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Case studies of Digital twins in Quality Engineering

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The process of digitalization is happening at a great pace and is driven by enabling technologies such as Internet of Things (IoT), cloud computing, simulation tools, big data analytics and artificial intelligence (AI). Altogether, these allow to create virtual copies of physical systems or even complete environments. The concept of Digital Twins (DTs) provides a framework for integrating the physical and virtual worlds. DTs were successfully used in numerous application fields, including agriculture, healthcare, automotive, manufacturing and smart cities (Qi et al., 2021).

In this contribution we will give two real-world examples of DTs for very diverse applications and show how multiple scientific fields are required and blended together. One example will be related to new product development for an expensive machine, whilst the other application relates to online quality inspection of complex products.

We will briefly list some key aspects of DTs where statisticians should play a crucial role, and that offer interesting research challenges. Historically, statisticians were mainly focused on the physical representation, and most statistical techniques are based on (and optimized for) characteristics that relate to the physical world where random variation is omnipresent. This, however, is changing and industrial statisticians are, and should be, looking more into the new field of virtual representations and the broader field of DTs.

References

De Ketelaere, B., Smeets, B., Verboven, P. Nicolai, B. and Saeys, W. (2022). Digital Twins in Quality Engineering. Quality Engineering, in press.

Qi, Q., Tao, F., Hu, T., Anwer, N., Liu, A., Wei, Y., Wang, L., Nee, A.Y.C., 2021. Enabling technologies and tools for digital twin. Journal of Manufacturing Systems 58, Part B, 3-21. <https://doi.org/10.1016/j.jmsy.2019.10.001>

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