Classification of pansharpened urban satellite images

The classification of high-resolution urban remote sensing imagery is addressed with the focus on classification of imagery that has been pansharpened by a number of different pansharpening methods. The pansharpening process introduces some spectral and spatial distortions in the resulting fused multispectral image, the amount of which highly varies depending on which pansharpening technique is used. In the majority of the pansharpening techniques that have been proposed, there is a compromise between the spatial enhancement and the spectral consistency. Here we study the effects of the spectral and spatial distortions on the accuracy in classification of pansharpened imagery. We also study the performance in terms of accuracy of the various pansharpening techniques during classification with spatial information, obtained using mathematical morphology (MM). MM is used to derive local spatial information from the panchromatic data. Random Forests (RF) and Support Vector Machines (SVM) will be used as classifiers. Experiments are done for three different datasets that have been obtained by two different imaging sensors, IKONOS and QuickBird. These sensors deliver multispectral images that have four bands, R, G, B and near infrared (NIR). To further study the contribution of the NIR band, experiments are done using both the RGB bands and all four bands, respectively.