Department of Systems Engineering and Engineering Management

Seminar Series

Accurate Emulation of Large-Scale Computer Experiments

Dr. Peter Z. G. Qian

Date:	16 May, 2012 (Wed)
Time:	11:00am (Tea reception at 10:45am)
Venue:	CSE Conference Room B6605 (6/F. via Lift no. 3)

Abstract

Gaussian process based surrogate models are often used in computer experiments. On one hand, the nominal accuracy of a Gaussian process model increases with the number of data points. On the other hand, fitting such a model to massive data leads to numerical singularity. To reconcile this contradiction, I will present a sequential method to simultaneously achieve numerical stability and theoretical accuracy in fitting a large-scale Gaussian process model. This method forms nested space-filling subsets of the data, builds kernel models for different subsets and then combines all submodels together to obtain an accurate model. We introduce a decomposition of the overall error of a Gaussian process model into nominal and numeric portions. Theoretical bounds on the numeric and nominal error are developed to show that substantial gains in overall accuracy can be attained with this sequential method. Examples are given to illustrate the effectiveness of the developed method.

About the Speaker

Dr. Qian received a Ph.D. degree in Industrial and Systems Engineering from Georgia Tech in 2006. He is currently an associate professor in the Department of Statistics at the University of Wisconsin-Madison and has an affiliated appointment with the Department of Industrial and Systems Engineering. He is working on the interface between statistics and engineering. His current research interests include modeling massive data, computer experiments, design of experiments, stochastic optimization and statistical methods for IT, nanotechnology and energy. He has received a Career Award from U.S. National Science Foundation and an IBM Faculty Award.

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All are welcome!

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