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基于Help-Training 的半监督支持向量回归

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Semi-supervised support vector regression based on Help-Training

摘要

图/表

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摘要

提出一种基于Help-Training 的半监督支持向量回归算法, 包含最小二乘支持向量回归(LS-SVR) 和 k 近邻(k -NN) 两种类型学习器. 主学习器LS-SVR 通过选择高置信度的未标记样本加以标记, 并将其添加到已标记样本集, 使训练样本的规模不断扩大, 以提高LS-SVR 的函数逼近性能. 辅学习器 k -NN用以协助LS-SVR 从训练样本比较密集的区域选取未标记样本加以置信度评估, 可以减弱噪声对学习效果的负面影响. 实验结果表明所提算法具有良好的回归估计性能, 学习精度较高.

关键词 : 半监督学习 ; 助训练 ; 支持向量回归 ; k 近邻 ; 置信度

Abstract :

A semi-supervised support vector regression based on Help-Training is proposed, which includes two kinds of learners: a least squares support vector regression(LS-SVR) and a k -nearest neighbor(k -NN). As a main learner, the LSSVR chooses unlabeled samples with the highest confidence to label and adds these samples to the labeled sample set, which is repeated for given iterations to enlarge the scale of the training samples so as to improve the property of function approximation of the LS-SVR. As an auxiliary learner, the k -NN is used to help the LS-SVR choose unlabeled samples to evaluate confidence from a high-density region of training samples, which can weaken the negative influence of noise on the learning performance of the LS-SVR. Experimental results show that the Help-Training LS-SVR has advantages of good regression performance and high learning accuracy.

Key words : semi-supervised learning ; Help-Training ; support vector regression ; k nearest neighbor ; confidence

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