IDEA Rensselaer Institute for Data Exploration and Applications

The Rensselaer Institute for Data Exploration and Applications

Presents

A Data IDEA Seminar

"Block Coordinate Update Methods In Tensor Optimization"

Thursday, October 19, 2017

4:00 p.m. to 5:00 p.m.
Refreshments served at 3:30 p.m.

Rensselaer Polytechnic Institute, Troy Campus

Location: Amos Eaton, Room 217
Troy, New York 12180

Yangyang Xu, Department of Mathematical Sciences, Rensselaer Polytechnic Institute

Abstract: Multi-way (tensor) data arises in many applications such as seismic data interpolation, hyperspectral imaging, higher order web link analysis, face recognition, EEG and fMRI data analysis, and so on. To explore the intrinsic structure of the multi-way data, people treat the data in higher-order format instead of simply reshaping it into a vector, and formulate the problems to tensor optimization problems. In this talk, I will utilize the idea of "divide and conquer" and give different forms of block coordinate descent methods to solve these problems. Convergence results for each method will be shown, and persuative numerical results are also used to demonstrate the powerfulness of the algorithms on solving various tensor optimization problems including tensor completion, tensor decomposition, and tensor learning.

Speaker Bio: Yangyang Xu is now a tenure-track assistant professor in the Department of Mathematical Sciences at Rensselaer Polytechnic Institute. He received his B.S. in Computational Mathematics from Nanjing University in 2007, M.S. in Operations Research from Chinese Academy of Sciences in 2010, and Ph.D from the Department of Computational and Applied Mathematics at Rice University in 2014. His research interests are optimization theory and methods and their applications such as in machine learning, statistics, and signal processing. He developed optimization algorithms for compressed sensing, matrix completion, and tensor factorization and learning. Recently, his research focuses on first-order methods, operator splitting, stochastic optimization methods, and high performance parallel computing. These works are motivated by very "big" problems arising in data science and engineering.