Implementation Techniques for Support Vector Machines Based on Karush-Kuhn-Tucker Conditions

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Abstract

In this report, we propose two implementation improvements, the first one for speed of training of support vector machines (SVM), the second one for simplifying implementation of SVM solver. The first improvement, called heuristic of alternatives (HoA), regards a new heuristic for choosing parameters to the working set. It checks not only satisfaction of Karush-Kuhn-Tucker (KKT) conditions, but also growth of an objective function. Tests on real world data sets show, that HoA leads to decreased time of training of SVM, compared to the standard heuristic. The second improvement, called Sequential Multidimensional Subsolver (SMS), regards a new method of solving subproblems with more than two parameters, instead of using complicated quadratic programming solvers, we use sequential minimal optimization (SMO) method. We achieve simpler implementation with similar speed performance.