Version 3.5

35th Annual Workshop of the Swedish Artificial Intelligence Society SAIS 2023

Program

June 12-13, 2023
Karlskrona, Sweden

12th of June

09:00 **Registration**

10:00 **Opening Remarks** *Location: J1504 Multisalen*

10:15 **Keynote 1**

Prof. Diego Calvanese

Prof. Diego Calvanese, one of the world-leading experts in knowledge representation and semantic technologies from the Free University of Bozen-Bolzano (IT) and Umeå University (SE) where he acts as a Wallenberg Guest Professor.

Title: Semantic Technologies for Digital Twins

Abstract: Digital twins are virtual representations of physical assets, systems, and processes that are becoming increasingly popular in different settings to optimize operations, minimize downtime, and enhance product quality. The full potential of digital twins can only be realized if they are able to faithfully represent all relevant aspects of their physical counterparts, considering both their structural and their dynamic features. Moreover, setting up digital twins typically requires leveraging data from multiple heterogenous sources. Semantic technologies, and specifically Virtual Knowledge Graphs (VKGs), provide means for representing data from diverse sources in a standardized way, and for integrated access. Hence, they can be adopted as powerful tools to aid the design of digital twins and to integrate them with enterprise applications, IoT devices, and other systems. In this talk, we will explore the role of VKGs in the development and deployment of digital twins in industrial settings, highlighting the benefits that can be achieved, and discussing the associated challenges, with respect to both structural and dynamic components.

11:15 **Session 1** **AI in Applications**
Location: J1504 Multisalen

Veronica Sundstedt, Veselka Boeva, Hans-Jürgen Zepernick, Prashant Goswami, Abbas Cheddad, Kurt Tutschku, Håkan Grahn, Emiliano Casalicchio, Markus Fiedler, Emilia Mendes, Shahrooz Abghari, Yan Hu, Valeria Garro, Thi My Chinh Chu, Lars Lundberg and Patrik Arlos	HINTS: Human-Centered Intelligent Realities
Aleksis Pirinen, Olof Mogren and Mårten Västerdal	Fully Convolutional Networks for Dense Water Flow Intensity Prediction in Swedish Catchment Areas
Aleksis Pirinen, Anton Samuelsson, John Backsund and Kalle Åström	Aerial View Localization with Reinforcement Learning: Towards Emulating Search-and-Rescue
Ella Olsson, Mikael Nilsson, Kristoffer Bergman, Daniel de Leng, Stefan Carlén, Emil Karlsson and Bo Granbom	Urdarbrunnen: Towards an AI-enabled mission system for Combat Search and Rescue operations

12:35 **Lunch**

13:30	**Session 2**	**AI for Security and User Management** *Location: J1504 Multisalen*
	Victor Arvidsson, Ahmad Al-Mashahedi and Martin Boldt	Evaluation of Defense Methods Against the One-Pixel Attack on Deep Neural Networks
	Rickard Brännvall, Helena Linge and Johan Östman	Can the use of privacy enhancing technologies enable federated learning for health data applications in a Swedish regulatory context?
	Jim Ahlstrand, Martin Boldt, Anton Borg and Håkan Grahn	Preliminary Results on the use of Artificial Intelligence for Managing Customer Life Cycles
14:30	**Fika**	
	Posters	
14:50	**Session 3**	**AI for Language Analysis** *Location: J1504 Multisalen*
	Maud van Lier	Understanding Large Language Models through the Lens of Artificial Agency
	Rakhshanda Jabeen, Morgan Ericsson and Jonas Nordqvist	Towards Better Product Quality: Identifying Legitimate Quality Issues through NLP & Machine Learning Techniques
	Igor Ryazanov and Johanna Björklund	How Does the Language of `Threat' Vary Across News Domains? A Semi-Supervised Pipeline for Understanding Narrative Components in News Contexts
15:50	**Award for Best Masterthesis**	*Location: J1504 Multisalen*
16:10	**Svenska AI-sällskapets årsmöte**	*Location: J1630*
17:00		
18:30	**Social Event**	*Location: Marinmuseum Karlskrona*
19:30	**Dinner**	*Location: Marinmuseum Karlskrona*

13th of June

08:45 **Registrering**

Coffee and tea

09:00 **Keynote 2** *Location: J1620*

Prof. Lars Kai Hansen

Lars Kai Hansen has MSc and PhD degrees in physics from University of Copenhagen. Since 1990 he has been with the Technical University of Denmark, where he heads the Section for Cognitive Systems. He has published more than 350 contributions on machine learning, signal processing, and applications in AI and cognitive systems. His research has been generously funded by the Danish Research Councils and private foundations, the European Union, and the US National Institutes of Health. He has made seminal contributions to machine learning including the introduction of ensemble methods. His work in functional neuroimaging includes the first brain state decoding work based on PET(1994) and on fMRI(1997). He was elected Catedra de Excelencia at UC3M Madrid, Spain(2011), ELLIS Society Fellow(2020) and received the Novo Nordisk Foundation's Distinguished Data Scientist Award(2022).

Title: Explainability for human-centered AI

Abstract: Understanding the barriers to human-machine alignment in AI is as important as ever. Explainability is an important tool for alignment and can help generate trust in machine learning based systems. I will discuss explainability in the context of human-centered AI and present established results as well as recent contributions to our understanding of machine learned representations.

10:00 **Session 4a** Extended abstracts, previously published papers *Location: J1620*

Ece Calikus and Slawomir Nowaczyk	Wisdom of the contexts: active ensemble learning for contextual anomaly detection
Edvin Listo Zec, Johan Östman, Olof Mogren and Daniel Gillblad	Efficient Node Selection in Private Personalized Decentralized Learning
Filip Nilsson and György Kovács	Detecting signs of Depression from Social Media: Examining the use of summarization methods as data augmentation for text classification
Denis Kleyko, Christopher Kymn, Bruno A. Olshausen, Friedrich Sommer and E. Paxon Frady	A Network of Sigma–Pi Units producing Higher-order Interactions for Reservoir Computing
David Speck, Paul Höft, Daniel Gnad and Jendrik Seipp	Finding Matrix Multiplication Algorithms with Classical Planning - Extended Abstract
Samaneh Jamshidi, Slawomir Nowaczyk and Mahmoud Rahat	EcoShap: Save Computations by Only Calculating Shapley Values for Relevant Features

10:00	**Session 4b**	Extended abstracts, Ph.D. projects *Location: J1630*
	David Hutter, Michael Hellwig and Adam Jatowt	Adaptive and Dynamic Scheduling for Robust Production Planning
	Alexander Galozy and Slawomir Nowaczyk	Extended Abstract: Personalised Data-driven Healthcare
	Ziyu Li, He Tan, Anders Jarfors, Lucia Lattanzi and Per Jansson	Enhancing Rheocasting Process Control with AI-based Systems
	Jia Fu, Sepideh Pashami, Fatemeh Rahimian and Anders Holst	Adversarial Robust Machine Learning
	Taavi Luik and Jaan Aru	Towards more robust and autonomous AI via introducing creativity and curiosity
	Jonne van Dreven, Veselka Boeva, Shahrooz Abghari, Håkan Grahn, Jad Al Koussa and Emilia Motoasca	A Data Generation Approach for Intelligent Fault Detection and Diagnosis in District Heating
	Simona Gugliermo	Learning Planning Domains for Intelligent Transport Systems
	Zahra Taghiyarrenani, Slawomir Nowaczyk, Sepideh Pashami and Mohamed-Rafik Bouguelia	Learning from Multiple Domains
11:30	**Lunch**	
12:30	**Keynote 3**	*Location: J1620*

Dr. Judith Bütepage

Dr. Judith Bütepage, a machine learning expert and robotics enthusiast with experience in both the academic and industry sector currently working as a research lead at SEED at Electronic Arts (SE).

Title: Evaluating deep generative models in theory and practice

Abstract: In the past year, deep generative models have made the leap from being known to mostly the ML community to being used by the general public. Most focus has been on generating natural language text and images. Both of these domains are easily interpretable by laymen who can usually rate the quality of the generated content. In many other domains however, one needs expert knowledge to judge quality. While human judgement is important, automatic evaluation methods are needed for model development and model comparison. To date, there exist only few qualitative metrics and most of these rely on the availability of labeled training data or pre-trained models. This leads to the question why deep generative models do not by design express a measure of sample quality, e.g. by assessing the likelihood of a data point. In this talk I will try to answer this question by discussing several aspects that make the evaluation of deep generative models difficult. I will highlight how different modelling choices impact the model's innate capability to detect out-of-distribution data points. These choices include the data likelihood, the uncertainty estimates of the hidden variables and which inference method is used. Finally, I will show how deep generative models can nevertheless assist model training when other methods, such as regression, would fail to assess output quality.

13:30	**Session 5a**	Extended abstracts, Ph.D. projects *Location: J1620*
	Max Pettersson	Gaining Insights From Expert Demonstrations Using Inverse Reinforcement Learning
	Marcus Gullstrand	Linking Labels to Neural Subnetworks
	Lachlan McPheat	Distributional Compositional Models of Discourse (Thesis Abstract)
	Dag Björnberg, Morgan Ericsson, Johan Lindeberg, Welf Löwe and Jonas Nordqvist	Improving Supervised Machine Learning Models in Forest Industry with Generated Data
	Md Fahim Sikder, Resmi Ramachandranpillai and Fredrik Heintz	Generating Private and Fair Long-Sequenced Longitudinal Healthcare Records
13:30	**Session 5b**	Extended abstracts, industrial applications *Location: J1630*
	Anderson Tavares, Jens Lundström, Stefan Byttner and Maycel Isaac	Deep Neural Networks in embedded systems for counters
	Felix Viberg, Jonas Nordqvist, Morgan Ericsson, Anton Kaiser, Martin Kroon, Welf Löwe, Marcus Nilsson and Fredrik Sandberg	A Case for Unsupervised Defect Detection in Manufacturing
14:30	**Session 6**	Extended abstracts, previously published papers *Location: J1620*
	Zahra Kharazian, Mahmoud Rahat, Fabio Gama, Peyman Sheikholharam Mashhadi, Slawomir Nowaczyk, Tony Lindgren, Sindri Magnusson and Håkan Lindström	AID4HAI: Automatic Idea Detection for Healthcare-Associated Infections from Twitter, A Framework based on Active Learning and Transfer Learning
	Ahmed Al-Saedi and Veselka Boeva	Group-Personalized Federated Learning for Human Activity Recognition
	John Martinsson and Maria Sandsten	A differentiable Mel spectrogram layer for neural networks
15:15	**Closing remarks**	*Location: J1620*

Venue

For travel information, please visit the following link:
https://www.bth.se/wp-content/uploads/2023/04/Travel_Information.pdf

The workshop will take place on the bottom floor of the J building at BTH, Karlskrona. The entrance is between buildings H and J, and the lecture halls are in the far-left corner of the building. Parking permits can be found in the reception in building A.