3 - You Get What You Pay For: How to Make Suppliers Avoid Product Recalls

Ana Groznik, Assistant Professor, Universidade Catolica Portuguesa, Palma de Cima, 1649-023 Lisboa, Lisboa, Portugal, agroznik@fcee.lisboa.ucp.pt, Hans Sebastian Heese

A general belief links the cost pressure on suppliers to the increasing frequency of product recalls. We model a supply chain where the supplier decides on costly effort, which affects the probability of a recall, but is not directly observable to the manufacturer and thus not contractible. We compare the effects of wholesale price increases and long-term contractual commitment on a supplier's incentives to exert effort and thus decrease the likelihood of product recalls.

■ WC04

C-Room 23B, Upper Level

Data Mining for Prediction Problems

Sponsor: Data Mining
Sponsored Session

Chair: Seoung Bum Kim, Assistant Professor, Korea University, Anam-dong Seongbuk-Gu, Seoul, Korea, Republic of, sbkim1@korea.ac.kr

1 - Oil Price Prediction From Influence Propagation

Hyunjung Shin, Assistant Professor, Ajou University, Suwon, Korea, Republic of, shin@ajou.ac.kr, Kanghee Park, Tianya Hou

Oil price prediction can become difficult and challenging particularly when the price fluctuates from irregular external factors— supply/demand-side shocks, political conflicts in the Middle East, and influences from other economical indices, etc. If the relationship between the oil price and those external factors is identified and quantified, the prediction may provide more relevant results. We implement this idea to crude oil prices of West Texas Intermediate using Semi-Supervised Learning.

2 - Dynamic Kernel-based Ridge Regression for Autocorrelations of Response Variables

Young-Seon Jeong, PhD Candidate, Rutgers, the State University of New Jersey, United States of America, ysjeong@eden.rutgers.edu, Myong K. (MK) Jeong, Norman Kim

We present a dynamic kernel ridge regression that combines kernel ridge regression with lagged dependent variables (LDVs) to improve the prediction accuracy when the dependent variables are autocorrelated and data are high-dimensional. Experimental results show that the proposed approaches with LDVs perform better than several conventional regression models.

3 - Using Classification and Regression Trees to Predict Ozone Concentration

Durai Sundaramoorthi, Assistant Professor, Steven L. Craig School of Business, Missouri Western State University, 4525 Downs Drive, Saint Joseph, MO, 64507, United States of America, dsundaramoorthi@missouriwestern.edu

Elevated levels of ground-level ozone are hazardous to the health of people and the environment. In this research, data was gathered for nine different variables from seven monitoring sites in the Dallas-Fort Worth. Classification and Regression Tree, a data mining tool for prediction and classification, was used to study the effect of environmental predictor variables on Ozone concentration.

■ WC05

C-Room 23C, Upper Level

Discussion Session: Recent Progress in Variation Reduction Methodologies for Manufacturing Processes

Sponsor: Quality, Statistics and Reliability
Sponsored Session

Chair: Shiyu Zhou, University of Wisconsin-Madison, Department of Industrial and Systems Engineering, 1513 University Avenue, Madison, WI, 53706-1572, United States of America, szhou@engr.wisc.edu

1 - Discussion Session: Recent Progress in Variation Reduction Methodologies for Manufacturing Processes

Shiyu Zhou, University of Wisconsin-Madison, Department of Industrial and Systems Engineering, 1513 University Avenue, Madison, WI, 53706-1572, United States of America, szhou@engr.wisc.edu

In this session, we will present some new progresses in variation reduction technologies for manufacturing processes. Particularly, we will focus on the recently developed "Stream of Variation (SoV)" methodologies for dimensional variation reduction for multistage machining and assembly processes.

■ WC06

C-Room 24A, Upper Level

Advances in Control Charting Methods

Sponsor: Quality, Statistics and Reliability
Sponsored Session

Chair: Adel Alaeddini, Wayne State University, Wayne State University, Detroit, MI, 48220, United States of America, adel.alaeddini@gmail.com

1 - Shift-preserving Residual Control Charts for Multivariate Autocorrelated Data

Giovanna Capizzi, Associate Professor, Department of Statistical Sciences, via C. Battisti 241, Padova, Italy, capizzi@stat.unipd.it, Guido Masarotto

One approach for monitoring autocorrelated data consists in applying a control chart to the residuals of dynamic models. However, due to the forecast recovery effect, the response to process mean shifts can be attenuated in the residuals. To try to overcome this problem, we suggest a simple modification to the standard residuals. Comparisons, based on two real industrial cases, show that the modification can enhance the ability to detect small and medium mean shifts.

2 - Using Hidden-Markov Models for the Design of Control Charts

Adel Alaeddini, Wayne State University, Wayne State University, Detroit, MI, 48220, United States of America, adel.alaeddini@gmail.com, Kai Yang

Effective use of control chart requires an appropriate chose of the parameters: sample size, sampling interval, and control limits, which is known as the design of control chart. In some applications these parameters are fixed, however in other applications they are variable. In this paper we use Hidden-Markov processes for the design of control charts. For this purpose we develop a mathematical model that integrates variable sampling strategies with statistical run-rules.

3 - A Distribution-free Control Charting Method for Autocorrelated Processes

Hyeh-rin Choi, Kyung Hee University, Department of Industrial Engineering, Yongin-si, Korea, Republic of, hoynolja@naver.com

Many design schemes of control charts assume the known distribution of the underlying process, which is often violated in practice. We propose a distribution-free control charting scheme applied to autocorrelated processes without any prior process information. Simulation results show that the scheme outperforms others in detection capability and robustness.

■ WC07

C-Room 24B, Upper Level

Joint Session QSR/ HAS:
Simulating Quality in Health Care

Sponsor: Quality, Statistics and Reliability & Healthcare Applications
Sponsored Session

Chair: John Fontanesi, Director, University of Califonia SD, San Diego, CA, jfontanesi@ucsd.edu

1 - It's My Turn: Real Life Constraints in Scheduling ORs

Gregory Feld, Director, Elecro-Physiology Labroatory, UC, San Diego School of Medicine, La Jolla, CA, United States of America, gfeld@ucsd.edu

This session will describe, from cardiologists standpoint, the political, financial, and staffing constraints that impact OR scheduling. Challenges to the Operational Research field will be reviewed and why many methodological studies are both brilliant and wrong.

2 - Simulating Quality and Patient Flow Characteristics in Ambulatory Care

Dave Goldsman, Professor, Georgia Institute of Technology, 765 Ferst Drive, Atlanta, GA, 30332, United States of America, sman@isye.gatech.edu

The complex interactions between patient arrival patterns, patient scheduling schemas and patient flow are ideally suited for simulation. Critical elements include how one quantifies tardiness, inter-arrival patterns and assumptions about service capacity. Impact on quality of care will be demonstrated with several case studies

3 - Developing a Theory of Quality for Health Care: Notes From the Field

John Fontanesi, Director, University of Califonia SD, San Diego, CA, United States of America, jfontanesi@ucsd.edu

Rising costs, medical errors, inconsistent adoption of known best practices make daily headlines. Paralleling these realities are a number of initiatives attempting to address quality of care. All have either have or are in jeopardy of failing. This presentation will argue that absent a coherent theory of health care quality, such