

Part2 Results

Perceptron:

perceptron with $n = 40$

1.0

perceptron with $n = 80$

1.0

perceptron with $n = 120$

0.9999

perceptron with $n = 160$

0.9999

perceptron with $n = 200$

0.9994

bestresult: correct1 = 1.0 $n = 40$

Perceptron with margin:

perceptron_margin with $n = 40$, $r = 1.5$

1.0

perceptron_margin with $n = 40$, $r = 0.25$

1.0

perceptron_margin with $n = 40$, $r = 0.03$

1.0

perceptron_margin with $n = 40$, $r = 0.005$

1.0

perceptron_margin with $n = 40$, $r = 0.001$

1.0

bestresult for $n = 40$: correct1 = 1.0 learning rate = 1.5

perceptron_margin with $n = 80$, $r = 1.5$

0.9998

perceptron_margin with $n = 80$, $r = 0.25$

1.0

perceptron_margin with $n = 80$, $r = 0.03$

1.0

perceptron_margin with $n = 80$, $r = 0.005$

1.0

perceptron_margin with $n = 80$, $r = 0.001$

1.0

bestresult for $n = 80$: correct1 = 1.0 learning rate = 0.25

perceptron_margin with $n = 120$, $r = 1.5$

0.9998

perceptron_margin with $n = 120$, $r = 0.25$

1.0

perceptron_margin with $n = 120$, $r = 0.03$

1.0
perceptron_margin with n = 120, r = 0.005
1.0
perceptron_margin with n = 120, r = 0.001
0.9959
bestresult for n = 120 : correct1 = 1.0 learning rate = 0.25
perceptron_margin with n = 160, r = 1.5
0.9997
perceptron_margin with n = 160, r = 0.25
1.0
perceptron_margin with n = 160, r = 0.03
1.0
perceptron_margin with n = 160, r = 0.005
1.0
perceptron_margin with n = 160, r = 0.001
0.9867
bestresult for n = 160 : correct1 = 1.0 learning rate = 0.25
perceptron_margin with n = 200, r = 1.5
0.9999
perceptron_margin with n = 200, r = 0.25
0.9996
perceptron_margin with n = 200, r = 0.03
1.0
perceptron_margin with n = 200, r = 0.005
1.0
perceptron_margin with n = 200, r = 0.001
0.9842
bestresult for n = 200 : correct1 = 1.0 learning rate = 0.03

Winnow:

winnow with n = 40, alpha = 1.1
0.9999
winnow with n = 40, alpha = 1.01
0.9991
winnow with n = 40, alpha = 1.005
0.9987
winnow with n = 40, alpha = 1.0005
0.9917
winnow with n = 40, alpha = 1.0001
0.8588
bestresult n = 40: correct1 = 0.9999 alpha = 1.1
winnow with n = 80, alpha = 1.1
1.0

winnow with $n = 80$, $\alpha = 1.01$
0.9983
winnow with $n = 80$, $\alpha = 1.005$
0.9981
winnow with $n = 80$, $\alpha = 1.0005$
0.9743
winnow with $n = 80$, $\alpha = 1.0001$
0.6979
bestresult $n = 80$: correct1 = 1.0 $\alpha = 1.1$
winnow with $n = 120$, $\alpha = 1.1$
1.0
winnow with $n = 120$, $\alpha = 1.01$
0.9973
winnow with $n = 120$, $\alpha = 1.005$
0.9971
winnow with $n = 120$, $\alpha = 1.0005$
0.9496
winnow with $n = 120$, $\alpha = 1.0001$
0.6431
bestresult $n = 120$: correct1 = 1.0 $\alpha = 1.1$
winnow with $n = 160$, $\alpha = 1.1$
0.9993
winnow with $n = 160$, $\alpha = 1.01$
0.9971
winnow with $n = 160$, $\alpha = 1.005$
0.9968
winnow with $n = 160$, $\alpha = 1.0005$
0.9362
winnow with $n = 160$, $\alpha = 1.0001$
0.6188
bestresult $n = 160$: correct1 = 0.9993 $\alpha = 1.1$
winnow with $n = 200$, $\alpha = 1.1$
0.9998
winnow with $n = 200$, $\alpha = 1.01$
0.9983
winnow with $n = 200$, $\alpha = 1.005$
0.998
winnow with $n = 200$, $\alpha = 1.0005$
0.922
winnow with $n = 200$, $\alpha = 1.0001$
0.6081
bestresult $n = 200$: correct1 = 0.9998 $\alpha = 1.1$

Winnow with margin:

winnow_margin with $n = 40$, $\alpha = 1.1$ $\gamma = 2.0$
1.0

winnow_margin with $n = 40$, $\alpha = 1.1$ $\gamma = 0.3$
0.9998

winnow_margin with $n = 40$, $\alpha = 1.1$ $\gamma = 0.04$
0.9998

winnow_margin with $n = 40$, $\alpha = 1.1$ $\gamma = 0.006$
0.9999

winnow_margin with $n = 40$, $\alpha = 1.1$ $\gamma = 0.001$
0.9999

winnow_margin with $n = 40$, $\alpha = 1.01$ $\gamma = 2.0$
1.0

winnow_margin with $n = 40$, $\alpha = 1.01$ $\gamma = 0.3$
0.9995

winnow_margin with $n = 40$, $\alpha = 1.01$ $\gamma = 0.04$
0.9991

winnow_margin with $n = 40$, $\alpha = 1.01$ $\gamma = 0.006$
0.999

winnow_margin with $n = 40$, $\alpha = 1.01$ $\gamma = 0.001$
0.9988

winnow_margin with $n = 40$, $\alpha = 1.005$ $\gamma = 2.0$
1.0

winnow_margin with $n = 40$, $\alpha = 1.005$ $\gamma = 0.3$
0.9994

winnow_margin with $n = 40$, $\alpha = 1.005$ $\gamma = 0.04$
0.9987

winnow_margin with $n = 40$, $\alpha = 1.005$ $\gamma = 0.006$
0.9987

winnow_margin with $n = 40$, $\alpha = 1.005$ $\gamma = 0.001$
0.9987

winnow_margin with $n = 40$, $\alpha = 1.0005$ $\gamma = 2.0$
1.0

winnow_margin with $n = 40$, $\alpha = 1.0005$ $\gamma = 0.3$
0.9939

winnow_margin with $n = 40$, $\alpha = 1.0005$ $\gamma = 0.04$
0.9927

winnow_margin with $n = 40$, $\alpha = 1.0005$ $\gamma = 0.006$
0.9918

winnow_margin with $n = 40$, $\alpha = 1.0005$ $\gamma = 0.001$
0.9917

winnow_margin with $n = 40$, $\alpha = 1.0001$ $\gamma = 2.0$
0.8955

winnow_margin with $n = 40$, $\alpha = 1.0001$ $\gamma = 0.3$

0.8619

winnow_margin with n = 40, alpha = 1.0001 gamma = 0.04

0.861

winnow_margin with n = 40, alpha = 1.0001 gamma = 0.006

0.8594

winnow_margin with n = 40, alpha = 1.0001 gamma = 0.001

0.8591

bestresult for n = 40: correct1 = 1.0 alpha = 1.1 gamma = 2.0

winnow_margin with n = 80, alpha = 1.1 gamma = 2.0

1.0

winnow_margin with n = 80, alpha = 1.1 gamma = 0.3

1.0

winnow_margin with n = 80, alpha = 1.1 gamma = 0.04

1.0

winnow_margin with n = 80, alpha = 1.1 gamma = 0.006

1.0

winnow_margin with n = 80, alpha = 1.1 gamma = 0.001

1.0

winnow_margin with n = 80, alpha = 1.01 gamma = 2.0

1.0

winnow_margin with n = 80, alpha = 1.01 gamma = 0.3

0.9988

winnow_margin with n = 80, alpha = 1.01 gamma = 0.04

0.9988

winnow_margin with n = 80, alpha = 1.01 gamma = 0.006

0.9982

winnow_margin with n = 80, alpha = 1.01 gamma = 0.001

0.9983

winnow_margin with n = 80, alpha = 1.005 gamma = 2.0

0.9999

winnow_margin with n = 80, alpha = 1.005 gamma = 0.3

0.9988

winnow_margin with n = 80, alpha = 1.005 gamma = 0.04

0.9985

winnow_margin with n = 80, alpha = 1.005 gamma = 0.006

0.9983

winnow_margin with n = 80, alpha = 1.005 gamma = 0.001

0.9982

winnow_margin with n = 80, alpha = 1.0005 gamma = 2.0

0.9967

winnow_margin with n = 80, alpha = 1.0005 gamma = 0.3

0.9783

winnow_margin with n = 80, alpha = 1.0005 gamma = 0.04

0.9753

winnow_margin with $n = 80$, $\alpha = 1.0005$ $\gamma = 0.006$
0.9744
winnow_margin with $n = 80$, $\alpha = 1.0005$ $\gamma = 0.001$
0.9742
winnow_margin with $n = 80$, $\alpha = 1.0001$ $\gamma = 2.0$
0.73
winnow_margin with $n = 80$, $\alpha = 1.0001$ $\gamma = 0.3$
0.7022
winnow_margin with $n = 80$, $\alpha = 1.0001$ $\gamma = 0.04$
0.6983
winnow_margin with $n = 80$, $\alpha = 1.0001$ $\gamma = 0.006$
0.6979
winnow_margin with $n = 80$, $\alpha = 1.0001$ $\gamma = 0.001$
0.698
bestresult for $n = 80$: correct1 = 1.0 $\alpha = 1.1$ $\gamma = 2.0$
winnow_margin with $n = 120$, $\alpha = 1.1$ $\gamma = 2.0$
1.0
winnow_margin with $n = 120$, $\alpha = 1.1$ $\gamma = 0.3$
0.9997
winnow_margin with $n = 120$, $\alpha = 1.1$ $\gamma = 0.04$
1.0
winnow_margin with $n = 120$, $\alpha = 1.1$ $\gamma = 0.006$
1.0
winnow_margin with $n = 120$, $\alpha = 1.1$ $\gamma = 0.001$
1.0
winnow_margin with $n = 120$, $\alpha = 1.01$ $\gamma = 2.0$
0.9998
winnow_margin with $n = 120$, $\alpha = 1.01$ $\gamma = 0.3$
0.9982
winnow_margin with $n = 120$, $\alpha = 1.01$ $\gamma = 0.04$
0.9971
winnow_margin with $n = 120$, $\alpha = 1.01$ $\gamma = 0.006$
0.9975
winnow_margin with $n = 120$, $\alpha = 1.01$ $\gamma = 0.001$
0.9975
winnow_margin with $n = 120$, $\alpha = 1.005$ $\gamma = 2.0$
0.9996
winnow_margin with $n = 120$, $\alpha = 1.005$ $\gamma = 0.3$
0.9977
winnow_margin with $n = 120$, $\alpha = 1.005$ $\gamma = 0.04$
0.997
winnow_margin with $n = 120$, $\alpha = 1.005$ $\gamma = 0.006$
0.9971
winnow_margin with $n = 120$, $\alpha = 1.005$ $\gamma = 0.001$

0.9972
winnow_margin with n = 120, alpha = 1.0005 gamma = 2.0
0.9853
winnow_margin with n = 120, alpha = 1.0005 gamma = 0.3
0.9568
winnow_margin with n = 120, alpha = 1.0005 gamma = 0.04
0.9508
winnow_margin with n = 120, alpha = 1.0005 gamma = 0.006
0.9498
winnow_margin with n = 120, alpha = 1.0005 gamma = 0.001
0.9495
winnow_margin with n = 120, alpha = 1.0001 gamma = 2.0
0.6574
winnow_margin with n = 120, alpha = 1.0001 gamma = 0.3
0.6465
winnow_margin with n = 120, alpha = 1.0001 gamma = 0.04
0.6433
winnow_margin with n = 120, alpha = 1.0001 gamma = 0.006
0.643
winnow_margin with n = 120, alpha = 1.0001 gamma = 0.001
0.643
bestresult for n = 120: correct1 = 1.0 alpha = 1.1 gamma = 2.0
winnow_margin with n = 160, alpha = 1.1 gamma = 2.0
1.0
winnow_margin with n = 160, alpha = 1.1 gamma = 0.3
1.0
winnow_margin with n = 160, alpha = 1.1 gamma = 0.04
0.9996
winnow_margin with n = 160, alpha = 1.1 gamma = 0.006
0.9993
winnow_margin with n = 160, alpha = 1.1 gamma = 0.001
0.9993
winnow_margin with n = 160, alpha = 1.01 gamma = 2.0
0.9996
winnow_margin with n = 160, alpha = 1.01 gamma = 0.3
0.9981
winnow_margin with n = 160, alpha = 1.01 gamma = 0.04
0.9974
winnow_margin with n = 160, alpha = 1.01 gamma = 0.006
0.9974
winnow_margin with n = 160, alpha = 1.01 gamma = 0.001
0.9971
winnow_margin with n = 160, alpha = 1.005 gamma = 2.0
0.9992

winnow_margin with $n = 160$, $\alpha = 1.005$ $\gamma = 0.3$
0.997
winnow_margin with $n = 160$, $\alpha = 1.005$ $\gamma = 0.04$
0.9965
winnow_margin with $n = 160$, $\alpha = 1.005$ $\gamma = 0.006$
0.9969
winnow_margin with $n = 160$, $\alpha = 1.005$ $\gamma = 0.001$
0.9968
winnow_margin with $n = 160$, $\alpha = 1.0005$ $\gamma = 2.0$
0.9709
winnow_margin with $n = 160$, $\alpha = 1.0005$ $\gamma = 0.3$
0.943
winnow_margin with $n = 160$, $\alpha = 1.0005$ $\gamma = 0.04$
0.9374
winnow_margin with $n = 160$, $\alpha = 1.0005$ $\gamma = 0.006$
0.9363
winnow_margin with $n = 160$, $\alpha = 1.0005$ $\gamma = 0.001$
0.9365
winnow_margin with $n = 160$, $\alpha = 1.0001$ $\gamma = 2.0$
0.6259
winnow_margin with $n = 160$, $\alpha = 1.0001$ $\gamma = 0.3$
0.6203
winnow_margin with $n = 160$, $\alpha = 1.0001$ $\gamma = 0.04$
0.6189
winnow_margin with $n = 160$, $\alpha = 1.0001$ $\gamma = 0.006$
0.619
winnow_margin with $n = 160$, $\alpha = 1.0001$ $\gamma = 0.001$
0.6189
bestresult for $n = 160$: correct1 = 1.0 $\alpha = 1.1$ $\gamma = 2.0$
winnow_margin with $n = 200$, $\alpha = 1.1$ $\gamma = 2.0$
1.0
winnow_margin with $n = 200$, $\alpha = 1.1$ $\gamma = 0.3$
0.9999
winnow_margin with $n = 200$, $\alpha = 1.1$ $\gamma = 0.04$
0.9999
winnow_margin with $n = 200$, $\alpha = 1.1$ $\gamma = 0.006$
0.9998
winnow_margin with $n = 200$, $\alpha = 1.1$ $\gamma = 0.001$
0.9998
winnow_margin with $n = 200$, $\alpha = 1.01$ $\gamma = 2.0$
0.9994
winnow_margin with $n = 200$, $\alpha = 1.01$ $\gamma = 0.3$
0.9986
winnow_margin with $n = 200$, $\alpha = 1.01$ $\gamma = 0.04$

0.9983
winnow_margin with $n = 200$, $\alpha = 1.01$ $\gamma = 0.006$
0.998
winnow_margin with $n = 200$, $\alpha = 1.01$ $\gamma = 0.001$
0.9983
winnow_margin with $n = 200$, $\alpha = 1.005$ $\gamma = 2.0$
0.9994
winnow_margin with $n = 200$, $\alpha = 1.005$ $\gamma = 0.3$
0.9983
winnow_margin with $n = 200$, $\alpha = 1.005$ $\gamma = 0.04$
0.9981
winnow_margin with $n = 200$, $\alpha = 1.005$ $\gamma = 0.006$
0.9979
winnow_margin with $n = 200$, $\alpha = 1.005$ $\gamma = 0.001$
0.998
winnow_margin with $n = 200$, $\alpha = 1.0005$ $\gamma = 2.0$
0.9552
winnow_margin with $n = 200$, $\alpha = 1.0005$ $\gamma = 0.3$
0.9266
winnow_margin with $n = 200$, $\alpha = 1.0005$ $\gamma = 0.04$
0.9226
winnow_margin with $n = 200$, $\alpha = 1.0005$ $\gamma = 0.006$
0.9225
winnow_margin with $n = 200$, $\alpha = 1.0005$ $\gamma = 0.001$
0.9221
winnow_margin with $n = 200$, $\alpha = 1.0001$ $\gamma = 2.0$
0.6143
winnow_margin with $n = 200$, $\alpha = 1.0001$ $\gamma = 0.3$
0.6092
winnow_margin with $n = 200$, $\alpha = 1.0001$ $\gamma = 0.04$
0.6084
winnow_margin with $n = 200$, $\alpha = 1.0001$ $\gamma = 0.006$
0.6085
winnow_margin with $n = 200$, $\alpha = 1.0001$ $\gamma = 0.001$
0.6081
bestresult for $n = 200$: correct1 = 1.0 $\alpha = 1.1$ $\gamma = 2.0$

Adagrad:

adagrad with $n = 40$, $r = 1.5$
1.0
adagrad with $n = 40$, $r = 0.25$
1.0
adagrad with $n = 40$, $r = 0.03$

0.7916
adagrad with $n = 40$, $r = 0.005$
0.5034
adagrad with $n = 40$, $r = 0.001$
0.4925
bestresult for $n = 40$: correct1 = 1.0 learning rate = 1.5
adagrad with $n = 80$, $r = 1.5$
1.0
adagrad with $n = 80$, $r = 0.25$
1.0
adagrad with $n = 80$, $r = 0.03$
0.852
adagrad with $n = 80$, $r = 0.005$
0.7071
adagrad with $n = 80$, $r = 0.001$
0.508
bestresult for $n = 80$: correct1 = 1.0 learning rate = 1.5
adagrad with $n = 120$, $r = 1.5$
1.0
adagrad with $n = 120$, $r = 0.25$
1.0
adagrad with $n = 120$, $r = 0.03$
0.8925
adagrad with $n = 120$, $r = 0.005$
0.7441
adagrad with $n = 120$, $r = 0.001$
0.4957
bestresult for $n = 120$: correct1 = 1.0 learning rate = 1.5
adagrad with $n = 160$, $r = 1.5$
1.0
adagrad with $n = 160$, $r = 0.25$
0.9994
adagrad with $n = 160$, $r = 0.03$
0.9218
adagrad with $n = 160$, $r = 0.005$
0.7467
adagrad with $n = 160$, $r = 0.001$
0.4982
bestresult for $n = 160$: correct1 = 1.0 learning rate = 1.5
adagrad with $n = 200$, $r = 1.5$
0.9982
adagrad with $n = 200$, $r = 0.25$
0.9945
adagrad with $n = 200$, $r = 0.03$

0.943

adagrad with $n = 200$, $r = 0.005$

0.8108

adagrad with $n = 200$, $r = 0.001$

0.5011

bestresult for $n = 200$: correct1 = 0.9982 learning rate = 1.5

Error Converge Matrix:

First line is perceptron, then perceptron with margin, etc.

[[6813. 15613. 29726. 65649. 87072.]

[6813. 20237. 33113. 55279. 113703.]

[2991. 4164. 4310. 5496. 4864.]

[4155. 3481. 4974. 5909. 4809.]

[11487. 23261. 55118. 129357. 183558.]]