

算法研究

采用概率密度比值估计的距离度量学习

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摘要:

现有的距离度量学习算法都是假设训练数据和测试数据服从相同的分布, 但是该假设在实际中不一定成立。当训练数据和测试数据的分布不同时, 利用训练数据学习得到的度量函数可能难以适用于测试数据。针对上述问题, 本文在NCA (Neighbourhood Components Analysis)度量学习方法的基础上, 通过引入概率密度比值对目标函数加权, 提出了一种采用概率密度比值估计的距离度量学习方法(Distance metric learning with Probability Density Ratio Estimation, DML-PDR)。在UCI数据集和Corel图像库上的KNN分类实验表明, 新方法克服了传统度量学习方法的不一致问题, 提高了分类的准确率。

关键词: 距离度量学习; 半正定规划; 概率密度比值估计; 图像分类

Distance metric learning with Probability Density Ratio Estimation

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Abstract:

Previous distance metric learning algorithms assume that the training data and test data have the same distribution, but the assumption may be not always true in practice. When the training data and test data have different distribution, the distance metric learned from the training data may be not fit for test data. In order to resolve above-mentioned problem, based on NCA(Neighbourhood Components Analysis), this paper propose a novel distance metric learning with probability density ratio estimation, which weight the objective function by applying the probability density ratio. The KNN classification on UCI data sets and Corel images demonstrate that the new method resolve the inconsistent of traditional distance metric learning.

Keywords: distance metric learning semi-definite programming probability density ratio estimation images classification

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