Abstract

Subspace detection of remote sensing hyperspectral image data cube has become an important area of research because of the challenges of dealing with high dimensional feature space for efficient identification of ground objects. Standard feature extraction method such as Principal Component Analysis (PCA) has several shortcomings as it depends solely on global variance of the data set generated ignoring the low variant components. In this paper these limitations are addressed and alternatively Folded-PCA (FPCA) is used for feature extraction. FPCA has some advantages over PCA as it utilizes both local and global structures of the image and requires comparatively less computational cost and memory. These properties make it suitable for feature extraction therefore our proposed method combines it with Quadratic Mutual Information (QMI) for the task of feature reduction. In this research, QMI is utilized as a means of feature selection over the new features generated from FPCA to obtain an informative subspace. The proposed method is named as (FPCA-QMI). It is tested on two hyperspectral datasets one is real mixed agricultural land and another one is an university area. Finally Kernel Support Vector Machine (KSVM) technique is applied to measure the classification accuracy of
these two datasets. From the experimental analysis it is observed that the proposed method can detect effective subspace and obtains the highest accuracy of 98.0328% and 99.0431% on two real hyperspectral images which is better than the baseline approaches.

References

classification”. In: Surveying and Land Information Systems, 62.2, pp. 115–122.


Index Terms

Computer Science Image Processing

Keywords

Subspace; Folded Principal Component Analysis; Quadratic Mutual Information; Kernel Support Vector Machine