

HW 5

Professor: Jacob Whitehill

Erik Reimert: ereimertburro

Vital T. Mendonca Filho: vtdemendoncafilh@wpi.edu

Cross Entropy Loss	% Correct
0.116397788862392	0.9687

Optimal Results:

{'Epoch': 100, 'Batch': 50, 'learnRate': 0.001, 'Loss': 0.116397788862392, 'Accuracy': 0.9687}

Hyperparameter testing

```
Hyper Parameters in run 1
Epochs: 100
Learning Rate: 0.001
Batch Size: 50
Loss: 0.12476181457730773
Accuracy: 0.9646
Hyper Parameters in run 2
Epochs: 20
Learning Rate: 0.005
Batch Size: 50
Loss: 0.20426732338939302
Accuracy: 0.9478
Hyper Parameters in run 3
Epochs: 10
Learning Rate: 0.01
Batch Size: 25
Loss: 0.17004880511451112
Accuracy: 0.9527
Hyper Parameters in run 4
Epochs: 10
Learning Rate: 0.001
Batch Size: 50
homework5_ereimertburro_vtdemendoncafilh.py:121: RuntimeWarning: overflow encountered in exp
  Zexp = np.exp(z)
homework5_ereimertburro_vtdemendoncafilh.py:125: RuntimeWarning: invalid value encountered in true_divide
  normalizedZexp = (Zexp.transpose() / sumZexp)
homework5_ereimertburro_vtdemendoncafilh.py:131: RuntimeWarning: invalid value encountered in less_equal
  z[z<=0] = 0
homework5_ereimertburro_vtdemendoncafilh.py:137: RuntimeWarning: invalid value encountered in less_equal
  z[z <= 0] = 0
homework5_ereimertburro_vtdemendoncafilh.py:138: RuntimeWarning: invalid value encountered in greater
  z[z > 0] = 1
Loss: nan
Accuracy: 0.098
Hyper Parameters in run 5
Epochs: 75
Learning Rate: 0.05
Batch Size: 100
Loss: 0.2935320038185787
Accuracy: 0.93
Hyper Parameters in run 6
Epochs: 50
Learning Rate: 0.01
Batch Size: 10
Loss: 2.3016169528053396
Accuracy: 0.1135
Hyper Parameters in run 7
Epochs: 40
Learning Rate: 0.05
Batch Size: 50
Loss: nan
Accuracy: 0.098
Hyper Parameters in run 8
Epochs: 10
Learning Rate: 0.5
Batch Size: 50
Loss: 0.1462724206049736
Accuracy: 0.9562
Hyper Parameters in run 9
Epochs: 10
Learning Rate: 0.001
Batch Size: 100
{'Epoch': 100, 'Batch': 50, 'learnRate': 0.001, 'Loss': 0.116397788862392, 'Accuracy': 0.9687}
(base) erikreimert0@machlearn:~/p5$
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```

Last 20 epochs

```
base) erikreimert0@machlearn:~/p5$ python homework5_ereimertburro_vtdemendoncafilh.py
.13315661593225

poch: 81 Loss: 0.1145676805543789
poch: 82 Loss: 0.11521467544416165
poch: 83 Loss: 0.11512835121290367
poch: 84 Loss: 0.11741485199304852
poch: 85 Loss: 0.1152200512328935
poch: 86 Loss: 0.11535892085459375
poch: 87 Loss: 0.11695293661715199
poch: 88 Loss: 0.11559245527417718
poch: 89 Loss: 0.11409386960703877
poch: 90 Loss: 0.1154156686176092
poch: 91 Loss: 0.11506473189332048
poch: 92 Loss: 0.11475591388031163
poch: 93 Loss: 0.11476335907522989
poch: 94 Loss: 0.11486228829867699
poch: 95 Loss: 0.11460729842344884
poch: 96 Loss: 0.11682131817480096
poch: 97 Loss: 0.11590158128862166
poch: 98 Loss: 0.11440954422972291
poch: 99 Loss: 0.11404530406511484
poch: 100 Loss: 0.11524410300873067
loss: 0.11524410300873068
accuracy: 0.9693
base) erikreimert0@machlearn:~/p5$
```