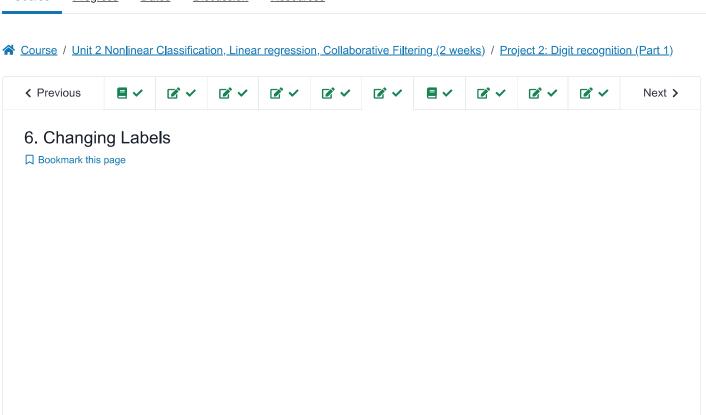
Course

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Project due Oct 21, 2020 05:29 IST Completed

We now wish to classify the digits by their (mod 3) value, such that the new label $y^{(i)}$ of sample i is the old $y^{(i)} \pmod 3$. An example is provided in the next section. (Reminder: Return the temp_parameter to be 1 if you changed it for the last section)

You will be working in the file part1/main.py and part1/softmax.py in this problem

Using the Current Model - update target

3.0/3.0 points (graded)

Given that we already classified every $x^{(i)}$ as a digit, we could use the model we already trained and just calculate our estimations (mod 3).

Implement update_y function, which changes the old digit labels for the training and test set for the new (mod 3) labels.

Available Functions: You have access to the NumPy python library as np

```
1 def update_y(train_y, test_y):
 3
      Changes the old digit labels for the training and test set for the new (mod 3)
 4
      labels.
5
6
      Args:
7
          train_y - (n, ) NumPy array containing the labels (a number between 0-9)
8
                   for each datapoint in the training set
9
          test_y - (n, ) NumPy array containing the labels (a number between 0-9)
10
                   for each datapoint in the test set
11
12
          train\_y\_mod3 - (n, ) NumPy array containing the new labels (a number between 0-2)
13
14
                       for each datapoint in the training set
15
          test_y_mod3 - (n, ) NumPy array containing the new labels (a number between 0-2)
                       for each datamoint in the test set
```

Press ESC then TAB or click outside of the code editor to exit

Correct

Test results

```
CORRECT

See full output

See full output

You have used 1 of 25 attempts
```

Using the Current Model - compute test error

3.0/3.0 points (graded)

Implement compute_test_error_mod3 function, which takes the test points x, their correct labels Y (digits (mod 3) from 0-2), theta, and the temp_parameter, and returns the error.

Example:

x_1	9	0	8	2
x_2	6	0	6	0
x_3	5	2	8	2

The error of the regression with the original labels would be 0.66667.

In comparison, the error of the regression with the labels after the "mod 3" operation would be 0.33333.

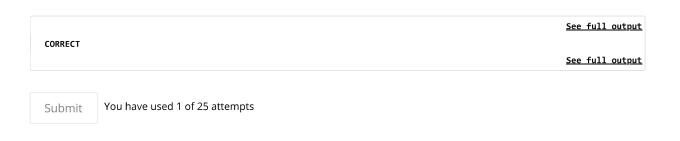
Available Functions: You have access to the NumPy python library as <code>np</code> and to the <code>get_classification</code> function from the released project.

```
1 def compute_test_error_mod3(X, Y, theta, temp_parameter):
3
      Returns the error of these new labels when the classifier predicts the digit. (mod 3)
 4
5
      Args:
 6
          X - (n, d - 1) NumPy array (n datapoints each with d - 1 features)
7
          Y - (n, ) NumPy array containing the labels (a number from 0-2) for each
8
              data point
9
          theta - (k, d) NumPy array, where row j represents the parameters of our
10
                  model for label j
11
          temp parameter - the temperature parameter of softmax function (scalar)
12
13
      Returns:
14
          test_error - the error rate of the classifier (scalar)
15
       #VOUR CODE HERE
```

Press ESC then TAB or click outside of the code editor to exit

Correct

Test results



Using the Current Model - test error

1.0/1.0 point (graded)

Find the error rate of the new labels (call these two functions at the end of run_softmax_on_MNIST). See the functions' documentation for detailed explanations of the inputs and outputs.

Submit You have used 3 of 20 attempts

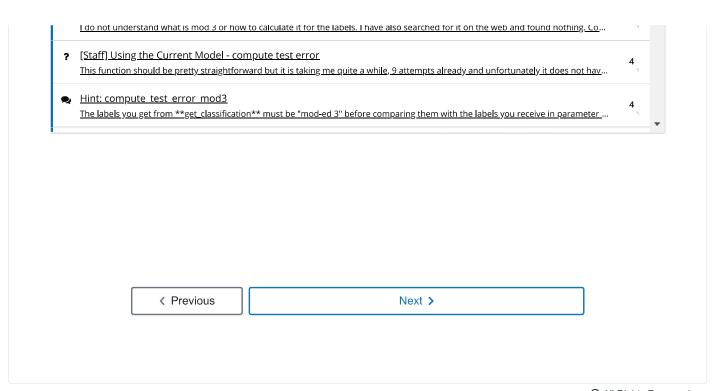
Answers are displayed within the problem

Retrain with New Labels

3.0/3.0 points (graded)

Now suppose that instead we want to retrain our classifier with the new labels. In other words, rather than training the model to predict the original digits and then taking those predictions modulo 3, we explicitly train the model to predict the digits modulo 3 from the original image.

How do you expect the performance to change using the new labels?) Increase Decrease Stay the same Implement run_softmax_on_MNIST_mod3 in main.py to perform this new training; report the new error rate. 0.187200000000000003 Error rate when trained on labels mod 3: ✓ Answer: 0.1881 Solution: We are trying to find common features of all numbers that have the same mod 3 value, however a lot of them look widely different, so it is harder to separate the data set into 3 groups since, for example, 2 does not share many features with 5 or 8. Therefore one would expect the performance to decrease, and this is what happens. Submit You have used 1 of 2 attempts **1** Answers are displayed within the problem Discussion **Hide Discussion** Topic: Unit 2 Nonlinear Classification, Linear regression, Collaborative Filtering (2 weeks):Project 2: Digit recognition (Part 1) / 6. Changing Labels Add a Post Show all posts by recent activity > [STAFF]Retrain with New Labels 3 Error increased not decreases. Answer is wrong for Retrain with New Labels ? Retrain with New Labels 2 What is the code to get the answer for Error rate when trained on labels mod 3? ? What is the error formulation, is it Mean Squared Error? 2 What is the error formulation, is it Mean Squared Error? Any help? ▶ [staff] Why not leave temp at 0.5 to speed up things? ... wasting another hour ... please vote +1 2 Please reply with: +1 ? Why are we doing mod(3)? 7 What is the purpose of this? I'm scratching my head why we'd want to do this? Is it just to see what happens? Tip that I found helpful for debugging 2 Hi guys, this exercise is encouraging us to be careful with our code by having us execute tests with long run times. For this problem, ... [STAFF] Compute Test error mod3 is wrongly formulated This function is trivial, but the formulation of the problem makes it a guess game. You should clarify that the thetas are computed b... ? The code takes too long to run, did anyone had similar issue? 9 Lam having issues while calculating the test error in both cases, it takes very long to run (because of the for loops). Any suggestions ... ? Retrain with New Labels - what exactly is meant by "the performance" 6 Is it performance of the computation (time it takes to complete training of the model) or performance in terms of the error rate? ? compute test error mod3 I'm having trouble to get the answer of the "compute_test_error_mod3" right. It looks simple, but i`m apparently missing something... What the freak is mod 3? 3 in a contract and a contract of



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