Softmax classification on Hyperspectral Images

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0.1 Results

We have made the code as shown in the Final.py file, which takes input from "Indian_pines.mat", "Indian_pines_corrected.mat", "Indian_pines_gt.mat".

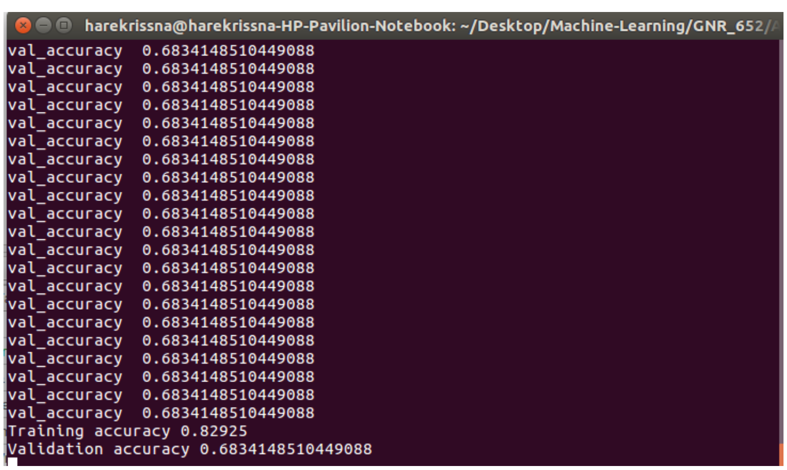
We have applied the Softmax classification and classified the 145*145 pixels, each having 200 feature into 16 different labels.

After Softamx, we have applied an optional layer of KNN as we know that the data (Picture) has segments and hence each pixel has a high probability to be like it's mode of neighbours.

We have removed the pixels with label 0 from the dataset for the sake of classification and from remaining around 10000 pixels, we have taken some as training and others as validation data set. Our results are tabulated below:

Training label %	Test label %	Validation Accuracy %	Training Acuracy
20%	80%	25-30%	30-35%
40%	60%	35-40%	45-50%
50%	50%	45-60%	50-65%
80%	80%	60-70%	75-90%

Validation accuracy before KNN and after only Softmax



One of the test examples at 80%

As expected the accuracy rose after KNN by a drastic 10% (almost) per test type. Below, we are attaching the pictures of the picture composed of 145*145 pixels used for classification

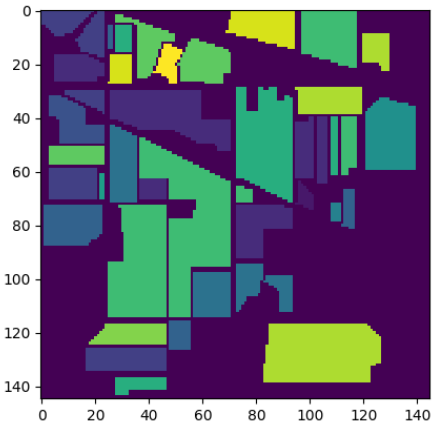


Figure 1: Origianl Label image

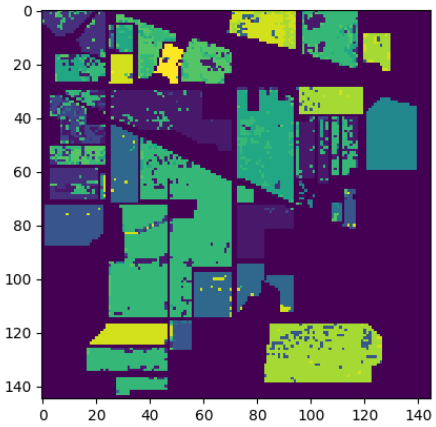


Figure 2: Label image after only Softmax

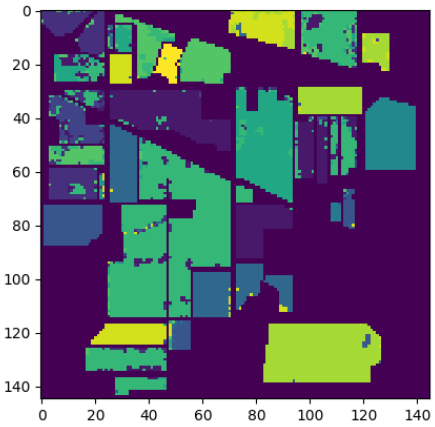


Figure 3: Label image aftr KNN with k=5

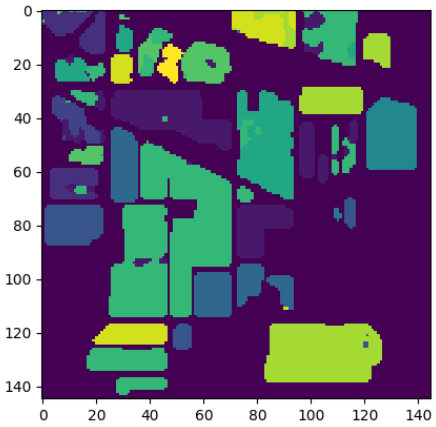


Figure 4: Label image after mode KNN

As we can see, the patches are very well identified after we do knn at 5 neighbours threshold and even better after we do mode thresholding.

Though KNN makes some of the border pixels to suffer from wrong classification, we can see that it clearly makes patches more better classified.

The learning rates and the number of buffered improvements are not properly optimized and hence the result can be further improved.

This concludes our report. Thanks