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Unit 1 Linear Classifiers and

Project 1: Automatic Review

<u>Course</u> > <u>Generalizations (2 weeks)</u>

> <u>Analyzer</u>

5. Algorithm Discussion

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5. Algorithm Discussion

Once you have completed the implementation of the 3 learning algorithms, you should qualitatively verify your implementations. In **main.py** we have included a block of code that you should uncomment. This code loads a 2D dataset from $\mathbf{toy_data.txt}, \text{ and trains your models using } T=10, \lambda=0.2. \mathbf{main.py} \text{ will compute } \theta \text{ and } \theta_0 \text{ for each of the learning algorithms that you have written. Then, it will call <math>\mathbf{plot_toy_data}$ to plot the resulting model and boundary.

Plots

6.0/6 points (graded)

In order to verify your plots, please enter the values of $\, heta$ and $\, heta_0$ for all three algorithms.

(For example, if $\, heta=(1,0.5)\,,\,$ then type **1, 0.5** without the brackets. Make sure your answers are correct up to 4 decimal places.)

For the **perceptron** algorithm:

$$\theta = \begin{bmatrix} 3.9174, 4.164 \end{bmatrix}$$

-8.0 **✓ Answer:** -8.0

For the **average perceptron** algorithm:

$$\theta = \begin{bmatrix} 3.4783, 3.6111 \end{bmatrix}$$

Answer: 3.478260499999999, 3.611060999999974 $\theta_0 =$

-6.373 **Answer:** -6.373

For the **Pegasos** algorithm:

$$\theta = \begin{bmatrix} 0.7346, 0.63 \end{bmatrix}$$

Answer: 0.7346463119064065, 0.6300224592973831 $heta_0 =$

-1.2195 **Answer:** -1.2195071848898564

Submit Yo

You have used 4 of 20 attempts

1 Answers are displayed within the problem

Convergence

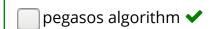
0/1 point (graded)

Since you have implemented three different learning algorithm for linear classifier, it is interesting to investigate which algorithm would actually converge. Please run it with a larger number of iterations T to see whether the algorithm would visually converge. You may also check whether the parameter in your theta converge in the first decimal place. Achieving convergence in longer decimal requires longer iterations, but the conclusion should be the same.

Which of the following algorithm will converge on this dataset? (Choose all that apply.)









Solution:

- Perceptron algorithm will not converge if the data is not linear separable.
- Average perceptron algorithm is stable due to averaging repeated solutions of perceptron outputs.
- Pegasos algorithm can find the optimal decision boundary for hinge loss.

Submit

You have used 3 of 3 attempts

1 Answers are displayed within the problem

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[STAFF] "Partially Correct" Theta for Pegasos Hi all, I have all previous taks rated as correct. Now for the question "Plots" the evaltuation sa	3
Theta value issues I have implemented all the algorithms and they have been marked correctly by the graders in	6 new_
Windows user need to install pillow first I get dll not found errors while running main.py. Installing pillow solved the issue for me.	1
Why my Pegasos theta and theta0 are incorrect My Pegasos algoritm has been verified as correct, but theta and theta0 computed are not An	10
Pegasos algorithm runs correctly in the Section 4 grader but incorrectly on local machine. Hello. My Pegasos algorithm passed all of the tests in Section 4 but seems to still be incorrect	1
[PROBLEM 5] Pegasos functions does not work when import from project 1.py in IDE Hi, **NameError: name 'label' is not defined** is the error when I tried main.py for problem	1
? Unable to verify my plots I have successfully completed the implementations of the learning algorithms, however, whe	4
? [STAFF] All answers marked as wrong - Checked for all the common mistakes described already - PLEASE HELP All my answers are marked as wrong! This is so frustrating after having passed all the test bef	3
<u>Library utils does not include a load data function</u> <u>I have tried to execute the main.py I got an error message indicating that the library utils doe</u>	3
? <u>@Staff:</u> <u>I checked each step for pegasos algo theta 0 is updating each time.considering for single ste</u>	6
? Convergence - check whether the parameter in your theta converge in the first	

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