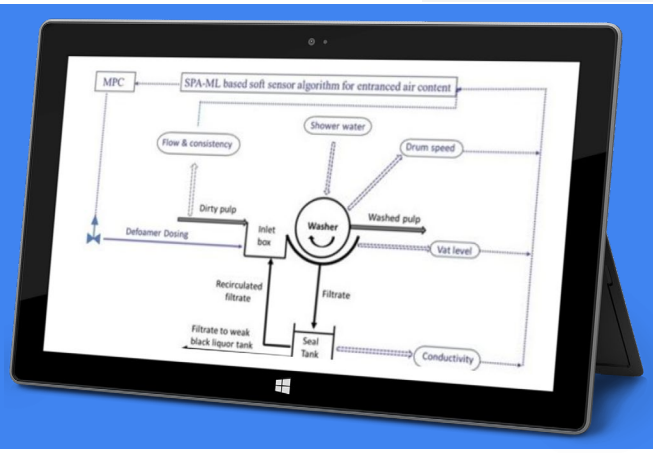
Industry
Pulp & Paper

Technologies
Sensing
Machine Learning
Predictive Modeling
Advanced Control

Solutions
Quality Improvement
Waste Reduction
Energy Efficiency

PROJECT CASE STUDY

Implementing Data-Driven Soft Sensors for Smart Manufacturing of Pulp and Paper



PROJECT LEAD

Auburn University

PROJECT TEAM

Georgia-Pacific

PROJECT OBJECTIVE

Implement machine learning (ML) soft sensors at multiple pulp and paper manufacturing facilities to demonstrate scalability within a company and across the industry.

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Machine Learning Powered Soft Sensors Reduce Toxic Chemical Use in Paper Manufacturing

BENEFITS TO OUR NATION

Data-driven soft sensors are predictive models that use machine learning and historical process data to estimate process variables. Soft sensor technology can be used to control manufacturing processes that are difficult to monitor with conventional sensors.

By leveraging predictive analytics, machine learning-based controls and soft sensors enable smarter decision-making and reduce energy consumption. Implementing these tools strengthens U.S. manufacturing competitiveness and contributes to a more resilient supply chain.

BENEFITS TO INDUSTRY

Soft sensors - which use historical data to estimate hard-to-measure variables - eliminate the need for expensive physical sensors. By leveraging vast amounts of data, machine learning-based controls can identify patterns and anomalies, enabling faster decision-making and process adjustments. This leads to increased productivity, reduced waste, and improved sustainability, enabling American industry to adapt to rapidly changing market demands.

PROJECT DESCRIPTION

TECHNICAL APPROACH

Implement soft sensors at various pulp and paper manufacturers:

1. Analyze historical operational data at each candidate plant
2. Verify and optimize soft sensor operation for multi-objective process control
3. Incorporate soft sensors into existing controls schema
4. Test soft sensor implementations during trial production runs
5. Implement soft sensor systems for live production runs

ACCOMPLISHMENTS

- Completed bump testing of the soft sensor system at Georgia-Pacific plants.
- Created Pulp Washing Equipment Smart Manufacturing Profiles for the CESMII Smart Manufacturing Interoperability Platform (SMIP).

DELIVERABLES

- Delivered complete implementation of soft sensor based controls at two Georgia-Pacific paper mills.
- Delivered complete washing equipment SM Profiles.

REUSABLE OUTCOMES / SM MARKETPLACE

- Machine learning based soft sensor for entrained air content for pulp and paper manufacturing. The sensor is reusable for modelling and control across a range of manufacturing processes.
- Soft sensor mathematical model and method for detecting entrained air content.
- Washing Equipment SM Profiles.

RESULTS

↓ 40%

Demonstrated 40% reduction in defoamer usage, improving environmental impact of brownstock washing.

↑ $250k/yr

40% demonstrated reduction in defoamer usage will save $250k/year per washer.

PROJECT DETAIL
Budget Period: BP5
Submission Date: 1-6-25
Sub-Award (contract) Number: 45500000058644
SOPO: 2358

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