Open Software Project

Assignment 12 Technical Report

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1. neural_net

In [3]

```
Your scores:
[[-0.81233741 -1.27654624 -0.70335995]
 [-0.17129677 -1.18803311 -0.47310444]
 [-0.51590475 -1.01354314 -0.8504215 ]
 [-0.15419291 -0.48629638 -0.52901952]
 [-0.00618733 -0.12435261 -0.15226949]]

correct scores:
[[-0.81233741 -1.27654624 -0.70335995]
 [-0.17129677 -1.18803311 -0.47310444]
 [-0.51590475 -1.01354314 -0.8504215 ]
 [-0.15419291 -0.48629638 -0.52901952]
 [-0.00618733 -0.12435261 -0.15226949]]

Difference between your scores and correct scores:
3.6802720745909845e-08
```

In [4]

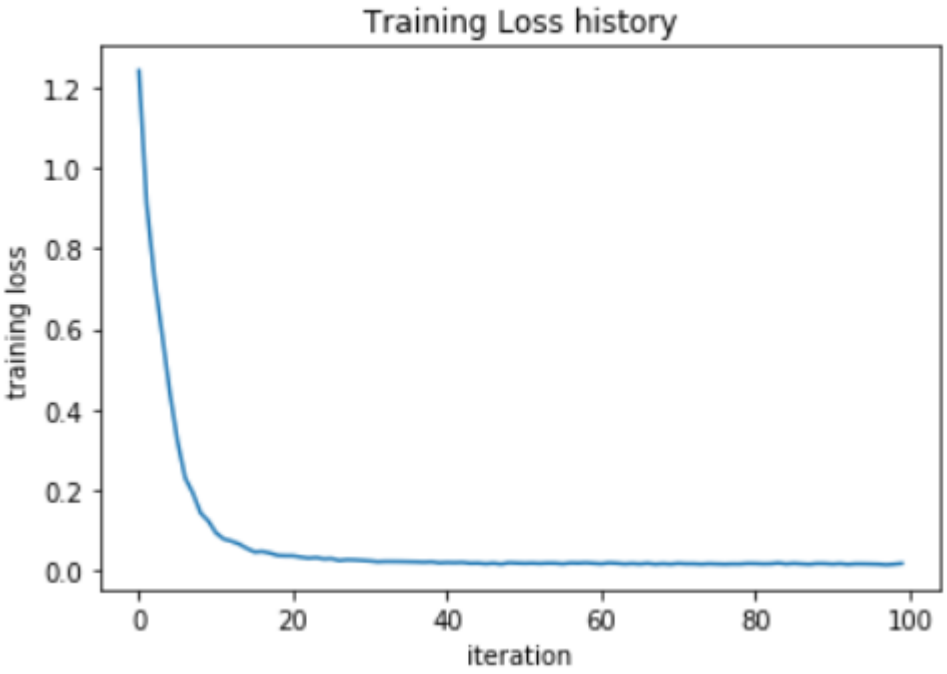
```
Difference between your loss and correct loss:
1.7985612998927536e-13
```

In [5]

```
W2 max relative error: 3.440708e-09
b2 max relative error: 4.447646e-11
W1 max relative error: 3.561318e-09
b1 max relative error: 2.738421e-09
```

In [6]

```
Final training loss:  0.017149607938732048
```



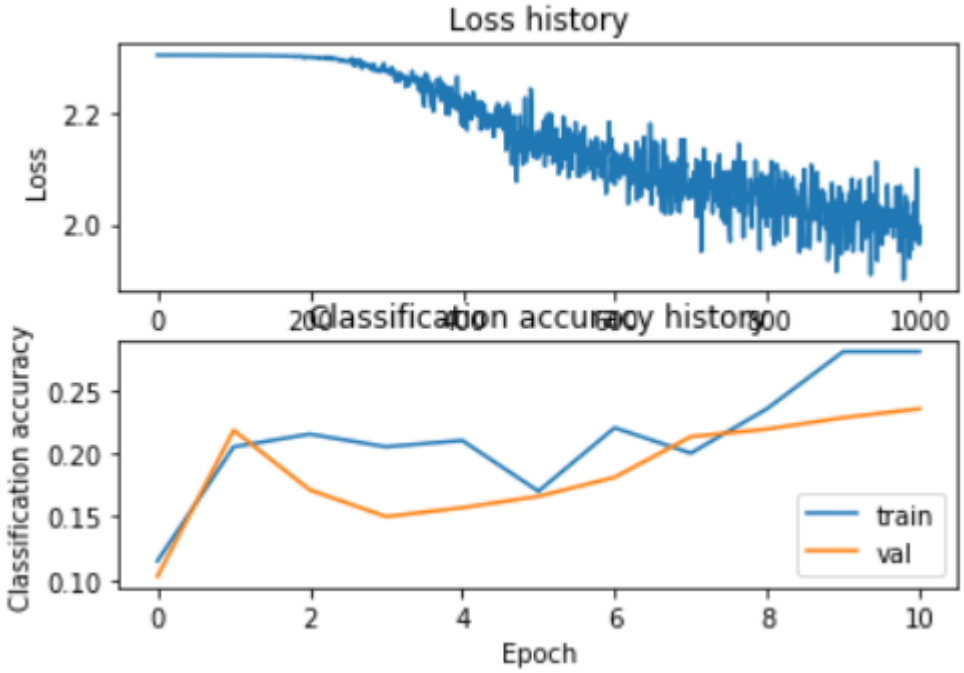
In [7]

```
Train data shape:  (19000, 3072)
Train labels shape:  (19000,)
Validation data shape:  (1000, 3072)
Validation labels shape:  (1000,)
Test data shape:  (1000, 3072)
Test labels shape:  (1000,)
```

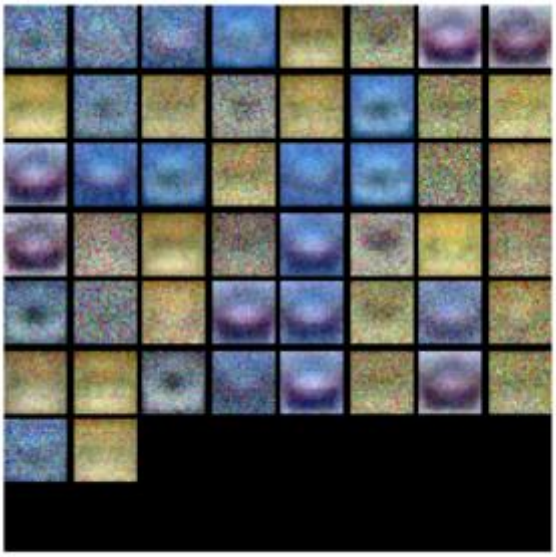
In [8]

```
iteration 0 / 1000: loss 2.302984
iteration 100 / 1000: loss 2.302664
iteration 200 / 1000: loss 2.299105
iteration 300 / 1000: loss 2.278315
iteration 400 / 1000: loss 2.214040
iteration 500 / 1000: loss 2.135265
iteration 600 / 1000: loss 2.071108
iteration 700 / 1000: loss 2.081200
iteration 800 / 1000: loss 2.075023
iteration 900 / 1000: loss 2.008127
Validation accuracy:  0.241
```

In [9]


Loss history
Loss
2.2
2.0
0
1000
Classification accuracy history
Classification accuracy
0.25
0.20
0.15
0.10
train
val
0
2
4
6
8
10
Epoch

In [10]



In [13]

```
iteration 0 / 2100: loss 2.303027
iteration 100 / 2100: loss 1.906391
iteration 200 / 2100: loss 1.714283
iteration 300 / 2100: loss 1.658936
iteration 400 / 2100: loss 1.524619
iteration 500 / 2100: loss 1.502597
iteration 600 / 2100: loss 1.640931
iteration 700 / 2100: loss 1.501571
iteration 800 / 2100: loss 1.437785
iteration 900 / 2100: loss 1.468035
iteration 1000 / 2100: loss 1.435982
iteration 1100 / 2100: loss 1.368599
iteration 1200 / 2100: loss 1.290079
iteration 1300 / 2100: loss 1.331382
iteration 1400 / 2100: loss 1.410153
iteration 1500 / 2100: loss 1.286681
iteration 1600 / 2100: loss 1.332296
iteration 1700 / 2100: loss 1.331380
iteration 1800 / 2100: loss 1.295749
iteration 1900 / 2100: loss 1.134056
iteration 2000 / 2100: loss 1.383006
```

In [14]

In [15]

```
Test accuracy:  0.488
```