
Abstract:
Land use classification is an important part of many remote sensing applications. A lot of research has gone into the application of statistical and neural network classifiers to remote-sensing images. This research involves the study and implementation of a new pattern recognition technique introduced within the framework of statistical learning theory called Support Vector Machines (SVMs), and its application to remote-sensing image classification. Standard classifiers such as Artificial Neural Network (ANN) need a number of training samples that exponentially increase with the dimension of the input feature space. With a limited number of training samples, the classification rate thus decreases as the dimensionality increases. SVMs are independent of the dimensionality of feature space as the main idea behind this classification technique is to separate the classes with a surface that maximizes the margin between them, using boundary pixels to create the decision surface. Results from SVMs are compared with traditional Maximum Likelihood Classification (MLC) and an ANN classifier. The findings suggest that the ANN and SVM classifiers perform better than the traditional MLC. The SVM and the ANN show comparable results. However, accuracy is dependent on factors such as the number of hidden nodes (in the case of ANN) and kernel parameters (in the case of SVM). The training time taken by the SVM is several magnitudes less.

Keywords: Neural networks; Learning theory; Support vector machines; Land use; Remote sensing; Pattern Recognition