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CECS Seminar

"An Integrated Environment for Modeling and Deploying Digital Twins"

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Friday, July 14th
11:00-12:00 p.m. PST
Location: EH 2430

Abstract: The Digital Twin (DT) has been the focus of researchers from academia and industry in the last few years. It is one of the key enablers of the current and next industrial revolutions, such as Industry 4.0, Industry 5.0, and Metaverse. The idea of digitalizing real-world "things" can bring many benefits since it can allow monitoring, simulation, predictions, optimizations and so on. However, representing real-world systems can be complex, since assets might have several ways of being represented and several stakeholders with different experiences might be involved. Also, keeping models updated with the current state of the system can also be challenging.
In this context, this thesis proposes an environment that integrates all these perspectives in a common language that different stakeholders can use, covering different system levels from the device level up to process and workflow levels. To support the creating of semantic DT models, a methodology has been proposed, starting from the identification of the real-world assets, creating the semantic models and linking external ones, and ending with the deployment of the system. Furthermore, a 4-layers architecture is presented to help designers to identify the responsibilities of each part of the system. Use cases related with a simulated industrial plant and in the automotive area have been developed to demonstrate the proposed approach.

Biography: Charles Steinmetz received the B.S. degree in Information Systems from the Franciscan University (UFN), Santa Maria, Brazil, in 2015, and the M.Sc. degree in Computer Science from the Federal University of Rio Grande do Sul (UFRGS), Porto Alegre, Brazil, in 2018. He is currently working toward the Ph.D. degree in Computer Science with the University of Oldenburg, Oldenburg, Germany. He also works as Research Assistant at the University of Applied Science Hamm-Lippstadt, Lippstadt, Germany. His research interests are Internet of Things, Digital Twins, semantic models and industry 4.0.

Hosted By: Prof. Nikil Dutt