Neural Net-Report

**Pre-Processing strategy:**

* If the value is *numeric,* the data is standardized by subtracting the mean from each of the values and dividing by the standard deviation.
* If the data is of type *string,* find the unique strings in the data, then each and every data is replaced by the integer id corresponding to it.
* Boolean is left the same.

**Assumptions made:**

* The learning rate is 0.3.
* The random weight assigned is in range [0,5).

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| --- | --- | --- | --- |
| **Sno** | **Input** | **Training error** | **Testing Error** |
| 1 | housing.data 90 0.01 4 4 4 3 3 | 0.004972485 | 2.3257918 |
| 2 | housing.data 70 0.01 7 3 4 5 6 3 5 4 | 0.0050215726 | 2.3268514 |
| 3 | housing.data 80 0.01 5 5 4 3 2 1 | 0.005021955 | 2.3268595 |
| 4 | iris.data 70 0.05 2 2 2 | 0.0022027818 | 0.0021961168 |
| 5 | Iris.data 80 0.01 2 3 2 | 3.367728E-4 | 3.3638772E-4 |
| 6 | Iris.data 90 0.001 3 3 3 3 | 2.0595126E-8 | 2.0595126E-8 |
| 7 | Adult.data 80 0.01 3 4 5 3 | 0.009985451 | 0.3707985 |
| 8 | Adult.data 90 0.02 5 4 3 2 3 2 | 0.019305786 | 0.3263273 |
| 9 | Adult.data 75 0.01 3 3 3 3 | 0.009985903 | 0.37079573 |

**Boston Housing Dataset:**

Input:

"D:\Honey\workspace\Machine Learning\data\neuralnet\housing.data" 80 0.01 5 4 3 2 1 5

Preprocessing

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Number of rows with ? mark(removable data): 0

Number of rows with complete data: 506

Total number of rows: 506

Training

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size: 404

Hidden Layer 1 :

Neuron 0 weights:

3.5028481 3.5915012 2.5677407 2.0980077 0.17706513 4.3792853 4.6698785 3.0207334 1.117363 4.159886 3.142978 4.805559 4.7486997

Neuron 1 weights:

3.1458092 2.3275087 3.091996 4.9140234 1.8881152 2.0451367 2.360492 0.77471435 0.27833998 0.88922054 0.7033682 0.3707686 1.0022175

Neuron 2 weights:

0.22944331 3.8930454 2.8421044 4.8066583 0.5582249 3.9425545 0.4134208 4.008264 3.74261 3.9674177 1.3151004 3.432394 3.796021

Neuron 3 weights:

1.4219332 2.647177 1.3047552 0.83571404 4.1720734 2.6126113 1.3014847 1.1516359 3.0483482 0.48088044 1.3957274 3.722502 2.2894044

Hidden Layer 2 :

Neuron 0 weights:

0.11551857 0.13713479 0.2765727 4.5798283

Neuron 1 weights:

1.7055199 3.946228 2.2108397 1.6005206

Neuron 2 weights:

1.8238783 2.63219 2.3294249 0.043605268

Hidden Layer 3 :

Neuron 0 weights:

0.9157747 0.52796096 0.7269186

Neuron 1 weights:

2.0453131 2.083912 0.9918985

Hidden Layer 4 :

Neuron 0 weights:

1.2298954 0.35960823

Hidden Layer 5 :

Neuron 0 weights:

4.665044

Neuron 1 weights:

3.862029

Neuron 2 weights:

2.6785567

Neuron 3 weights:

2.5354247

Neuron 4 weights:

1.0883865

Output Layer :

Neuron 0 weights:

0.34986252 2.1402094 4.054362 2.4812996 3.0750027

Total Training error: 0.005021919

Testing

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Total Testing error: 2.3268585

**Iris Data:**

Input:   
"D:\Honey\workspace\Machine Learning\data\neuralnet\iris.data” 70 0.05 2 2 2

Output:

Preprocessing

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Number of rows with ? mark(removable data): 0

Number of rows with complete data: 150

Total number of rows: 150

Training

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size: 105

Hidden Layer 1 :

Neuron 0 weights:

1.1110563 1.2515209 3.624528 2.222277

Neuron 1 weights:

0.19751076 3.7718418 0.45288348 0.097134985

Hidden Layer 2 :

Neuron 0 weights:

4.1285887 0.25702897

Neuron 1 weights:

1.2577385 3.7522385

Output Layer :

Neuron 0 weights:

0.8213308 0.45894462

Total Training error: 0.0022027818

Testing

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Total Testing error: 0.0021961168

**Adult Data:**Input: "D:\Honey\workspace\Machine Learning\data\neuralnet\adult.data" 75 0.01 3 3 3 3

Output:

Preprocessing

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Number of rows with ? mark(removable data): 2399

Number of rows with complete data: 30162

Total number of rows: 32561

Training

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size: 22621

Hidden Layer 1 :

Neuron 0 weights:

3.3053672 0.9920296 2.9030495 4.2503796 3.3505797 3.566008 4.793061 3.04451 1.8589947 4.1812334 4.814185 4.436714 2.124035 0.613327

Neuron 1 weights:

2.2681699 1.3253242 1.632066 3.008189 3.2864609 2.4634025 4.94897 1.1473393 4.169354 3.0597153 1.1353052 1.7189288 2.7770357 0.889256

Neuron 2 weights:

1.6967493 0.94729006 3.5176134 1.2782452 2.8887203 1.6254842 2.0042677 3.9116268 3.1793642 3.6245308 2.1738675 1.1812868 0.9909904 2.20684

Hidden Layer 2 :

Neuron 0 weights:

2.8602078 4.1435556 4.0059824

Neuron 1 weights:

0.5443561 0.8811122 2.9182715

Neuron 2 weights:

4.038371 1.0215583 0.52283883

Hidden Layer 3 :

Neuron 0 weights:

3.2499578 2.746975 2.438722

Neuron 1 weights:

2.1406124 4.976698 4.1377316

Neuron 2 weights:

2.693795 0.83084995 1.9783701

Output Layer :

Neuron 0 weights:

-0.15899143 -0.09299179 -0.34925508

Total Training error: 0.009985903

Testing

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Total Testing error: 0.37079573