Comp135

Project 4

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3.4 Experiments and Results to Report

Are the primal and dual version of algorithms with linear kernel indeed identical?

* Yes, the primal and dual version of algorithms with linear kernel are identical.

How does the kernel parameter affect the results for the polynomial and RBF kernels?

* For polynomial kernel, the best accuracy generally occurs when d = 2 or 3 for perceptron method. For KNN method, best accuracy generally occurs when d = 1
* For RBF kernel, the best accuracy generally occurs when s = 1

Is the effect consistent across algorithms?

* No

How do Perceptron and k-NN compare in the experiments across the kernels?

* For polynomial kernel, Perceptron in general performs better than KNN, especially at optimal accuracy.
* For RBF kernel, Perceptron is better than KNN as the accuracy is better for all 3 parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | A | B | back | sonar |
| Primal Perceptron | 0.75862069 | 0.772421053 | 0.677419355 | 0.85 |
| d=1 | 0.75862069 | 0.772421053 | 0.677419355 | 0.85 |
| d=2 | 0.941045606 | 0.849052632 | 0.806451613 | 0.85 |
| d=3 | 0.936596218 | 0.830105263 | 0.838709677 | 1 |
| d=4 | 0.926585095 | 0.817052632 | 0.838709677 | 0.85 |
| d=5 | 0.917686318 | 0.794105263 | 0.741935484 | 0.85 |
| 0.1 | 0.893770857 | 0.768210526 | 0.774193548 | 0.65 |
| 0.5 | 0.912124583 | 0.788421053 | 0.774193548 | 0.85 |
| 1 | 0.939377086 | 0.825894737 | 0.774193548 | 0.85 |
| Primal KNN | 0.890989989 | 0.768 | 0.774193548 | 0.85 |
| d=1 | 0.890989989 | 0.768 | 0.774193548 | 0.85 |
| d=2 | 0.881535039 | 0.745263158 | 0.838709677 | 0.8 |
| d=3 | 0.877641824 | 0.702947368 | 0.806451613 | 0.85 |
| d=4 | 0.875973304 | 0.685052632 | 0.806451613 | 0.7 |
| d=5 | 0.875973304 | 0.682947368 | 0.774193548 | 0.6 |
| 0.1 | 0.890989989 | 0.308 | 0.741935484 | 0.45 |
| 0.5 | 0.890989989 | 0.768 | 0.774193548 | 0.6 |
| 1 | 0.890989989 | 0.768 | 0.774193548 | 0.85 |

README:

For experiment, please run ‘python experiment.py’

For additional test, please run ‘python test.py’