CSVM Logbook

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December 21, 2015

Influence of second order Soft Assignment

I'd like to know what the influence of 'second order soft assignment' is, compared to regular Soft Assignment patchSize = 12, stride = 2. As feat. descriptor, HOG is used, with 4x4 cells. As codebook, a deep convolutional codebook is used.

The settings will be tested on the MNIST dataset, with 6000 random images to train, and 1000 images to test. As a classifier the CSVM will be used, with learningRate = 0.000002, and 20000 iterations, wieghtInit = 0.002, C = 1000

These settings are not proven to be the "best" settings for each, both the provide a common context for this experiment, with only the type of assignment function as controlled variable.

With both settings, 8 runs are done. To compare the two codebook activation function, a two-sides paired t-test is used. A P-value threshold of 0.05 will be used.

```
SoftAssignment <- c(87.2, 86.6, 87.7, 88.2, 85.9, 86.0, 84.2, 86.5)
SoftAssignmentClipping <- c(87.6, 84.7, 83.6, 84.5, 84.1, 83.0, 85.8, 85.5)

t.test(SoftAssignment, SoftAssignmentClipping, paired = FALSE, alternative = "two.sided")
```

```
##
##  Welch Two Sample t-test
##
## data:  SoftAssignment and SoftAssignmentClipping
## t = 2.5107, df = 13.681, p-value = 0.02528
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  0.2427602 3.1322398
## sample estimates:
## mean of x mean of y
##   86.5375   84.8500
```

This test shows that in second order soft assignment performs slightly worse than a first order soft assignment.

Influence of the amount of centroids used

I'd like to explore the influence of the number of centroids used in MNIST on the classification rate. All values are gained from a 8 fold crossvalidation. The same settings as the above experiment are used, with normal Soft Assignment and a Deep Codebook.

```
v10centr <- c(68.9, 69.8, 62.7, 67.4, 73.1, 69.9, 69.3, 63.9)
v30centr <- c(82.4, 82.2, 80.4, 80.1, 83.6, 82.6, 83.7, 82.2)
v50centr <- c(1)
v70centr <- c(1)
```

```
v90centr <- c(1)
v110centr <- c(1)
v130centr <- c(1)
```