1. Record Nr. UNINA9910799491003321

Autore	Stjepandi Josip
Titolo	Generation and Update of a Digital Twin in a Process Plant
Pubbl/distr/stampa	Cham : , : Springer International Publishing AG, , 2024 ©2024
ISBN	3-031-47316-7
Edizione	[1st ed.]
Descrizione fisica	1 online resource (211 pages)
Altri autori (Persone)	LützenbergerJohannes KremerPhilipp
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Intro -- Used Trademarks -- Contents -- About the Authors -- 1 Introduction to the Digital Twin of a Process Plant -- 1.1 Origins of the Digital Twin -- 1.2 Origins of the Book -- 1.3 Goals of the Book -- 1.4 Audience -- 1.5 Problem Definition -- 1.6 Objective of Work -- 1.7 Content of the Book -- References -- 2 Requirements and Process Design for Digital Twin of a Process Plant -- 2.1 Introduction -- 2.2 Requirements for the Concept Twin -- 2.2.1 Process Modeling with Cameo Systems Modeler -- 2.2.2 Requirements Elicitation and Validation -- 2.2.3 Results of Requirements Validation -- 2.3 Process Design -- 2.3.1 Cooperation Process -- 2.3.2 Internal Process PROSTEP AG -- 2.3.3 Verification of Concepts -- 2.4 Conclusions and Outlook -- References -- 3 Literature Review to Digital Twin of a Process Plant -- 3.1 Introduction -- 3.2 Definition and Taxonomy of Digital Twin -- 3.3 Main Applications of the Digital Twin -- 3.3.1 Digital Twin Technologies -- 3.3.2 Digital Twin Scope -- 3.3.3 Digital Twin Industrial Domains -- 3.4 Application of Digital Twin in a Process Plant -- 3.5 Discussion -- 3.6 Conclusions and Outlook -- References -- 4 Common Practice in Plant Design with Interoperability Standards -- 4.1 Introduction -- 4.2 Plant Engineering -- 4.2.1 Process Plant Engineering -- 4.2.2 Plant Project Planning -- 4.2.3 Asset Overhaul -- 4.2.4 Seamless and Dynamic Engineering of Plants -- 4.3 Basics of Piping Construction -- 4.3.1 Structure Piping Plant -- 4.3.2 Piping

and Instrumentation Diagram (P&amp -- ID) -- 4.4 Interoperability Standards for Process Plants -- 4.5 Discussion -- 4.6 Conclusions and Outlook -- References -- 5 Business Case for Digital Twin of a Process Plant -- 5.1 Introduction -- 5.2 Offerings Analysis -- 5.3 Conceptual Definition of the New Business Model -- 5.4 Value Creation and Business Planning.
5.5 Customers' View to the Digital Twin -- 5.6 Customers' Demand for a Digital Twin -- 5.6.1 As-Built Documentation -- 5.6.2 Virtual Reality -- 5.6.3 Modernization -- 5.6.4 Augmented Reality -- 5.7 Conclusions and Outlook -- References -- 6 Solution Approach for Digital Twin of a Process Plant -- 6.1 Introduction -- 6.2 Concept Selection -- 6.2.1 Solution Patterns -- 6.2.2 Solution Blocks -- 6.3 Functional Components -- 6.4 Collaboration Among Stakeholders -- 6.4.1 Client -- 6.4.2 Internal Processes -- 6.5 Conclusions and Outlook -- References -- 7 Implementation of a Digital Twin of a Process Plant -- 7.1 Introduction -- 7.2 Methodology for Object Recognition -- 7.2.1 Image-Oriented Methods -- 7.2.2 Video-Oriented Methods -- 7.2.3 Point Cloud-Oriented Methods -- 7.3 Object Recognition Procedure -- 7.3.1 Learning Procedure -- 7.3.2 Deep Learning Pipes -- 7.4 Implemented Procedure -- 7.4.1 Segmentation -- 7.4.2 Clustering -- 7.4.3 Classification -- 7.5 Practical Workflow -- 7.5.1 Interactive Model Preparation -- 7.5.2 Workflow Automation -- 7.6 Discussion and Future Perspectives -- 7.7 Conclusions and Outlook -- References -- 8 Practical Application of Digital Twin of a Process Plant -- 8.1 Introduction -- 8.2 Specific Properties of Components -- 8.3 Complexity of Plants -- 8.3.1 Biogas Plant -- 8.3.2 Chemical Plant -- 8.3.3 Power Plant -- 8.3.4 Refinery -- 8.3.5 Ship -- 8.3.6 Discussion-Impact of Complexity Dimensions -- 8.4 Generation of Piping CAD Model -- 8.5 Conclusions and Outlook -- References -- 9 Creation of a New Offering: Digital Twin as a Service -- 9.1 Introduction -- 9.2 Reduced Point Cloud -- 9.3 Segmentation Basic -- 9.4 Segmentation Plus -- 9.5 CAD Basic -- 9.6 Optional Service -- 9.7 Conclusions and Outlook -- References -- 10 Digital Twin: Conclusion and Future Trends in Process Plants -- 10.1 Introduction.
10.2 Developments with Impact on 3DigitalTwin Solution -- 10.2.1 Advances in the Scanning Process -- 10.2.2 Advances in the Process Modeling -- 10.2.3 Advances in Data Processing and Services -- 10.3 Synchronization with Piping and Instrumentation Diagram -- 10.4 Discussion -- 10.5 Closing Remarks and Conclusions -- References.