2. Linear Regression with Closed Form Solution

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

After seeing the problem, your classmate Alice immediately argues that we can apply a
as the labels are numbers from 0-9, very similar to the example we learned from Unit 1.
doubtful, you decide to have a try and start simple by using the raw pixel values of eac

Alice wrote a skeleton code `run_linear_regression_on_MNIST` in main.py, but she
complete the code and make the model work.

Closed Form Solution of Linear Regression

5.0/5.0 points (graded)

To solve the linear regression problem, you recall the linear regression has a closed for

$$\theta = (X^T X + \lambda I)^{-1} X^T Y$$

where I is the identity matrix.

Write a function `closed_form` that computes this closed form solution given the featu
regularization parameter λ.

Available Functions: You have access to the NumPy python library as `np` ; No need to

```
def closed_form(X, Y, lambda_factor):
    """
    Computes the closed form solution of linear regression with L2 regulari

    Args:
        X - (n, d + 1) NumPy array (n datapoints each with d features plus
        Y - (n, ) NumPy array containing the labels (a number from 0-9) fo
            data point
        lambda_factor - the regularization constant (scalar)
    Returns:
        theta - (d + 1, ) NumPy array containing the weights of linear regr
        represents the y-axis intercept of the model and therefore X[0] = 1
    """
    theta = np.linalg.inv(X.T @ X + lambda_factor * np.identity(X.shape[1]
    return theta
```

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

Unanswered

Submit You have used 2 of 25 attempts

0.7698 ✔

0.7702 ✔

Submit You have used 1 of 20 attempts

What went Wrong?

0.0/1.0 point (graded)

Alice and you find that no matter what factor you try, the test error is large. With som
that something is wrong with this approach.

- [x] Gradient descent should be used instead of the closed form solution.
- [ ] The loss function related to the closed-form solution is inadequate for this proble
- [ ] Regularization should not be used here.

✖

Submit You have used 2 of 2 attempts

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Discussion

hi everyone, I completed the closed_form method and tried to run main.py and i was getting this error. numpy

? Memory error

Hi everyone! I was able to complete the first part of the question, but when I try to run main.py for the 2nd pa

package dependencies issue

I downloaded the files and ran python main.py. But I'm getting the following message: "qt.qpa.plugin: Could r

How did we get this formula for the closed solution?

? TypeError related to transpose

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