Research Highlight: Incremental regularized least squares for dimensionality reduction of large-scale data

Work of Associate Professor CHU Delin

Prof. CHU Delin and his collaborators have developed a new incremental algorithm for dimensionality reduction of large-scale data. For this purpose, they designed an incremental algorithm named IRLS that incrementally computes the solution to the regularized least squares (RLS) problem with multiple columns on the right-hand side by solving a RLS problem with single column on the right-hand side whenever a new sample arrives, instead of solving a RLS problem with multiple columns on the right-hand side from scratch. As a direct application, they studied the supervised dimensionality reduction of large-scale data and focus on linear discriminant analysis (LDA). They first propose a new batch LDA model that is closely related to RLS problem, and then apply IRLS to develop a new incremental LDA algorithm. Experimental results on real-world datasets demonstrate the effectiveness and efficiency of the new algorithms.

Reference:

[1] X. Zhang, L. Cheng, D. Chu, L. Liao, M. Ng and R. C. E. Tan, "Incremental regularized least squares for dimensionality reduction of large-scale data". SIAM Journal on Scientific Computing, 38, no. 3 (2016): B414-B439.