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Machine Learning with Python-From Linear Models to Deep Learning

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6. Changing Labels

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Project due Mar 15, 2023 08:59 -03 Completed

We now wish to classify the digits by their (mod 3) value, such that the new label $y^{(i)}$ is $y^{(i)} \pmod{3}$. An example is provided in the next section. (Reminder: Return the temp 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 have to calculate our estimations (mod 3).

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

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

```
1 def update_y(train_y, test_y):
2     """
3     Changes the old digit labels for the training and test set for the new
4     labels.
5
6     Args:
7         train_y - (n, ) NumPy array containing the labels (a number between 0 and 9
8                     for each datapoint in the training set
9         test_y - (n, ) NumPy array containing the labels (a number between 0 and 9
10                    for each datapoint in the test set
11
12     Returns:
13         train_y_mod3 - (n, ) NumPy array containing the new labels (a number between 0 and 2
14                         for each datapoint in the training set
15         test_y_mod3 - (n, ) NumPy array containing the new labels (a number between 0 and 2
```

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

Correct

Test results

CORRECT

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 w

Available Functions: You have access to the NumPy python library as `np` and to the `softmax` function from the released project.

```
1 def compute_test_error_mod3(X, Y, theta, temp_parameter):
2     """
3     Returns the error of these new labels when the classifier predicts the
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
8             data point
9         theta - (k, d) NumPy array, where row j represents the parameters of
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     """
```

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

Correct

Test results

CORRECT

Submit

You have used 2 of 25 attempts

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` functions' documentation for detailed explanations of the inputs and outputs.

☒ Decrease☐ Stay the same

Implement `run_softmax_on_MNIST_mod3` in **main.py** to perform this new training; report

Error rate when trained on labels mod 3:



You have used 2 of 2 attempts

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Discussion

Topic: Unit 2. Nonlinear Classification, Linear regression, Collaborative Filtering (2



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