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论文

最新目录 | 下期目录 | 过刊浏览 | 高级检索

◀ 前一篇 | 后一篇 ▶

基于????-范数约束的LSSVR 多核学习算法

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Multiple kernel learning LSSVR algorithm based on ????-norm constraint

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摘要

图/表

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摘要

针对核函数选择对最小二乘支持向量机回归模型泛化性的影响, 提出一种新的基于????-范数约束的最小二乘支持向量机多核学习算法. 该算法提供了两种求解方法, 均通过两重循环进行求解, 外循环用于更新核函数的权值, 内循环用于求解最小二乘支持向量机的拉格朗日乘数, 充分利用该多核学习算法, 有效提高了最小二乘支持向量机的泛化能力, 而且对惩罚参数的选择具有较强的鲁棒性. 基于单变量和多变量函数的仿真实验表明了所提出算法的有效性.

关键词: 最小二乘支持向量机, ????-范数, 多核学习, 泛化性

Abstract:

In order to improve generalization performance of learning least squares support vector machines regression(LSSVR), a novel multiple kernel learning least squares support vector machines regression algorithm based on ????-Norm constraint is proposed. Two wrapper methods are provided to solve the proposed algorithm, and both the training method are two-step methods. The inner loop is used to update the combination function parameters while fixing the least squares support vector machine(LSSVM) parameters, the outside loop is used to update the parameters of LSSVM while fixing the combination function parameters, and these two steps are repeated until convergence. The simulation on the one-variable function and multivariable function shows that the proposed algorithm is useful and outperforms the traditional LSSVR algorithm for generalization performance.

Key words: least squares support vector machine ????-norm constraint multiple kernel learning generalization performance

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