

Literature Review and Approach for the Use of Digital Factory Models in an Augmented Reality Application for Decision Making in Restructuring Processes

Authors : Rene Hellmuth, Jorg Frohnmayer

Abstract : The requirements of the factory planning and the building concerned have changed in the last years. Factory planning has the task of designing products, plants, processes, organization, areas, and the building of a factory. Regular restructuring gains more importance in order to maintain the competitiveness of a factory. Even today, the methods and process models used in factory planning are predominantly based on the classical planning principles of Schmigalla, Aggteleky and Kettner, which, however, are not specifically designed for reorganization. In addition, they are designed for a largely static environmental situation and a manageable planning complexity as well as for medium to long-term planning cycles with a low variability of the factory. Existing approaches already regard factory planning as a continuous process that makes it possible to react quickly to adaptation requirements. However, digital factory models are not yet used as a source of information for building data. Approaches which consider building information modeling (BIM) or digital factory models in general either do not refer to factory conversions or do not yet go beyond a concept. This deficit can be further substantiated. A method for factory conversion planning using a current digital building model is lacking. A corresponding approach must take into account both the existing approaches to factory planning and the use of digital factory models in practice. A literature review will be conducted first. In it, approaches to classic factory planning and approaches to conversion planning are examined. In addition, it will be investigated which approaches already contain digital factory models. In the second step, an approach is presented how digital factory models based on building information modeling can be used as a basis for augmented reality tablet applications. This application is suitable for construction sites and provides information on the costs and time required for conversion variants. Thus a fast decision making is supported. In summary, the paper provides an overview of existing factory planning approaches and critically examines the use of digital tools. Based on this preliminary work, an approach is presented, which suggests the sensible use of digital factory models for decision support in the case of conversion variants of the factory building. The augmented reality application is designed to summarize the most important information for decision-makers during a reconstruction process.

Keywords : augmented reality, digital factory model, factory planning, restructuring

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