EU-DAIS Showcase

Al in process industry and heavy rotating machinery

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Step Solutions AS

- NXTStep Data Capture: Unlocking true potential of analytics
- Industrial and maritime control systems
- Automation and robotics



Keytopics covered

- Our ultimate goal with data capture and AI in process Industry
- EU-DAIS Showcase
- What we achieved
- Key take-aways & Lessons learned



Our ultimate goals with AI in process industry

- Detect anomalies
- Production optimalization
- Mechanical lifecycle management



Solution requirements from our perspective

- Easy to retrofit
- Economically feasable
- A distributed solution



Horizon 2020 – DAIS project

- Distributed Artificial Intelligent Systems
- Key Digital Technologies Joint Undertaking (KDU JU)
- Support from EU Horizon 2020
- Approx. 30 Mill. EUR
- 47 companies
- 11 countries



Horizon 2020 – DAIS project

- Develop secure, energy-efficient data processing solutions
- Focus on merging edge AI software and hardware components
- Domains: Digital Life, **Digital Industry** and Smart Mobility
- Norwegian Consortium: Jotne, Step Solutions and Expert Analytics





Finding the perfect use-case

Our use-case:

NORGIPS

- 130 000 m2 plasterboards every day
- 24/7 production
- Significant energy consumption



Illustration photo: Grenzebach



Narrowing down the scope

Calsining process:

- Pre treatment of gypsum
- Heat treatment to remove chemically bound water
- Laboratory test every second hour to verify quality



The calsining process



Approximately 250 sensor/signals

Gas-fuelled mill to pulverize and dry the gypsum

Weights, temperatures, pressures, motor feedbacks etc.



Predicting the laboratory result every minute



Other achievements

- Identification of key factors
- Anomaly detection
- Automatic suggestion of setpoints



Machine Learning algorithms

- Extreme Gradient Boosted Trees (XGBoost)
- Convolutional Neural Networks (CNNs)
- Long Term Short Term Memory (LTSM)



The path to success

- No quick fix
- Attention to project timeline and the sequence of tasks
- Data exploration



Data exploration

Gas Flow Vs Production Flow



- Project impact greater than ML-Algorithms lacksquare
- Examining data over an extended period

StepSolutions













February









Timeline



Keytake-aways

- Do not waste time:
 - Involving stakeholders from the start
 - Avoid unnecessary data wrangling
 - Carefully define goals for the stakeholders
- Be aware of human factors
- Data quality
- Changing production patterns and raw material properties

Technical facts: System architecture



Technical facts: System architecture



Creating a ML framework





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