Cognify your Products and Production Systems with Pro²Future

Pro²Future - Products and Production Systems of the Future - is an industry-related and independent research centre in the field of artificial intelligence (AI) and cognitive / industrial ICT with a focus on cognitive products and production systems. These are supported by the areas of Perception and Aware Systems, Cognitive Robotics and Shop Floors, and Cognitive Decision Making. Further fields of activity of the centre cover mechatronic systems, embedded systems, pervasive computing systems and big data analytics. We are currently offering the position of a

Master's Student (m/w/d)

within the topic "Cognitive Decision Making / Causality"

Part-time (20 hours/week), at one of the Pro2Future GmbH locations in Graz or Linz

Thesis context

In contemporary manufacturing environments, mechanical degradation poses a significant challenge, impacting product quality and process efficiency. Addressing this challenge necessitates a nuanced understanding of dynamic production processes and the ability to detect subtle changes indicative of degradation. This master's thesis aims to delve into methodologies for monitoring dynamic manufacturing processes, particularly those sensitive to degradation such as equipment reliability, with a focus on leveraging causal discovery techniques. The core objective of this research is to develop robust mechanisms for identifying potential issues within dynamic manufacturing processes by analyzing changes in causal relationships over time. To achieve this, a comprehensive exploration of established causal discovery methods will be undertaken, supplemented by the application of these techniques to real industry data as well as open-source datasets. By rigorously testing the efficacy of causal discovery in monitoring degradation, this thesis seeks to provide actionable insights for enhancing process reliability and quality control.

A central aspect of this work involves a comparative analysis with contemporary methods, notably LSTM-based autoencoders, which have gained traction but lack interpretability. By comparing the results of the causal analysis with these approaches, this work aims to emphasize the advantages and validity of the proposed methodology. Ultimately, the findings of this master thesis are poised to make significant contributions to the ongoing evolution of process optimization and quality assurance practices within manufacturing contexts. By highlighting the benefits of causal detection in recognizing and mitigating mechanical degradation, this thesis seeks to support strategic decision making and promote continuous improvement of production processes.

Job profile

- Conduct a comparative study of methods for causal analytics
- Writing a scientific master thesis (including related work/background and evaluation)
- Defending the master thesis in a final presentation

Your qualifications

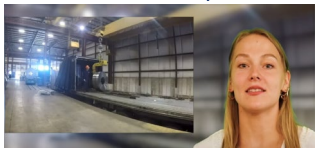
- Bachelor's degree in computer science, computer engineering, mathematics or similar
- Experience and practical knowledge of programming languages and tools (e.g. Python, Java, Git, etc.)
- High affinity for applied research, interest in shaping future technologies
- Independent and reliable way of working, enjoy working in a team
- Fluent in English or German
- Flexibility, willingness to learn, openness and commitment

Our offer

- The opportunity to work in a highly qualified, international, young, and dynamic research team
- Collaboration in innovative, beyond-state-of-the-art research projects
- Opportunity for personnel development in a learning and respectful environment
- Great emphasis on gender, diversity, and equal opportunities
- Flexible working hours, flat organizational structures, fun at work
- Full-time gross salary per month EUR 2,700.00 - 3,000.00 EUR

Pro2Future GmbH aims to increase the proportion of women in the research area - we are therefore particularly looking forward to applications from qualified women!

Jaroslava Huber, MSc



My focus lies on the investigation of next generation AI Systems to increase occupational safety and accident prevention in industrial settings.

Matej Vukovic, M.Inf.

Our results give an insight into the Key Influencing Parameters for Blast Furnace and Electric Arc Furnace Operations in the Metal Industry.

Dr. Ouijdane Guiza

I work on privacy respect and monitoring of human intensive assembly processes and cognitive line balancing support.

To apply for this position, please send your application (including CV, supporting documents, letter of motivation), via e-mail to: jobs@pro2future.atjobs. Pro2Future GmbH, z.H. Mag. (FH) Sandra Neuhold-Pauer, Altenberger Straße 69, 4040 Linz, Standort Graz: Inffeldgasse 25F, 8010 Graz, Tel.: +43 664 / 8889 2189.