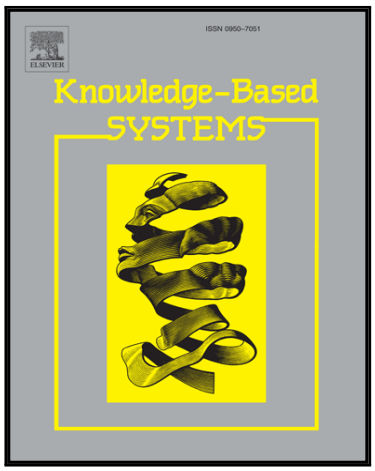

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Minimum deviation distribution machine for large scale regression

Ming-Zeng Liu[a], Yuan-Hai Shao[b,*], Zhen Wang[c], Chun-Na Li[d], Wei-Jie Chen[d]

[a]*School of Mathematics and Physics Science, Dalian University of Technology, Panjin, 124221, P.R.China*
[b]*School of Economics and Management, Hainan University, Haikou, 570228, P.R.China*
[c]*School of Mathematical Sciences, Inner Mongolia University, Hohhot, 010021, P.R.China*
[d]*Zhijiang College, Zhejiang University of Technology, Hangzhou, 310024, P.R.China*

Abstract

In this paper, by introducing the statistics of training data into support vector regression (SVR), we propose a minimum deviation distribution regression (MDR). Rather than just minimizing the structural risk, MDR also minimizes both the regression deviation mean and the regression deviation variance, which is able to deal with the different distribution of boundary data and noises. The formulation of minimizing the first and second order statistics in MDR leads to a strongly convex quadratic programming problem (QPP). An efficient dual coordinate descend algorithm is adopted for small sample problem, and an average stochastic gradient algorithm for large scale one. Both theoretical analysis and experimental results illustrate the efficiency and effectiveness of the proposed method.

Keywords: regression, support vector machine, minimum deviation distribution machine, dual coordinate descend algorithm, stochastic gradient algorithm

*Corresponding author.
Email address: shaoyuanhai21@163.com (Yuan-Hai Shao)