

# **A Systematic Review of Image-Based Technologies for Detecting As-Is BIM Objects**

**Angelina Aziz, Ph.D. Student,<sup>1</sup> Markus König, Dr. Prof.,<sup>2</sup> and Jens-Uwe Schulz, Prof.<sup>3</sup>**

<sup>1</sup>Faculty of Civil and Environmental Engineering, Ruhr-University Bochum, in Bochum, Germany; e-mail: [angelina.aziz@ruhr-uni-bochum.de](mailto:angelina.aziz@ruhr-uni-bochum.de)

<sup>2</sup>Faculty of Civil and Environmental Engineering, Ruhr-University Bochum, in Bochum, Germany; e-mail: [koenig@inf.bi.rub.de](mailto:koenig@inf.bi.rub.de)

<sup>3</sup>Detmold School of Architecture and Interior Architecture, University of Applied Sciences and Arts, in Detmold, Germany; e-mail: [jens-uwe.schulz@th-owl.de](mailto:jens-uwe.schulz@th-owl.de)

## **ABSTRACT**

Despite many potential applications of Building Information Modeling (BIM), the automated evaluation of existing as-is information in images and its transformation into purpose-oriented digital as-is BIM models is still under investigation. Although several previous studies have systematically investigated technologies for creating as-is BIM models for existing building elements, they do not include the latest approaches to object recognition in terms of machine learning methods (e.g., supervised, unsupervised learning). Many researchers point out the need for more efficient and feasible algorithms to provide an automatic and information-rich BIM model generation system. By following a systematic assessment methodology, this review paper provides an overview of current object recognition and detection strategies in the Architecture, Engineering and Construction and Operation (AECO) domain and discusses their potentials and limitations based on the richness of semantic information with respect to as-is BIM generation of existing buildings. The combined application of image-based object detection and the automated transfer to BIM will be investigated in future work.