First International Workshop on Leveraging Semantics for Transparency in Industrial Systems: Summary

Konrad Diwold[1], Katrin Ehrenmüller[2], Andreas Harth[3], Marta Sabou[2] and Gernot Steindl[4,5]

[1]Siemens AG Österreich, Vienna, Austria
[2]Vienna University of Economics and Business, Austria
[3]Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany
[4]TU Wien, Vienna, Austria
[5] University of Applied Sciences Burgenland, Austria

Abstract

This is a summary of the First International Workshop on Leveraging Semantics for Transparency in Industrial Systems co-located with the 21st International Conference on Semantic Systems (SEMANTICS)

1. Summary

The increasing complexity of industrial automation systems is transforming traditionally deterministic systems into distributed non-deterministic cyber-physical systems (CPS). This evolution, combined with the growing adoption of ML and AI technologies, creates an urgent need for transparency and explainability in industrial applications. The upcoming EU AI Act further emphasizes this requirement, making it essential to convert black box systems into interpretable white box solutions that provide trustworthy information and recommendations to system operators. Semantic web technologies (SWT) and knowledge graphs (KG) have emerged as powerful tools to address these challenges in complex automation systems.

The SENTIS workshop serves as a collaborative platform dedicated to connecting researchers, and industry professionals. The workshop focuses on advancing transparency in both automation systems and their AI models, while promoting explainable solutions for industrial applications. SENTIS marked the ending of the FFG funded SENSE[1] (Semantics based Explainability of Cyber-physical Systems) project: research performed during this project has inspired this first edition of the SENTIS workshop.

The workshop was a half-day event, structured into three main parts: presentations of accepted papers, a keynote address, and a dedicated session for briefly introducing the results of the SENSE project, discussion and networking. Six accepted submissions were presented, covering diverse topics including interpretable forecasting, semantic methods for achieving explainability and auditability of industrial processes, and the integration of causal expert knowledge in automation processes. Danilo Valerio, Principal Key Expert for Neurosymbolic AI at Siemens, delivered a keynote address on the growing significance of semantics and neurosymbolic AI in industrial applications.

SENTIS reaffirmed the critical importance of this field of research, particularly in light of the rapid advancements in AI methods, and underscored the need for continued investigation into the diverse research avenues within this domain in the coming years.

The website of the workshop is: https://semsys.ai.wu.ac.at/sentis2025/

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konrad.diwold@siemens.com (K. Diwold); katrin.schreiberhuber@wu.ac.at (K. Ehrenmüller); andreas.harth@fau.de (A. Harth); marta.sabou@wu.ac.at (M. Sabou); gernot.steindl@tuwien.ac.at (G. Steindl)
https://www.wu.ac.at/dpkm/team/katrin-schreiberhuber (K. Ehrenmüller); https://harth.org/andreas/ (A. Harth); https://www.wu.ac.at/dpkm/team/marta-sabou (M. Sabou); https://informatics.tuwien.ac.at/people/gernot-steindl (G. Steindl)
0000-0002-6265-4064 (K. Diwold); 0000-0002-9421-8566 (M. Sabou)

[1]https://sense-project.net/