DaMIA – Data Mining in Industrial Applications of Digital Twins
Pattern 2023 – IARA

Track Chair: Prof. Dr. Jens Weber

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A warm welcome to our special track!

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The special track creates a panel for leaders, researchers, industry practitioners, and users to drive the development of the field of **Data Mining in Industrial Applications of Digital Twins** by discussing emerging trends and opportunities.

The objective is exchanging **new ideas as well as tested best practices**.

We achieve this by promoting a **transdisciplinary and cross-domain collaboration**.

The contributions show **the wide range of Digital Twin concepts** in manufacturing and the automotive industry as well as in digital threat detection.

The contributions of this special track enable **solutions for real-world challenges** of industrial applications such as:

- Two useful **datasets for future research projects for digital threat detection** are evaluated and presented.
- An **IT landscape roadmap for the development of an Industrial Metaverse**.
- A foundation for a development of application of **Digital Twins and knowledge graphs in manufacturing**.
Three facts about Digital Twins regarding the special track:

1. The core idea of a Digital Twin as a virtual representation of a physical system but also a functional entity on its own was first introduced in 2002 by Grieves [1].

2. The research activities are growing in field of manufacturing.

3. The Digital Twin concept is today more versatile and applied in different scenarios and domains which is also confirmed by the contributions today.
Digital Threat Detection
- The Digital Twin is used as method to track the online vulnerability of individuals regarding privacy [2].
- In this context, we will see a contribution that lays the foundation for future research with focus on the evaluation of Digital Twin capabilities in mitigating privacy threats [3].

Industrial Metaverse
- The Metaverse emerged from the field of Digital Twins to enable an immersive collaboration among all participants.
- For the application of Industrial Metaverse solutions, the IT landscape of a manufacturing company must be adjusted for the specific requirements of such complex systems, which we also will see in one of our session presentations [4].

Knowledge Graphs
- Knowledge graphs are discussed as enablers and source for contextual and semantically enriched information [5].
- Knowledge graphs are applications which acquire and integrate information into an ontology and provide a reasoning [6].
- The last contribution points out that methods and requirements of practitioners and literature differ [7].
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Agenda

1. 14:30 – 14:40
   Welcome and Introduction to DaMIA – Data Mining in Industrial Applications of Digital Twins
   Jens Weber, Baden-Wuerttemberg Cooperative State University, Loerrach, Germany

2. 15:45 – 15:10
   Protecting Your Online Privacy: Insights on Digital Twins and Threat Detection
   Sergej Schultenkämper, Bielefeld University of Applied Sciences, Germany (Online)

3. 15:15 – 15:40
   Architecture Options to orchestrate Digital Twins in an Industrial Metaverse for the Predictive Production with AI methods
   Bernd Lüdemann-Ravit, University of Applied Science Kempten, Germany

4. 15:45 – 16:10
   Requirements for the Application of Knowledge Graphs in Body-In-White Manufacturing
   Christian Graewe, NTT Data Deutschland AG, Germany
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References


