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INDIN 2023 Special Session on

SS 2 - Explainable and Interactive Machine Learning for Industrial Applications

organized by

Principal Organizer: Gianluca Manca (gianluca.manca@de.abb.com)

Affiliation: ABB Corporate Research Center Germany / Helmut-Schmidt-
University Hamburg, Germany



Born in Buchholz i.d.N., Germany in 1989. He received a B.Sc. degree in mechanical engineering and an M.Sc. degree in mechatronics from the Helmut-Schmidt-University, Hamburg, Germany, in 2013 and 2014, respectively, as well as a B.Sc. degree in information systems from the University of Hagen, North Rhine-Westphalia, Germany, in 2019. He is currently pursuing a Ph.D. in engineering at the Helmut-Schmidt-University, Hamburg, Germany.

Since 2022 he is working in the Industrial Data Analytics research team at ABB Corporate Research. His main research interests are the analysis and reduction of alarm floods in industrial alarm systems as well as the application of data mining and machine learning methods to industrial processes.

Organizer 1: Marcel Dix (marcel.dix@de.abb.com)
Affiliation: ABB Corporate Research Center Germany



Born in Heidelberg, Germany, in 1975. He received a Dipl.-Inform (FH) degree in Computer Science from the Technical University of Applied Sciences in Mannheim, Germany, in 2001, and an MBA in International Management from the European University of Applied Sciences in Hamburg, Germany, in 2012. Since 2001 he is working as Scientist at the ABB Corporate Research Center Germany. There, his research focus has been on the software configuration and life cycle management of industrial distributed control systems (DCSs).

Since 2013 he is working in the Industrial Data Analytics research team at ABB Corporate Research, that was founded at this time to account for the increasing relevance of big data and AI in the industrial domain. His main research interests today are the application of data mining and machine learning methods for the detection of anomalies in industrial systems.

Organizer 2: Alexander Fay (alexander.fay@hsu-hh.de)
Affiliation: Helmut-Schmidt-University Hamburg, Germany



Born 1970, received the Diploma and the Ph.D. in electrical engineering from the Technical University of Braunschweig, Germany, in 1995 and 1999, respectively.

He had worked five years at the ABB Corporate Research laboratories in Heidelberg and Ladenburg before he was appointed Full Professor at the Institute of Automation Technology at the Helmut-Schmidt-University in Hamburg, Germany, in 2004. His main research interests are models and methods for the engineering of large automated systems, especially in the process and manufacturing industries, in buildings and transportation systems.

Professor Fay served as a member of the AdCom of the IEEE Industrial Electronics Society and was Program Co-Chair of the IEEE Int. Conf. on Automation Science and Engineering (CASE) in 2018. Between 2011 and 2017, he served as an Associate Editor of the IEEE Transactions on Industrial Informatics.

Organizer 3: Willem van Driel (willem.van.driel@signify.com)
Affiliation: Signify / Delft University of Technology, Netherlands



Received the degree in mechanical engineering from the Technical University of Eindhoven and the Ph.D. degree from the Delft University of Technology, The Netherlands. He is currently a Fellow Scientist at Signify (formerly Philips Lighting).

Besides that, he is also a Professor at the Delft University of Technology, The Netherlands. He has more than 25 year track record in the reliability domain. Application areas range from healthcare, gas and oil explorations, and semiconductors. He has authored or coauthored more than 350 scientific publications, including journals and conference papers, books or book chapters, and invited keynote lectures.

His research interests include solid state lighting, microelectronics and microsystems technologies, virtual prototyping, virtual reliability qualification, and designing for reliability of microelectronics and microsystems. He is the Chair of the Organizing Committee of the IEEE Conference EuroSimE.

Organizer 4: Carl Westin (carl.westin@liu.se)
Affiliation: Linköping University, Sweden



For thirteen years, he combined the role of an academic researcher and a commercial pilot.

His main research interests center on empirical studies in safety-critical transportation domains, such as flight decks, air traffic control, and maritime operations. His focus has been on understanding the relationship between humans and machines from the perspective of human behavior and cognition and exploring automation designs that work in symbiosis with humans while supporting safety and efficiency. I am particularly interested in personalized automation (i.e., strategic conformal automation), transparent automation, and solutions to applying eye-tracking technologies in active operations and simulator training.

Call for Papers

Machine learning (ML) applications promise to enhance industrial processes in terms of availability, yield, and safety. Though many ML models fail after a short pilot phase, very few are actually used over the long term. One of the biggest challenges in using ML for industrial applications is the struggle to incorporate domain knowledge and build trust in ML models. Two strategies for resolving these issues are explainable artificial intelligence (XAI) and interactive machine learning. However, these methods face unique difficulties in industrial applications with

high-dimensional, noisy, and severely unbalanced data. In order to address this challenge in the industrial domain, this special session will examine techniques and application examples for interactive learning and explainability. This will help to put the process and domain experts at the forefront of the ML development process. Contributions that can clarify the difficulties of using such methods in the industrial setting are also welcome.

Topics of interest include, but are not limited to:

- Interactive data labeling for industrial applications.
- Industrial process simulation for generating (labeled) data for ML.
- Active ML in industrial applications.
- Human–AI interactions and interfaces in industrial applications.
- Trustworthy AI for industrial applications.
- Industry specific methods and approaches for ML model validation.
- Industry specific visualizations for XAI explanations.
- Industrial applications of XAI methods (e.g., LIME, SHAP, or model specific).
- Explanatory user interfaces and human-computer interaction (HCI) for XAI.
- Self-explanatory agents and decision support systems.
- XAI for planning and decision-making.
- Causal reasoning and causal explanations for monitoring and fault diagnosis.

Submissions Procedure: All the instructions for paper submission are included in the conference website <https://2023.ieee-indin.org/index.php>

Deadlines:

Deadline for submission of papers:	March 01, 2023
Notification of acceptance of papers:	April 15, 2023
Final manuscripts due:	June 05, 2023