit the data increase and web content representation to provide semantically interconnected and interrelated information, while deep learning technology offers novel solutions and applications in various domains. The aim of this study is to present how augmented reality functions and services can be enhanced when integrating deep learning, semantic web and knowledge graphs and to showcase the potentials their combination can provide in developing contemporary, user-friendly and user-centered intelligent applications. Particularly, we briefly describe the concept of augmented reality and mixed reality and present deep learning, semantic web and knowledge graphs technologies. Moreover, based on our literature review, we present and analyze related studies regarding the development of augmented reality applications and systems that utilize these technologies. Finally, after discussing how the integration of deep learning, semantic web and knowledge graphs into augmented reality enhances the quality of experience and quality of service of augmented reality applications to facilitate and improve users' everyday life, conclusions and suggestions for future research and studies are given.

“ Abdi and Meddeb, 2017

Deep learning traffic sign detection, recognition and augmentation

Abdi L. and Meddeb A.
Proceedings of the Symposium on Applied Computing, ACM (2017), pp. 131-136

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Abstract

Driving is a complex, continuous, and multitask process that involves driver's cognition, perception, and motor movements. The way road traffic signs and vehicle information is displayed impacts strongly driver's attention with increased mental workload leading to safety concerns. Drivers must keep their eyes on the road, but can always use some assistance in maintaining their awareness and directing their attention to potential emerging hazards. Research in perceptual and human factors assessment is needed for relevant and correct display of this information for maximal road traffic safety as well as optimal driver comfort. In-vehicle contextual Augmented Reality (AR) has the potential to provide novel visual feedbacks to drivers for an enhanced driving experience. In this paper,