Using Data Glasses inside a modern BIM approach for the Planning, Construction and Maintenance of Structures

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1   Abstract

The planning methods of Building Information Modeling (BIM) are already used as standard for the planning of buildings and bridges. 3-D models of the structures are created. From these 3-D models, 2-D drawings are derived and made available to the construction site for construction. This derivation of 2-D drawings takes a lot of work and questions the continuous digital planning process. New ways have to be developed how the information is brought from the office to the construction site and how this information is made available digitally to the workers. On the other hand, in-situ collection and post-processing of data is a highly topical issue. The techniques of Virtual and Augmented Reality look promising for that purpose. This article on the one hand shows the potentials of data glasses inside a modern BIM approach for the whole civil engineering context and on the other hand presents concepts as well as first experiences with the use of data glasses for the construction of building components within a BIM work flow. It can be shown, that data glasses are very well suited and promising for the use of transferring planning information to the construction site and vice versa.

Keywords: Building Information Modeling, Augmented and Virtual Reality, Construction of Structures

2   Introduction

In order to make _Building Information Modeling_ (BIM) methods successful in planning and construction of bridges and buildings, it is necessary to develop concepts and strategies that allow high-quality BIM models to be generated, modified and associatively exchanged across programs in a very short period of time for buildings of any complexity. As every building possesses its own characteristics and technical challenges, the BIM software must be very flexible and open in order to not force the designers and engineers into predefined schemes. The whole value of BIM-based approaches is gained, when the BIM models were designed such, that they can be used across the entire project lifecycle including design, planning and construction to operations and maintenance. Taking into account very recent advances in further technologies such as _Digital Services_ (_DS_)_, Internet of Things_ (_IoT_), visualization techniques (_virtual and augmented reality (VR/AR) glasses_), data processing and analysis (especially artificial intelligence (AI)), together with BIM have the potential to transform the way of how we build and interact with the environment. This paper hence elaborates smart BIM concepts and highlights various fields of potential applications as well as current research at the Bundeswehr University Munich (UniBwM) in that field.