REWAI – Reducing Energy and Waste using AI

Building Explainable and Trustworthy AI-Solutions for Even More Sustainable Fiber Production

Pro²Future

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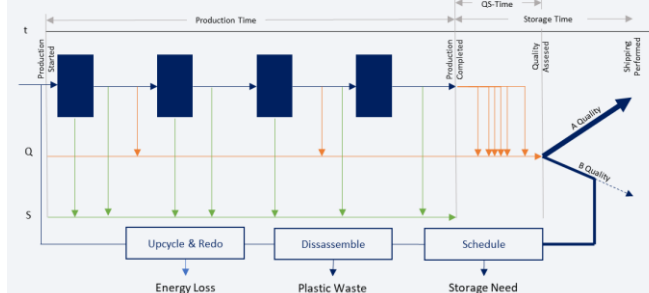[2] Inffeldgasse 25F, 8010 Graz

MOTIVATION & GOALS

We contribute to SDG 12 with AI by
- avoiding low quality production outcomes that would otherwise result in energy loss, as well as package and storage requirements
- by empowering operators with AI tools to optimize production by informed decisions

Production Process (examplified)

Project FactBox

Project Name	REWAI
Project ID	FFG No. 892233
Duration	36 Months

Area 1 & Area 3
1 - Perception & Aware Systems
3 - Cognitive Decision Making

Project Lead
DI Dr. Michael Haslgrübler
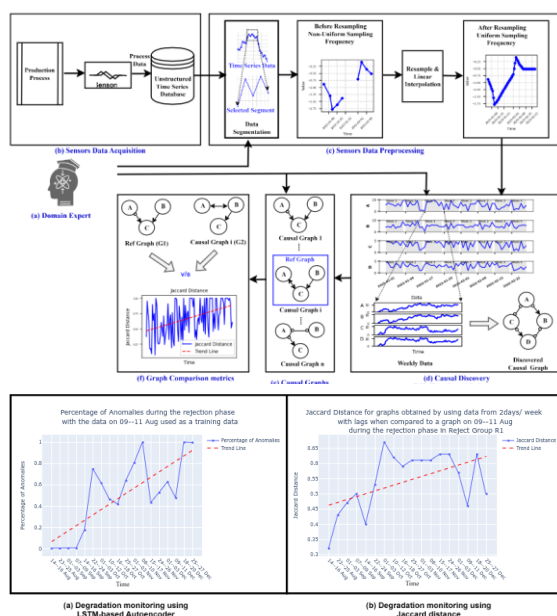DI Dr. Belgin Mutlu

SCIENTIFIC CONTRIBUTION

- Efficiently show changes in causal relationships reflect deterioration of complex industrial processes
- Awareness building for energy costs of ML in industrial production
- Ensuring proper operator trust and mistrust in AI models by deploying appropriate XAI techniques

ECONOMIC CONTRIBUTION

- Avoiding low quality outcomes to avoid upcycling process
- Improving resource utilization by reducing the computational cost
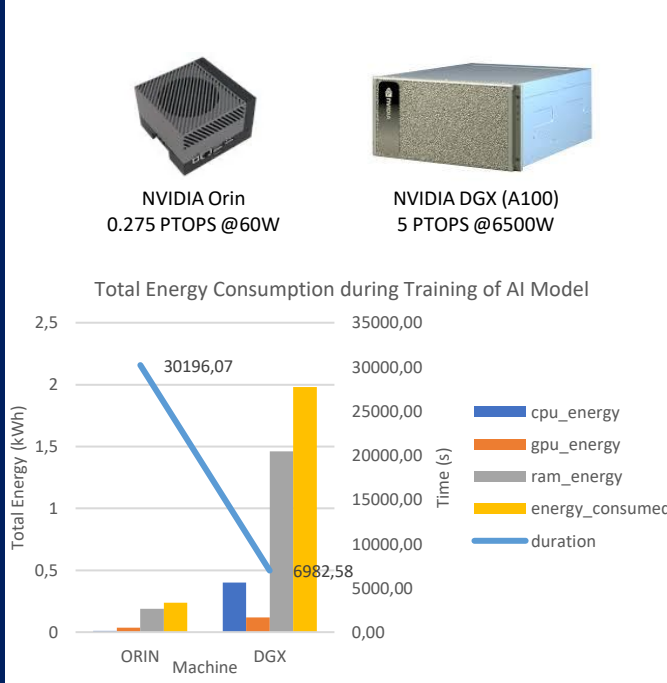- Empowering human operators to make informed decisions

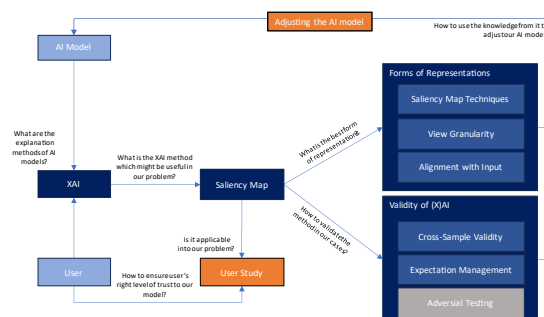## EXAMPLIFIED RESULTS

Causal Deterioration Tracking

Choudhary, A.; Vuković, M.; Mutlu, B.; Haslgrübler, M.; Kern, R.
Interpretability of Causal Discovery in Tracking Deterioration in a Highly Dynamic Process.
Sensors 2024, 24, 3728. https://doi.org/10.3390/s24123728

Energy Costs of AI Training

NVIDIA Orin
0.275 PTOPS @60W

NVIDIA DGX (A100)
5 PTOPS @6500W

Total Energy Consumption during Training of AI Model

- cpu_energy
- gpu_energy
- ram_energy
- energy_consumed
- duration

30196,07

6982,58

Trustworthiness w. Saliency

Saliency and Bias

Vanilla Saliency (Zero signal)

Vanilla Saliency (Actual signal)