Week 9

SUBFORUMS

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Assignment: Anomaly Detection and Recommender Systems

Week 9

Test cases for ex8_cofi - Recommender Systems

Tom Mosher Mentor Week 9 · 3 years ago · Edited

Here are test cases for the second part of ex8.

Note: There is an error in ex8_cofi.m. You will need to edit the script, see the tutorial for ex8 in the Resources menu.

```
------------------------------------
Test 3a (Collaborative Filtering Cost):
input:
params = [ 1:14 ] / 10;
Y = magic(4);
Y = Y(:,1:3);
R = [1 0 1; 1 1 1; 0 0 1; 1 1 0] > 0.5;     % R is logical
num_users = 3;
num_movies = 4;
num_features = 2;
lambda = 0;
J = cofiCostFunc(params, Y, R, num_users, num_movies,
    num_features, lambda)
output:
J =  311.63
------------------------------------
Test 4a (Collaborative Filtering Gradient):
input:
params = [ 1:14 ] / 10;
Y = magic(4);
Y = Y(:,1:3);
R = [1 0 1; 1 1 1; 0 0 1; 1 1 0] > 0.5;     % R is logical
num_users = 3;
num_movies = 4;
num_features = 2;
lambda = 0;
[J, grad] = cofiCostFunc(params, Y, R, num_users, num_movies,
    num_features, lambda)

output:
J =  311.63

grad =
  -16.1880
  -23.5440
   -5.1590
  -14.9720
  -21.4380
  -30.4620
   -6.5660
  -19.5440
   -3.4230
   -7.0280
   -3.4140
  -12.2590
  -16.0600
   -9.7420


------------------------------------
Test 5a (Regularized Cost):
input:
params = [ 1:14 ] / 10;
Y = magic(4);
Y = Y(:,1:3);
R = [1 0 1; 1 1 1; 0 0 1; 1 1 0] > 0.5;     % R is logical
num_users = 3;
num_movies = 4;
num_features = 2;
lambda = 6;
J = cofiCostFunc(params, Y, R, num_users, num_movies,
```

```
    num_features, lambda)

output:
J =  342.08

---------------------------------------
Test 6a (Gradient with regularization):
input:
params = [ 1:14 ] / 10;
Y = magic(4);
Y = Y(:,1:3);
R = [1 0 1; 1 1 1; 0 0 1; 1 1 0] > 0.5;     % R is logical
num_users = 3;
num_movies = 4;
num_features = 2;
lambda = 6;
[J, grad] = cofiCostFunc(params, Y, R, num_users, num_movies,
    num_features, lambda)
output:
J =  342.08

grad =
  -15.5880
  -22.3440
   -3.3590
  -12.5720
  -18.4380
  -26.8620
   -2.3660
  -14.7440
    1.9770
   -1.0280
    3.1860
   -5.0590
   -8.2600
   -1.3420
-----------
Test 6b (a user with no reviews):
input:
params = [ 1:14 ] / 10;
Y = magic(4);
Y = Y(:,1:3);
R = [1 0 1; 1 1 1; 0 0 0; 1 1 0] > 0.5;     % R is logical
num_users = 3;
num_movies = 4;
num_features = 2;
lambda = 6;
[J, grad] = cofiCostFunc(params, Y, R, num_users, num_movies,
    num_features, lambda)
output:
J =  331.08

grad =
  -15.5880
  -22.3440
    1.8000
  -12.5720
  -18.4380
  -26.8620
    4.2000
  -14.7440
```

```
  1.9770
 -1.0280
  4.5930
 -5.0590
 -8.2600
  1.9410
```

==========

keywords: test case ex8_cofi test case cofiCostFunc

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VB Vikas Bahirwani · 2 years ago

Hello Tom,

In your example 6b - a user with no reviews. You define R as

```
R = [1 0 1; 1 1 1; 0 0 0; 1 1 0] > 0.5; % R is logical
```

Given that R is nm * nu - this would give Movie 3 = movie with no ratings.

Instead wouldn't we want

```
R = [1 0 1; 1 0 1; 0 0 0; 1 0 0] > 0.5; % R is logical
```

Which gives user 2 as the user with no reviews?

0 Upvotes Hide 1 Reply

Tom Mosher Mentor · 2 years ago

Sorry, I am currently out of town with a very bad internet connection.

If you need assistance, please start a new thread so that another mentor will pick it up.

0 Upvotes

Nagy Dávid · 2 years ago

Amazingly helpful tutorials and test cases! Thank you for all your efforts to make this course World Class! :-)

1 Upvote Hide 1 Reply

Tom Mosher Mentor · 2 years ago

I am glad you are finding success in the course.

0 Upvotes

Selvakumaresan · 2 years ago

Dear Tom

Thanks for Tutorial, It is very useful...

I have implemented the code as per suggestion given the PDF with one loop for X and another with Theta...I also tried without the loop using R matrix element-wise matrix multiplication using R.. It has given similar results and passed summit.. Is it right way use without loop.

0 Upvotes Hide 1 Reply

Tom Mosher Mentor · 2 years ago

I cannot say for certain - I do no use iterative methods myself.

If you get the correct results for ex8_cofi.m and for the additional test case, and for the submit grader, then it is probably a correct implementation.

0 Upvotes

SV

Satwik V · 3 years ago

I am getting correct values for J and submission also works.However, I am using R matrix as a filter after multiplying the X and Theta. If X and Theta are large matrices and R too many 0's, will it not be highly costly operation? Is there any other way of using R to optimize?

0 Upvotes Hide 1 Reply

Tom Mosher Mentor · 3 years ago

A single element-wise matrix multiplication is not very costly. The R matrix is designed to be used this way.

0 Upvotes

Alireza Asadi · 3 years ago

Hi Tom, I am copying and pasting the part of the test codes to "submit.m" like

elseif partId == '5'

params = [1:14] / 10;

Y = magic(4);

Y = Y(:,1:3);

R = [1 0 1; 1 1 1; 0 0 1; 1 1 0] > 0.5; % R is logical

R=logical(R);

num_users = 3;

num_movies = 4;

num_features = 2;

lambda = 6;

J = cofiCostFunc(params, Y, R, num_users, num_movies, num_features, lambda)

%[J] = cofiCostFunc(params, Y, R, n_u, n_m, n, 1.5);

out = sprintf('%0.5f ', J(:));

but I still get zero grade for the Collaborate filtering cost and Regularized Cost. Any advise how i can handle this?

0 Upvotes Hide 9 Replies

Tom Mosher Mentor · 3 years ago · Edited

I am not sure why you are doing that.

The submit grader expects your results to match what is stored on Coursera's server. You can't substitute a different test case.

Do you get the correct result when you run the test case by entering the commands in the console? This is the method you should use.

0 Upvotes

Alireza Asadi · 3 years ago

The problem started when I tried to submit my final results. Although my code seems OK (based on checks in ex8 and ex8_cofi, I am getting no grade for "Regularized Cost" and "Collaborative Filtering Cost". I opened a threat which guided me to here saying that there is an error in test and I should use test cases mentioned here.

0 Upvotes

Alireza Asadi · 3 years ago

Actually not. In ex8_cofi it works well but not in console ...

0 Upvotes

Alireza Asadi · 3 years ago

My cost function was wrong. Solved.

0 Upvotes

Tom Mosher Mentor · 3 years ago

Please enter the test case commands in your console and paste a screen capture of the results here.

0 Upvotes

Tom Mosher Mentor · 3 years ago

Also, the tutorial for this exercise gives you a tip that your code must include in order to pass the grader. I'll repeat it here:

There is an error in the ex8_cofi.m script. In Part 7, around line 200, the code that calls fmincg() and cofiCostFunc() should use the Ynorm variable, instead of Y.

Figure 4 in ex8.pdf is also incorrect - no movies should have ratings higher than 5.

0 Upvotes

Tom Mosher Mentor · 3 years ago

And this:

---

*(**Note**: there is a quirk in the submit grader's test case that requires you to use the R matrix to ignore movies that have had no ratings).*

0 Upvotes

Alireza Asadi · 3 years ago

Thank you Tom. I have seen this. There was a small bug in my code which was not visible when running ex08_cofi but was visible when trying on test cases. I fixed the bug and submitted successfully. Thanks again.

0 Upvotes

Tom Mosher Mentor · 3 years ago

OK, good news!

0 Upvotes

SR Siddharth Ram · 3 years ago

I'm struggling with the vectorization. What am I missing?

Theta_grad has to be same size as Theta.

I start with Theta = Theta_grad = 5x3, X = 4x3, R=4X5, Y=4x5

So Theta*X = 5X4

(Theta*X -Y) = 5X4

R*(Theta*X-Y) = 5x4*5x4 = (5X5 or 4x4)

R*(Theta*X-Y)*X = 4x4 *(4x3) -> This is 4x3, which is a different size than Theta(5x3)

What am I doing wrong?

thanks

0 Upvotes Hide 4 Replies

Tom Mosher Mentor · 3 years ago

Why start with Theta * X? You want the hypothesis to have "m" rows, and Theta * X is going to give you the wrong size of hypothesis.

Start with X. It has size (m x n). Figure out how to multiply by Theta and get a result with "m" rows.

1 Upvote

SR

Siddharth Ram · 3 years ago · Edited

Hi Tom,

Thank you. I don't quite follow. In either case, I will end up with a 5x4 or transposed, 4x5 matrix.Multiplying with R will still give a 5x5 or 4x4 matrix. How do I get a 5x3 matrix from that?

0 Upvotes

Tom Mosher Mentor · 3 years ago · Edited

R is 5 x 4. Multiply by it element-wise. You're using it as a mask or scaling factor - not for any summation.

1 Upvote

SR

Siddharth Ram · 3 years ago

Doh. Thanks Tom - that clears it up

0 Upvotes

DW

David West · 3 years ago · Edited

Hi Tom,

For Part 2 of the assignment, I get 22.224604 for ex8 but 491.1291 for the test case. I performed matrix multiplication of X with tranpose theta, then element multiplication by R. Then square each element followed by sum over both rows and

columns. And multiple result by 0.5.

Any ideas on what I did wrong?

1 Upvote Hide 4 Replies

Tom Mosher Mentor · 3 years ago · Edited

Which test case were you running? There are two, with and without regularization.

0 Upvotes

DW David West · 3 years ago

3a, without regularisation.

0 Upvotes

DW David West · 3 years ago

I worked it out. I has not element-wise multiplied Y with R.

2 Upvotes

Tom Mosher Mentor · 3 years ago

Good catch.

0 Upvotes

RC Rohit Chaturvedi · 3 years ago

My error should be correct but there is some issue in Theta and X . Do I have to add intercept here. My error values are

-15.3100 -1.2500 -2.1900

-4.1000 -10.0200 -8.9400

-7.8900 -5.7900 -4.6900

-2.6800 -12.5600 -13.4400

0 Upvotes Hide 5 Replies

Tom Mosher Mentor · 3 years ago

This exercise does NOT use any bias units.

Be sure your code uses the tip that you can find in the Tutorial. It is included in Ali's post from two days ago (see above).

1 Upvote

AA abdulrahman aljahoosh · 3 years ago

do i need to create Xtemp when i calculate Theta_grad

0 Upvotes

Tom Mosher Mentor · 3 years ago

What is "Xtemp"?

0 Upvotes

AA abdulrahman aljahoosh · 3 years ago

never mind , i figured it out and calculate Theta_grad with single line code

thank anyway tom

0 Upvotes

家佑 周 · 2 years ago

I don't know why I got the SAME result when" X convolution THETA - Y"

By the way the j is 313.63 but answer is 311.63

0 Upvotes

RC Rohit Chaturvedi · 3 years ago

I am getting the correct solution for J but following results for grad are different . I am getting the following results. What could be the possible reasons please :

-17.4380

-23.5440

-18.0500

-29.7560

-23.0630

-30.4620

-23.5610

-38.3600

-5.7900

-8.8900

-8.7900

-17.7820

-20.7380

-20.4940

1 Upvote Reply

Tom Mosher Mentor · 3 years ago · Edited

What you have in 1) is not just the hypothesis, it is the error term. That's good, you're just not using the correct name for it. When you compute it vectorized, you're including the sum. The result is a matrix. So you're OK there.

Your step 2) is fine also.

To compute the X gradients, you multiply the error sum matrix by Theta.

To compute the Theta gradients, you multiply the error sum matrix by X.

You will need to adjust the order of operators and transposition so you get results that are the correct size. The two gradient calculations use different transpositions.

These are both very similar to the method we used for the linear and logistic regression gradient.

1 Upvote Reply

Ali Saleh Essa Al-Thuwaini · 3 years ago

Hi Tom,

I'm finding difficulties computing the gradient. I'm putting here X_grad as an example:

I did the following steps:

1- Compute the hypothesis:

$$(\theta^{(j)})^T x^{(i)} - y^{(i,j)})$$

Result is a 5*4 matrix.

2- Multiply hypo matrix by R in order to zero any unrated movie by a user.

Result is 5*4 matrix.

3- Now I've all hypo per user but, I'm really not sure what the (red circled) term means (this is what we multiply the hypo from step#2 by):

$$\frac{\partial J}{\partial x_k^{(i)}} = \sum_{j:r(i,j)=1} ((\theta^{(j)})^T x^{(i)} - y^{(i,j)})\theta_k^{(j)}$$

I suspect it to be the features of the users, but, how then to relate this to the hypo? Still matrix multiplication can be done, but the results will never be correct.

0 Upvotes Reply

Boris Rozinov · 3 years ago

Thanks a lot, these unit tests are extremely helpful

0 Upvotes Reply

Andre Dellph · 3 years ago

Thanks Tom for helping me join all the dots during this course.

1 Upvote Hide 1 Reply

Tom Mosher Mentor · 3 years ago

I am glad you were successful!

0 Upvotes

Chile Chia · 3 years ago

Hi, Tom. I think it's better to add "R = logical(R);" in the tests. You know the R is stored by the type of logical in the exercise 8.

0 Upvotes Hide 7 Replies

Chile Chia · 3 years ago

Forget it, my wrong. I use M(R) instead of R .* M ;)

0 Upvotes

Tom Mosher Mentor · 3 years ago

I believe you are correct. The "R" matrix in the submit grader's test case is from a logical comparison, so the test case should be also.

It doesn't matter when you use element-wise multiplication.

0 Upvotes

Chile Chia · 3 years ago

Thanks a lot.

0 Upvotes

ML

minghai li · 3 years ago

should not be R = (Y>0)?

0 Upvotes

Tom Mosher Mentor · 3 years ago

Perhaps, but that's not how the submit script works, and this test case is designed to help you pass the grader.

0 Upvotes

Siyuan Hua · 2 years ago

I agree with Minghai Li that ideally, R should be (Y>0), but apparently this is not the case for how submissions are graded. Initially I put [(X * Theta') .* R - Y], but got 0 points. After I went through this test case, I changed all that into [(X * Theta' - Y) .* R], and then got 100 points...

3 Upvotes

VS Vikramjit Sidhu · 2 years ago

Yeah i needed to do the same thing as Siyuan to make it work

0 Upvotes