

TOWARDS DIGITAL TWINS FOR INFRASTRUCTURES

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ABSTRACT

Digital twins are a powerful tool to design, optimize, monitor, operate and service real (physical) objects by allowing for holistic and realistic simulations and predictions. The digital representation of a real object combines all relevant and available models, data and information about its real counterpart. Thereby, the coexisting digital and real twin are able to exchange information bi-directionally [1]. While the term digital twin arose in the context of manufacturing (Industry 4.0), the concept is more and more explored in various other fields such as health care, education, meteorology and construction, too [2]. Using the great potential of digital twins for various and critical infrastructures, like road systems, bridges, water treatment facilities and energy networks, which are valuable and expensive goods of our society, is meaningful to increase among others safety, sustainability and operability. However, the development of digital twins at hand of sub-models, data and interfaces requires huge interdisciplinary knowledge and

contributions on, e.g., coupling of models, domain knowledge, sophisticated data science and machine learning.

The objective of our mini-symposium is to bring experts in the field of digital twins for infrastructures and their enabling technologies together to increase the interdisciplinary knowledge and to foster scientific exchange and collaboration.

Topics of interest include, but are not limited to:

- efficient physical and data-driven models,
- obtaining and processing of sensor data from real objects and experiments as data source for digital twins,
- scientific machine learning for digital twins, e.g. physics-informed neural networks,
- approaches to combine different models and data of a real object in one digital representation,
- twinning approaches to keep the real object and its digital representation consistent,
- architectures and use cases of digital twins,
- treatment of uncertainties within digital twins.

REFERENCES

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