Iris:

sigmoid:

After 1000 iterations, the total error is 47.3982216194

The final weight vectors are (starting from input to output layers)

[[ 1.46403998 1.66152203 4.86325828 -0.33574342]

[ 1.38046715 -0.18307644 7.26644229 -0.21993834]

[-0.014896 1.52445728 -1.2103732 0.36292535]

[-1.19971655 5.99289798 -2.70936294 0.27991306]]

[[ 8.00315715 -0.57192506]

[-40.7627001 1.9654157 ]

[ 21.23894364 -0.44707952]

[ -1.40820616 0.60617336]]

[[ 0.45159362 3.03828713 -0.36621975]

[-3.20714777 3.45516077 1.24274092]]

Train accuracy

0.375

Reading weight from file:

[array([[ 1.46403998, 1.66152203, 4.86325828, -0.33574342],

[ 1.38046715, -0.18307644, 7.26644229, -0.21993834],

[-0.014896 , 1.52445728, -1.2103732 , 0.36292535],

[-1.19971655, 5.99289798, -2.70936294, 0.27991306]]), array([[ 8.00315715, -0.57192506],

[-40.7627001 , 1.9654157 ],

[ 21.23894364, -0.44707952],

[ -1.40820616, 0.60617336]]), array([[ 0.45159362, 3.03828713, -0.36621975],

[-3.20714777, 3.45516077, 1.24274092]]), 0]

Test accuracy

0.416666666667

tanh:

After 1000 iterations, the total error is 36.1833806622

The final weight vectors are (starting from input to output layers)

[[-0.34285186 -0.66843876 -1.52697799 -2.32216065]

[-1.47326359 -1.59657306 -2.22960241 -3.26613387]

[ 0.27687805 -0.68838899 0.11614301 -0.13664534]

[ 0.27316203 4.13133624 0.11489909 3.57497366]]

[[ 1.10816634 0.5514493 ]

[-4.81915363 -0.61792156]

[ 4.21406545 1.76059151]

[-1.90946492 0.61218403]]

[[ 0.23878988 -0.10274401 -0.59005575]

[-1.58708405 -0.1035278 -0.72072587]]

Train accuracy

0.758333333333

Reading weight from file:

[array([[-0.34285186, -0.66843876, -1.52697799, -2.32216065],

[-1.47326359, -1.59657306, -2.22960241, -3.26613387],

[ 0.27687805, -0.68838899, 0.11614301, -0.13664534],

[ 0.27316203, 4.13133624, 0.11489909, 3.57497366]]), array([[ 1.10816634, 0.5514493 ],

[-4.81915363, -0.61792156],

[ 4.21406545, 1.76059151],

[-1.90946492, 0.61218403]]), array([[ 0.23878988, -0.10274401, -0.59005575],

[-1.58708405, -0.1035278 , -0.72072587]]), 0]

Test accuracy

0.166666666667

Relu:

After 1000 iterations, the total error is 44.9113480576

The final weight vectors are (starting from input to output layers)

[[-0.16595599 -2.88673879 -0.99977125 0.5909164 ]

[-0.70648822 -2.49085362 -0.62747958 -0.04277254]

[-0.20646505 -0.90470678 -0.16161097 -0.25195727]

[-0.5910955 5.67747774 -0.94522481 4.18764281]]

[[-0.1653904 0.11737966]

[-0.71922612 -4.40475654]

[ 0.60148914 0.93652315]

[-0.37315164 2.01851356]]

[[ 0.7527783 0.78921333 -0.82991158]

[-0.92189043 -0.66033916 1.55509613]]

Train accuracy

0.583333333333

Reading weight from file:

[array([[-0.16595599, -2.88673879, -0.99977125, 0.5909164 ],

[-0.70648822, -2.49085362, -0.62747958, -0.04277254],

[-0.20646505, -0.90470678, -0.16161097, -0.25195727],

[-0.5910955 , 5.67747774, -0.94522481, 4.18764281]]), array([[-0.1653904 , 0.11737966],

[-0.71922612, -4.40475654],

[ 0.60148914, 0.93652315],

[-0.37315164, 2.01851356]]), array([[ 0.7527783 , 0.78921333, -0.82991158],

[-0.92189043, -0.66033916, 1.55509613]]), 0]

Test accuracy

0.441666666667

Car

sigmoid:

After 1000 iterations, the total error is 1156.35505438

The final weight vectors are (starting from input to output layers)

[[ 3.37527091e-02 1.40491057e-01 2.43042064e+01 -2.80251489e+01]

[ -1.44651424e-01 -2.54364655e-01 2.94763181e+01 -3.11335183e+01]

[ 5.21782318e-03 -2.38291058e-01 3.27120665e+01 -3.10195685e+01]

[ -1.68743203e-01 -9.38327947e-01 4.90905624e+01 1.57120460e+02]

[ 9.22228759e-03 1.99557534e-01 2.32824216e+01 -3.03983428e+01]

[ 2.78810913e-01 1.32415312e+00 1.89154753e+01 -3.48775570e+01]]

[[ 5.62445468e+00 2.01506564e-01]

[ 2.46007931e+00 3.95272422e+00]

[ -2.83638002e+02 -2.63139807e+02]

[ -3.25007134e+02 -3.13894328e+02]]

[[ 5.76711443 10.90428027 1.99108167 0.38701533]

[ 4.52393179 -1.72619774 8.75716579 8.68082116]]

Train accuracy

0.356263577118

Reading weight from file:

[array([[ 3.37527091e-02, 1.40491057e-01, 2.43042064e+01,

-2.80251489e+01],

[ -1.44651424e-01, -2.54364655e-01, 2.94763181e+01,

-3.11335183e+01],

[ 5.21782318e-03, -2.38291058e-01, 3.27120665e+01,

-3.10195685e+01],

[ -1.68743203e-01, -9.38327947e-01, 4.90905624e+01,

1.57120460e+02],

[ 9.22228759e-03, 1.99557534e-01, 2.32824216e+01,

-3.03983428e+01],

[ 2.78810913e-01, 1.32415312e+00, 1.89154753e+01,

-3.48775570e+01]]), array([[ 5.62445468e+00, 2.01506564e-01],

[ 2.46007931e+00, 3.95272422e+00],

[ -2.83638002e+02, -2.63139807e+02],

[ -3.25007134e+02, -3.13894328e+02]]), array([[ 5.76711443, 10.90428027, 1.99108167, 0.38701533],

[ 4.52393179, -1.72619774, 8.75716579, 8.68082116]]), 0]

Test accuracy

0.248914616498

tanh:

After 1000 iterations, the total error is 2712.5

The final weight vectors are (starting from input to output layers)

[[-4.6424387 5.90780367 -2.67966073 2.45141715]

[-6.54702326 6.43404659 -4.74645634 3.06908798]

[-4.98429108 5.99155839 -3.51340867 3.15183408]

[-3.50603013 4.26595032 -1.01939778 2.40215651]

[-5.25549854 6.38102635 -3.8198222 2.37955778]

[-5.32638766 8.24878577 -4.35804223 3.82579144]]

[[ -8.74754697 -3.97094183]

[ 10.12915825 5.93444439]

[ -6.39580904 4.29074454]

[ 5.11262309 6.83671472]]

[[-17.78737009 40.17271195 50.11239765 13.8528807 ]

[-10.94364076 10.24410578 45.38109245 5.52117291]]

Train accuracy

0.0166545981173

Reading weight from file:

[array([[-4.6424387 , 5.90780367, -2.67966073, 2.45141715],

[-6.54702326, 6.43404659, -4.74645634, 3.06908798],

[-4.98429108, 5.99155839, -3.51340867, 3.15183408],

[-3.50603013, 4.26595032, -1.01939778, 2.40215651],

[-5.25549854, 6.38102635, -3.8198222 , 2.37955778],

[-5.32638766, 8.24878577, -4.35804223, 3.82579144]]), array([[ -8.74754697, -3.97094183],

[ 10.12915825, 5.93444439],

[ -6.39580904, 4.29074454],

[ 5.11262309, 6.83671472]]), array([[-17.78737009, 40.17271195, 50.11239765, 13.8528807 ],

[-10.94364076, 10.24410578, 45.38109245, 5.52117291]]), 0]

Test accuracy

0.0499276410999

Relu:

After 1000 iterations, the total error is 690.5

The final weight vectors are (starting from input to output layers)

[[-0.16595599 0.44064899 -0.99977125 -0.39533485]

[-0.70648822 -0.81532281 -0.62747958 -0.30887855]

[-0.20646505 0.07763347 -0.16161097 0.370439 ]

[-0.5910955 0.75623487 -0.94522481 0.34093502]

[-0.1653904 0.11737966 -0.71922612 -0.60379702]

[ 0.60148914 0.93652315 -0.37315164 0.38464523]]

[[ 0.7527783 0.78921333]

[-0.82991158 -0.92189043]

[-0.66033916 0.75628501]

[-0.80330633 -0.15778475]]

[[ 0.91577906 0.06633057 0.38375423 -0.36896874]

[ 0.37300186 0.66925134 -0.96342345 0.50028863]]

Train accuracy

0.232440260681

Reading weight from file:

[array([[-0.16595599, 0.44064899, -0.99977125, -0.39533485],

[-0.70648822, -0.81532281, -0.62747958, -0.30887855],

[-0.20646505, 0.07763347, -0.16161097, 0.370439 ],

[-0.5910955 , 0.75623487, -0.94522481, 0.34093502],

[-0.1653904 , 0.11737966, -0.71922612, -0.60379702],

[ 0.60148914, 0.93652315, -0.37315164, 0.38464523]]), array([[ 0.7527783 , 0.78921333],

[-0.82991158, -0.92189043],

[-0.66033916, 0.75628501],

[-0.80330633, -0.15778475]]), array([[ 0.91577906, 0.06633057, 0.38375423, -0.36896874],

[ 0.37300186, 0.66925134, -0.96342345, 0.50028863]]), 0]

Test accuracy

0.248914616498

Adult

sigmoid:

After 1000 iterations, the total error is 5974.99999676

The final weight vectors are (starting from input to output layers)

[[-1.95992905 1.86180114 -1.28380094 -0.32945108]

[-0.49678811 3.32334599 -1.45206615 -0.33912616]

[-0.28913689 2.35047021 -0.43880182 0.37620319]

[-2.07971348 1.90921392 -0.87971584 0.32418798]

[-3.16352036 0.39166553 -0.98134182 -0.57992773]

[ 1.08149654 3.73329681 -0.60514971 0.38018269]

[ 1.72685845 3.99282962 -1.28217517 -1.04436887]

[ 1.62844167 7.99534378 -2.18778549 -0.26219632]

[ 1.32994364 3.97051313 -0.24424328 -0.40134018]

[ 4.77986525 6.88493501 -2.05427758 0.48256644]

[ 6.2183938 -1.17167904 2.68146665 0.69560447]

[-3.26441462 -1.71092314 1.07211409 -0.34289258]

[-2.47226846 1.39014311 -1.4279059 0.36459245]

[-0.64520676 3.20628995 -0.64890055 -0.91068737]]

[[ 1.24712163 -25.87067944]

[ 29.66310002 -51.17669607]

[ 4.27565764 6.18706843]

[ 3.24923079 3.29637843]]

[[-41.05780604 36.17683085]

[-11.02933555 14.85434112]]

Train accuracy

0.752362400531

Reading weight from file:

[array([[-1.95992905, 1.86180114, -1.28380094, -0.32945108],

[-0.49678811, 3.32334599, -1.45206615, -0.33912616],

[-0.28913689, 2.35047021, -0.43880182, 0.37620319],

[-2.07971348, 1.90921392, -0.87971584, 0.32418798],

[-3.16352036, 0.39166553, -0.98134182, -0.57992773],

[ 1.08149654, 3.73329681, -0.60514971, 0.38018269],

[ 1.72685845, 3.99282962, -1.28217517, -1.04436887],

[ 1.62844167, 7.99534378, -2.18778549, -0.26219632],

[ 1.32994364, 3.97051313, -0.24424328, -0.40134018],

[ 4.77986525, 6.88493501, -2.05427758, 0.48256644],

[ 6.2183938 , -1.17167904, 2.68146665, 0.69560447],

[-3.26441462, -1.71092314, 1.07211409, -0.34289258],

[-2.47226846, 1.39014311, -1.4279059 , 0.36459245],

[-0.64520676, 3.20628995, -0.64890055, -0.91068737]]), array([[ 1.24712163, -25.87067944],

[ 29.66310002, -51.17669607],

[ 4.27565764, 6.18706843],

[ 3.24923079, 3.29637843]]), array([[-41.05780604, 36.17683085],

[-11.02933555, 14.85434112]]), 0]

Test accuracy

0.751336565958

tanh:

After 1000 iterations, the total error is 60320.0

The final weight vectors are (starting from input to output layers)

[[ -2.46468333 4.14487464 -10.79421715 -3.97566843]

[ -3.2856423 3.29215855 -11.45505232 -4.29666483]

[ -2.6870126 3.78881056 -9.72125676 -3.44513489]

[ -2.1148117 3.25030924 -7.56606903 -2.00556373]

[ -2.96270179 5.00728598 -14.0172637 -5.00543631]

[ -1.46843339 3.89057755 -7.82766508 -2.77859946]

[ -1.67236287 4.72603436 -11.26721533 -4.66820225]

[ -3.17429334 4.86070305 -11.71204683 -4.07432504]

[ -1.99272511 4.80471324 -12.21599734 -4.90410933]

[ -1.35802668 2.61566507 -5.32876205 -2.01169341]

[ 0.38013087 1.76277597 -4.07641765 -0.43739352]

[ -1.07193883 0.26170837 -0.06005065 -0.82047688]

[ -2.98733543 3.51422623 -12.33858268 -3.65221037]

[ -3.54082012 4.50513379 -13.3736335 -5.52777581]]

[[ -1.60314118 -35.36586618]

[ -7.61215439 2.64582774]

[ 30.75927224 40.9968924 ]

[ 3.5855418 -42.09056281]]

[[ 19.12796628 172.35977949]

[ 12.56698325 -135.30399327]]

Train accuracy

0.752362400531

Reading weight from file:

[array([[ -2.46468333, 4.14487464, -10.79421715, -3.97566843],

[ -3.2856423 , 3.29215855, -11.45505232, -4.29666483],

[ -2.6870126 , 3.78881056, -9.72125676, -3.44513489],

[ -2.1148117 , 3.25030924, -7.56606903, -2.00556373],

[ -2.96270179, 5.00728598, -14.0172637 , -5.00543631],

[ -1.46843339, 3.89057755, -7.82766508, -2.77859946],

[ -1.67236287, 4.72603436, -11.26721533, -4.66820225],

[ -3.17429334, 4.86070305, -11.71204683, -4.07432504],

[ -1.99272511, 4.80471324, -12.21599734, -4.90410933],

[ -1.35802668, 2.61566507, -5.32876205, -2.01169341],

[ 0.38013087, 1.76277597, -4.07641765, -0.43739352],

[ -1.07193883, 0.26170837, -0.06005065, -0.82047688],

[ -2.98733543, 3.51422623, -12.33858268, -3.65221037],

[ -3.54082012, 4.50513379, -13.3736335 , -5.52777581]]), array([[ -1.60314118, -35.36586618],

[ -7.61215439, 2.64582774],

[ 30.75927224, 40.9968924 ],

[ 3.5855418 , -42.09056281]]), array([[ 19.12796628, 172.35977949],

[ 12.56698325, -135.30399327]]), 0]

Test accuracy

0.751170790335

Relu:

After 1000 iterations, the total error is 12064.0

The final weight vectors are (starting from input to output layers)

[[ -1.22132791e+00 -1.81813262e+03 -7.24731348e-01 -7.67828043e+00]

[ -1.55761493e+00 -1.96218146e+03 -2.74420197e-01 -7.69788494e+00]

[ -1.00630724e+00 -1.80108247e+03 1.53587292e-01 -7.10052677e+00]

[ -1.25209646e+00 -1.74997992e+03 -7.30508078e-01 -7.96002137e+00]

[ -1.16113709e+00 -1.97629073e+03 -3.27838009e-01 -8.00765943e+00]

[ -4.87994472e-01 -1.76662690e+03 -1.54324579e-01 -8.00201232e+00]

[ -3.12285636e-01 -1.76704756e+03 -5.71216757e-01 -5.07229378e+00]

[ -1.22853856e+00 -1.59695547e+03 -6.96642185e-01 -5.41785282e+00]

[ -1.11515666e-01 -1.95961043e+03 7.94302616e-01 -7.37806315e+00]

[ -5.22427720e-01 -1.80204803e+03 -7.61206109e-01 -7.54105908e+00]

[ -4.33898988e+00 -6.02943281e+02 -4.39112016e-01 -1.78777805e+01]

[ -7.93754569e-01 -4.85136789e+02 3.38751887e+00 -4.31566145e-01]

[ -1.32239126e+00 -1.87244879e+03 -6.72631725e-01 -7.90794383e+00]

[ -1.58192300e+00 -2.01020378e+03 3.90748873e-01 -7.65740665e+00]]

[[ 1.15644521e-01 -7.77266404e-01]

[ -3.80733044e+03 -3.78218132e+03]

[ -1.15515889e+00 -5.25673253e-01]

[ -2.00643749e+01 -2.05342589e+01]]

[[ -8.99746978e-01 -5.78110906e+03]

[ 3.30282487e-01 -7.74550032e+03]]

Train accuracy

0.752362400531

Reading weight from file:

[array([[ -1.22132791e+00, -1.81813262e+03, -7.24731348e-01,

-7.67828043e+00],

[ -1.55761493e+00, -1.96218146e+03, -2.74420197e-01,

-7.69788494e+00],

[ -1.00630724e+00, -1.80108247e+03, 1.53587292e-01,

-7.10052677e+00],

[ -1.25209646e+00, -1.74997992e+03, -7.30508078e-01,

-7.96002137e+00],

[ -1.16113709e+00, -1.97629073e+03, -3.27838009e-01,

-8.00765943e+00],

[ -4.87994472e-01, -1.76662690e+03, -1.54324579e-01,

-8.00201232e+00],

[ -3.12285636e-01, -1.76704756e+03, -5.71216757e-01,

-5.07229378e+00],

[ -1.22853856e+00, -1.59695547e+03, -6.96642185e-01,

-5.41785282e+00],

[ -1.11515666e-01, -1.95961043e+03, 7.94302616e-01,

-7.37806315e+00],

[ -5.22427720e-01, -1.80204803e+03, -7.61206109e-01,

-7.54105908e+00],

[ -4.33898988e+00, -6.02943281e+02, -4.39112016e-01,

-1.78777805e+01],

[ -7.93754569e-01, -4.85136789e+02, 3.38751887e+00,

-4.31566145e-01],

[ -1.32239126e+00, -1.87244879e+03, -6.72631725e-01,

-7.90794383e+00],

[ -1.58192300e+00, -2.01020378e+03, 3.90748873e-01,

-7.65740665e+00]]), array([[ 1.15644521e-01, -7.77266404e-01],

[ -3.80733044e+03, -3.78218132e+03],

[ -1.15515889e+00, -5.25673253e-01],

[ -2.00643749e+01, -2.05342589e+01]]), array([[ -8.99746978e-01, -5.78110906e+03],

[ 3.30282487e-01, -7.74550032e+03]]), 0]

Test accuracy

0.751336565958