3. Perceptron Algorithm

Project due Mar 1, 2023 08:59 -03 Completed

Now you will implement the Perceptron algorithm

Perceptron Single Step Update

0.8/1 point (graded)

Now you will implement the single step update for the perceptron algorithm (implement
You will be given the feature vector as an array of numbers, the current θ and θ_0 param
label of the feature vector. The function should return a tuple in which the first element
value of θ and the second element is the correctly updated value of θ_0.

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

Tip:: Because of numerical instabilities, it is preferable to identify 0 with a small range $[$
is a float, "$x = 0$" should be checked with $|x| < \varepsilon$.

```
def perceptron_single_step_update(
                feature_vector,
                label,
                current_theta,
                current_theta_0):
        """
        Updates the classification parameters `theta` and `theta_0` via a s
        step of the perceptron algorithm.  Returns new parameters rather th
        modifying in-place.

        Args:
                feature_vector - A numpy array describing a single data poi
                label - The correct classification of the feature vector.
                current_theta - The current theta being used by the percept
                        algorithm before this update.
```

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

Incorrect

Test results

INCORRECT

shuffle indices to do stochastic optimization.

Available Functions: You have access to the NumPy python library as `np` and `perceptron_single_step_update` which you have already implemented.

```
def perceptron(feature_matrix, labels, T):
        """
        Runs the full perceptron algorithm on a given set of data. Runs T
        iterations through the data set: we do not stop early.

        NOTE: Please use the previously implemented functions when applica
        Do not copy paste code from previous parts.

        Args:
                `feature_matrix` - numpy matrix describing the given data.
                        represents a single data point.
                `labels` - numpy array where the kth element of the array
                        correct classification of the kth row of the featu
                `T` - integer indicating how many times the perceptron alg
                        should iterate through the feature matrix.
```

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

Correct

Test results

CORRECT

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Average Perceptron Algorithm

1.0/1 point (graded)

The average perceptron will add a modification to the original perceptron algorithm: sin
continues updating as the algorithm runs, nudging parameters in possibly conflicting di
take an average of those parameters as the final answer. Every update of the algorithm
The returned parameters , however, are an average of the s across the steps:

You will now implement the average perceptron algorithm. This function should be cons
Full Perceptron Algorithm above, except that it should return the average values of ar

```
11                    represents a single data point.
12                labels - A numpy array where the kth element of the array
13                    correct classification of the kth row of the featu
14                T - An integer indicating how many times the perceptron al
15                    should iterate through the feature matrix.
```

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Correct

Test results

CORRECT

Submit You have used 2 of 25 attempts

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