Abstract

Hyperspectral imaging sensors are able to collect images with both high spatial and spectral resolution. This fusion of spatial and spectral information opens new avenues for analysis, and provides a unique opportunity for processing and understanding characteristics of an imaged scene. One important area in hyperspectral image processing, and the topic of this thesis, is the problem of hyperspectral image classification; the problem of assigning a class label to every pixel in a hyperspectral image. There has been a lot of work applying different classification methods to this problem, and it is still an active research topic. In this thesis, we investigate one recent approach; namely, the use of deep learning for hyperspectral image classification. Deep feed-forward neural networks have the ability to learn progressively more abstract features at deeper layers of the network which is believed to give them an advantage over other "shallow" classifiers. We explore several aspects of deep learning related to network architecture and training algorithms and how they effect classification accuracy on the hyperspectral image classification problem.