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Practical challenges and statistical solutions for process monitoring and control in dairy production

Industrial manufacturing processes are complex, often including many known and unknown factors like various raw materials and their properties, multiple production lines, hundreds of process variables and different product quality parameters. Using data analysis to understand, optimize and monitor and control several parts of these processes is a common practice with big proven value. However, not all data-driven projects deliver fast and long-lasting results. It is because of challenges like limited data traceability, low data quality and ever-changing process conditions, raw materials and industrial practices.

In this presentation we would like to discuss few challenges and statistical approaches used on recent project focusing on monitoring and controlling production process for one of dairy products. First challenge was using parallel production lines with similar but not identical settings in the production of different product batches and sometimes using two different lines to produce the same one batch. Another challenge was complex relationships between product quality parameters for fresh products and shelf-life products that need to be modelled and understood. Moreover, using different types of raw materials for the same product with limited knowledge on relationship of their properties with final product quality was also challenging. Historical dataset including data on raw material, process and product was collected and analyzed with different methods and approaches including correlation analysis and PLS regression models. Results are compared and method's performance evaluated and statistically validated to select the best strategy and provide the best insights on critical-to-quality process and raw material variables for process monitoring and control.

Special/ Invited session

Classification

Mainly application

Keywords

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Track Classification: Statistical Process Monitoring