

论文

基于分类别PCA散度的高光谱图像分类波段选择

黄睿, 何明一

西北工业大学电子信息学院 陕西省信息获取与处理重点实验室 西安 710072

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摘要

波段选择是去除高光谱图像段间冗余, 实现降维的有效方法。该文提出了一种新的基于分类别主成分分析

(PCA) 散度的波段选择方法。即首先对训练集各类样本分别进行PCA变换去相关并计算散度, 接着分析相应PCA变换系数获得对各类样本分类都重要的原始波段, 在综合考虑波段的相关度, 散度和子集规模的基础上获得最终选择波段。复杂度分析表明该方法较局部寻优的前向搜索计算量大为降低, 提高了效率, 并用高光谱遥感图象的分类实验进行了验证。

关键词 [高光谱图像分类](#) [波段选择](#) [分类别PCA](#) [散度](#)

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Band Selection Using Divergence of Class-within PCA in Hyperspectral Images Classification

Huang Rui, He Ming-yi

Shanxi Key Lab of Information Acquisition and Processing, Northwestern Polytechnical University, Xi'an 710072, China

Abstract

Band selection from multispectral or hyperspectral image data is an effective method to remove redundancy among bands and thus reduce dimension. An efficient algorithm using divergence based class-within principal component analysis (PCA) and analysis of corresponding coefficients is proposed. At first, the covariance of each class is diagonalized through PCA transforms on class data respectively, and then the divergence only depends on the summation of individual feature separability of transformed bands. Secondly, after an analysis of corresponding PCA transform coefficients, the candidate bands, original bands essential to classification, are determined by majority vote. At last, the final band subset is obtained by analyzing the dependency and divergence of bands in every subset generated according to the correlations of original band in candidates. Compared with sequential forward selection, the proposed method reduces the computation complexity, and encouraging results have been shown by experiments with an Airborne Visible/InfraRed Imaging Spectrometer (AVIRIS) data set.

Key words [Hyperspectral image classification](#) [Band selection](#) [Class-within principal component analysis](#) [Divergence](#)

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通讯作者

作者个人主页 [黄睿; 何明一](#)

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