

工程与应用

ICA结合纹理特征的SVM盐渍化信息提取研究

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摘要 以渭干河-库车河三角洲绿洲为例, 利用ETM+数据, 探讨了该绿洲盐渍化土地覆盖信息的提取方法。提出了基于ICA与纹理特征的SVM复合的分类方法(简称ICA-T-SVM法), 通过此方法对该绿洲进行分类研究, 并将分类结果与基于ICA的SVM法(简称ICA-SVM)、单源数据(光谱)SVM法、最大似然法(MLC)、神经网络法(Neural Network)分类结果进行定性和定量比较分析。研究结果表明: 该方法能够有效地解决单数据源分类效果破碎、分类精度不高等问题, 并对高维输入向量具有较高的推广能力。总精度达到93.418 3%, 比基于ICA的SVM法提高了3.412 3%, 比单源信息的SVM分类法提高了3.423 7%, 比最大似然法提高了4.979 6%, 比神经网络法提高了7.714 4%, 取得了良好的效果。与传统的分类方法的比较表明, 文中所提出的分类方法具有明显的优越性和良好的前景, 因此该方法更适合于遥感图像分类和盐渍化信息提取, 是地物遥感信息提取的有效途径。

关键词 [独立成分分析](#) [纹理特征](#) [支持向量机](#) [盐渍地](#) [分类](#)

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Study on soil salinization information extraction with SVM's classification based on ICA and texture features

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Abstract

This paper takes the Delta Oasis of Weigan and Kuqa rivers for example, using ETM+data, discusses the extraction method of soil salinization. This paper reports the SVM's classification method based on Independent Component Analysis (ICA) and Texture features (ICA-T-SVM method). Meanwhile, the paper introduces the fundamental theory of SVM algorithm and ICA, then incorporates ICA and texture features. The classification result is compared with ICA-SVM classification, single data source SVM classification, Maximum Likelihood Classification (MLC) and neural network classification qualitatively and quantitatively. The research result shows that this method can effectively solve the problem of low accuracy and fracture classification result in single data source classification. It has high spread ability toward higher array input. The overall accuracy is 93.4183%, which increases by 3.4123% compared with SVM based on ICA and increases by 3.4237% compared with single data source SVM classification, and increases by 4.9796% compared with maximum likelihood classification, even increases by 7.7144% compared with neural network classification, and thus acquires good effectiveness. The classification results are easier interpreted when compared with the conventional classification method. Therefore, the classification method based on SVM (Support Vector Machine) and incorporating the ICA and texture features can be adapted to RS image classification and monitoring of soil salinization, furthermore, provides effective way for the things remote sensing information extraction.

Key words [Independent Component Analysis \(ICA\)](#) [texture features](#) [Support Vector Machines \(SVM\)](#) [soil salinization](#) [classification](#)

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