Optimization in Learning and Data Analysis

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ABSTRACT

Optimization tools are vital to data analysis and learning. The optimization perspective has provided valuable insights, and optimization formulations have led to practical algorithms with good theoretical properties. In turn, the rich collection of problems in learning and data analysis is providing fresh perspectives on optimization algorithms and is driving new fundamental research in the area. We discuss research on several areas in this domain, including signal reconstruction, manifold learning, and regression/classification, describing in each case recent research in which optimization algorithms have been developed and applied successfully. A particular focus is asynchronous parallel algorithms for optimization and linear algebra, and their applications in data analysis and learning.

Categories and Subject Descriptors

G.1.6 [**Numerical Analysis**]: Optimization

General Terms

Algorithms

Keywords

Optimization; Learning

Short Bio

Stephen J. Wright is a Professor of Computer Sciences at the University of Wisconsin-Madison. His research is on computational optimization and its applications to many areas of science and engineering. Prior to joining UW-Madison in 2001, Wright was a Senior Computer Scientist at Argonne National Laboratory (1990-2001), and a Professor of Computer Science at the University of Chicago (2000-2001). During 2007-2010, he served as chair of the Mathematical Optimization Society, and is on the Board of the Society for Industrial and Applied Mathematics (SIAM). He is a Fellow of SIAM.

Wright is the author or coauthor of widely used text/ reference books in optimization including "Primal Dual Interior-Point Methods" (SIAM, 1997) and "Numerical Optimization" (2nd Edition, Springer, 2006, with J. Nocedal). He has published widely on optimization theory, algorithms, software, and applications. He is coauthor of widely used software for linear and quadratic programming and for compressed sensing.

Wright currently serves on the editorial boards of the leading journals in optimization (SIAM Journal on Optimization and Mathematical Programming, Series A) as well as SIAM Review. He served a term as editor-in-chief of Mathematical Programming, Series B from 2003-2007.