Week 5

Test case for ex4 nnCostFunction()

Tom Mosher Mentor Week 5 · 2 years ago · Edited

Here is a test case for the nnCostFunction() with (and without) regularization:

Enter these values in your console workspace, compare your results with those given.

Test Case with regularization:

```
il = 2;              % input layer
hl = 2;              % hidden layer
nl = 4;              % number of labels
nn = [ 1:18 ] / 10;  % nn_params
X = cos([1 2 ; 3 4 ; 5 6]);
y = [4; 2; 3];
lambda = 4;
[J grad] = nnCostFunction(nn, il, hl, nl, X, y, lambda)
```

output:

```
J = 19.474
grad =
0.76614
0.97990
0.37246
0.49749
0.64174
0.74614
0.88342
0.56876
0.58467
0.59814
1.92598
1.94462
1.98965
2.17855
2.47834
2.50225
2.52644
2.72233
```

Here are the values for all internal variables for the regularized test case:

```
d2 =
   0.79393   1.05281
   0.73674   0.95128
   0.76775   0.93560

d3 =
   0.888659   0.907427   0.923305  -0.063351
   0.838178  -0.139718   0.879800   0.896918
   0.923414   0.938578  -0.049102   0.960851

Delta1 =
   2.298415  -0.082619  -0.074786
   2.939691  -0.107533  -0.161585

Delta2 =
   2.65025   1.37794   1.43501
   1.70629   1.03385   1.10676
   1.75400   0.76894   0.77931
   1.79442   0.93566   0.96699

z2 =
   0.054017   0.166433
  -0.523820  -0.588183
   0.665184   0.889567

sigmoidGradient(z2)
ans =
   0.24982   0.24828
   0.23361   0.22957
   0.22426   0.20640

a2 =
   1.00000   0.51350   0.54151
   1.00000   0.37196   0.35705
   1.00000   0.66042   0.70880

a3 =
   0.88866   0.90743   0.92330   0.93665
   0.83818   0.86028   0.87980   0.89692
   0.92341   0.93858   0.95090   0.96085
```

Test case without regularization (uses same data, but 0 for lambda):

```
>> [J grad] = nnCostFunction(nn, il, hl, nl, X, y, 0)
J =  7.4070
grad =
   0.766138
   0.979897
  -0.027540
  -0.035844
  -0.024929
  -0.053862
   0.883417
   0.568762
   0.584668
   0.598139
   0.459314
   0.344618
   0.256313
   0.311885
   0.478337
   0.368920
   0.259771
   0.322331
```

==========

Values for Delta1 and Delta2 (the unregularized gradient, from tutorial Step 5 and Step 6) - truncated to 3 decimal places, prior to scaling by 1/m.

```
Delta1 =
   2.298 -0.082 -0.074
   2.939 -0.107 -0.161

Delta2 =
   2.650  1.377  1.435
   1.706  1.033  1.106
   1.754  0.768  0.779
   1.794  0.935  0.966
```

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Results for unregulated test case:

```
a2 =
    1.00000   0.51350   0.54151
    1.00000   0.37196   0.35705
    1.00000   0.66042   0.70880

a3 =
    0.88866   0.90743   0.92330   0.93665
    0.83818   0.86028   0.87980   0.89692
    0.92341   0.93858   0.95090   0.96085

d3 =
    0.888659   0.907427   0.923305  -0.063351
    0.838178  -0.139718   0.879800   0.896918
    0.923414   0.938578  -0.049102   0.960851

d2 =
    0.00000   0.79393   1.05281
    0.00000   0.73674   0.95128
    0.00000   0.76775   0.93560

Delta1/m =
    0.766138  -0.027540  -0.024929
    0.979897  -0.035844  -0.053862

Delta2/m =
    0.88342   0.45931   0.47834
    0.56876   0.34462   0.36892
    0.58467   0.25631   0.25977
    0.59814   0.31189   0.32233
```

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