



Optimization of Ercros' Production Process

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Ercros is an industrial group with a solid track record, diversified across various areas, including the Intermediate Chemicals Division. In this context, the Tortosa plant is the only one in Spain and the fourth worldwide in the **production of pentaerythritol and dipentaerythritol, essential compounds for the manufacture of paints and lubricants.**

With this project, Ercros aims **to optimize the production process at this plant** through advanced machine learning techniques.

The Challenge

Currently, the production process depends on maintaining consistent evaporation ratios. Variations can impact both the efficiency and the quality of the final product.

The main challenge of the project is **to develop an intelligent monitoring system capable of identifying variable values that negatively affect the process performance**, minimizing inefficiencies and improving overall production quality.

The Project

Machine Learning Models

1. Signal Behavior Autoencoder

This model learns the typical behavior of process signals under optimal conditions, following the *golden batch* philosophy for continuous signals. In inference mode, the autoencoder recommends signal values based on historical behavior and generates alerts in case of deviations.

2. Multivariable Model Based on PCA (Principal Component Analysis)

The PCA model monitors process stability by analyzing the data trajectory on a two-dimensional plane. If an unusual distance is detected within the plane, the system triggers an alert about potential instabilities.

Visualization in a Customized Application

A specific application has been developed to visualize the data generated by both models in real time. This platform allows operators to monitor the process and react quickly to any potential instabilities.

The Results

With the implementation of these artificial intelligence models, the following benefits are expected:

- **Reduction of process variations:** Optimizing evaporation ratios will enable a more efficient and consistent production process.
- **Improved product quality:** By stabilizing the process, the quality of pentaerythritol and dipentaerythritol will be strengthened, consolidating Ercros' position in the market.
- **Real-time monitoring and decision-making:** The visualization application will support continuous supervision, enabling operators to make informed decisions in real time.
- **Cost reduction and resource savings:** Early anomaly detection and process optimization will reduce costs associated with inefficiencies and reprocessing, improving the profitability of the Tortosa plant.