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Continuous adaption through real data analysis turn simulation models into digital twins

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Abstract

Digital twins of production systems enable new forms of production control, flexibility and continuous improvement. While off-the-shelf software for discrete-event simulation permits the fast implementation of rough simulation models with sufficient accuracy for project-based analysis, they lack the precision and generality of a digital twin. This paper presents an approach to close the gap between model and reality by continuous and iterative updates enabled by connecting the simulation model to IT systems and smart data analysis. However, handling different databases requires a generative and flexible modelling approach as well as suitable algorithms for probability distribution estimation and control logic identification. The presented approach was validated at a real world example from the automotive industry where an average deviation of output to reality per week of 0.1% was achieved, proving the effectiveness of the approach.

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