Can AI improve AEC?

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Abstract:

The AEC industry presents a unique set of difficult challenges for engineers who wish to develop computing applications. For example, there may be many design criteria, construction in changing environments, potential changes in use over service lives and high failure consequences. This creates a situation where many applications of AI in AEC have failed to reach performance goals. This talk begins with a presentation of some of the challenges that successful AEC projects have to overcome. While initially, it would seem that such a combination of challenges is a precise recipe for avoiding AI, there are many opportunities. Since civil engineers are legally responsible for their decisions and actions, they will not use software that they do not trust. The talk continues with an extension of computer-science criteria for trustworthiness to engineering criteria for trustworthiness in the built world. This extension has inspired several research projects at the TUM Georg Nemetschek Institute AI for the Built World since 2022. These projects are briefly described. Expected outcomes beyond specific project results include the creation of a new generation of engineers who are aware of opportunities and risks of AI in AEC.

Bio:

Ian F.C. Smith is the Director of the Georg Nemetschek Institute, AI for the Built World, at the Technical University of Munich, Germany. From 1996 to 2020, he was Professor of Structural Engineering at the Swiss Federal Institute of Technology (EPFL) in Lausanne, Switzerland. He received his undergraduate degree from the University of Waterloo, Canada in 1978 and his PhD from Cambridge University, UK in 1982. His research interests are on intersections of computer science with structures and urban systems. In 2003, he co-authored the text book Fundamentals of Computer-Aided Engineering (Wiley) and the 2nd Edition appeared in June 2013.

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