

算法研究

基于L1-Graph表示的标记传播多观测样本分类算法

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摘要:

同类样本被认为是分布在同一个高维观测空间的低维流形上, 针对多观测样本分类如何利用这一流形结构的问题, 提出基于L1-Graph表示的标记传播多观测样本分类算法。首先基于稀疏表示的思路构造L1-Graph, 进而得到样本之间的相似度矩阵, 然后在半监督分类标记传播算法的基础上, 限制所有的观测样本都属于同一个类别的条件下, 得到一个具有特殊结构的类标矩阵, 最后把寻找最优类标矩阵的计算转化为离散目标函数优化问题, 进而计算出测试样本所属类别。在USPS手写体数据库、ETH-80物体识别数据库以及Cropped Yale人脸识别数据库上进行了一系列实验, 实验结果表明了本文提出方法的可行性和有效性。

关键词: 稀疏表示; L1 Graph; 标记传播; 多观测样本分类

Label Propagation Classification Algorithm of Multiple Observation Sets Based on L1-Graph Representation

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Abstract:

The samples in each class set can be supposed to distribute on a same low-dimensional manifold of the high-dimensional observation space. With regard to how to take advantage of this manifold structure for the effective classification of the multiple observation sets, label propagation classification algorithm of multiple observation sets based on L1-Graph representation is proposed in this paper. Based on sparse representation to construct L1-Graph and obtains a similarity matrix between samples as the first step. All observation images belong to a same class is restricted that to obtain a label matrix of special structure on the basis of semi-supervised label propagation algorithm. Lastly, transform the computation of the optimization label matrix to an optimization problem of discrete object function and obtains the class of the test samples. Experiments on the USPS handwritten digit database, ETH-80 object recognition database and Cropped Yale face recognition database show that the proposed method is valid and efficient.

Keywords: Sparse Representation L1-Graph Label Propagation Classification of Multiple Observation Sets

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