Centre for Systems Informatics Engineering Seminar

Integration of Process Knowledge and Statistical Learning for the Dow Data Challenge Problem

Date: 27 January 2021
Time: 2:00 pm – 3:30 pm

Abstract

In this talk, I will introduce the Dow data challenge problem and propose a statistical machine learning method that integrates process knowledge. The challenge is to build an accurate inferential sensor model to predict the impurity in the product stream. The proposed method consists of i) process data exploratory analysis, ii) a method for variable selection, iii) a method to deal with non-negative physical property modeling using a softplus function; and iv) a method for online bias updating based on known data. We make use of process operation knowledge in all steps of data analytics, including exploratory analysis and feature selections. Partial least squares (PLS) and the least angle regression solution (LARS) are adopted to model the data. Pros and cons of LARS and PLS are given with practical implications.

Biography

Prof. S. Joe Qin is Chair Professor and Dean of the School of Data Science, and Director of Hong Kong Institute for Data Science at City University of Hong Kong. Previously he was the Fluor Professor at the Viterbi School of Engineering of the University of Southern California and endowed Professor at the University of Texas at Austin. He is a Fellow of the U.S. National Academy of Inventors, IFAC, AIChE, and IEEE, and recipient of the U.S. NSF CAREER Award and numerous other awards. He published over 400 international journal papers and/or presentations. He received 31,000 Google Scholar citations with an h-index of 76.

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