Assignment 7, Machine Learning Fall 2018

Cristian Mitroi, dmn470

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Contents

Neural network implementation

I implement a feed forward neural network, with 20 hidden layers. I choose a learning rate of 0.00001.

I observe the following costs:

```
training cost at epoch 0 : 1.1001108785183233
training cost at epoch 1000 : 0.10316066939192149
training cost at epoch 2000 : 0.09639025145040896
training cost at epoch 3000 : 0.09540069343104607
training cost at epoch 4000 : 0.09530560444013073
training cost at epoch 5000 : 0.09529703254340653
training cost at epoch 6000 : 0.09529551269842344
training cost at epoch 7000 : 0.09529461583789273
training cost at epoch 8000 : 0.09529379472075016
training cost at epoch 9000 : 0.09529298931213302
training cost at epoch 10000 : 0.09529218994040997
training cost at epoch 11000 : 0.09529139441564304
training cost at epoch 12000 : 0.09529060212517226
training cost at epoch 13000 : 0.09528981285672819
training cost at epoch 14000 : 0.0952890265072417
training cost at epoch 15000 : 0.0952882430047166
training cost at epoch 16000 : 0.09528746228672985
training cost at epoch 17000 : 0.09528668429445823
training cost at epoch 18000 : 0.09528590897100045
training cost at epoch 19000 : 0.09528513626089102
training cost at epoch 20000 : 0.09528436610994506
training cost at epoch 21000 : 0.09528359846519524
training cost at epoch 22000 : 0.09528283327485516
training cost at epoch 23000 : 0.09528207048829013
training cost at epoch 24000 : 0.09528131005599053
training cost at epoch 25000 : 0.09528055192954625
training cost at epoch 26000 : 0.09527979606162225
```

```
training cost at epoch 27000 : 0.09527904240593388
training cost at epoch 28000 : 0.09527829091722366
training cost at epoch 29000 : 0.09527754155123803
val cost 0.15495453343928461
```

NOTE: I have based my implementation on online tutorials: https://towardsdatascience.com/how-to-build-your-own-neural-network-from-scratch-in-python-68998a08e4f6