Machine Learning, 2024 Spring
Assignment 4

Notice

Plagiarizer will get 0 points.
LATEXis highly recommended. Otherwise you should write as legibly as possible.

Problem 1 For problem 3 in assignment 3, change your GD code to SGD and complete the tasks below:

- Present your code.
- How to choose (mini -) batch size?
- How to choose learning rate?
- How to terminate?
- Demonstrate the impact of different learning rates on the accuracy of the solution. In other words, your program should output an image similar to the image on page 34 of the Lecture 6-SGD PPT.

Solution:
Students should provide a code, otherwise will get 0pt.

- Present your code. (20pt)
  - Different languages such as python, C, C++ or matlab can be used.
  - The Key point is to check the mini-batch training process(batch size) and the gradient function(similar to hw3).

- How to choose (mini -) batch size? (20pt)
  - Any reasonable batch size is acceptable except the whole training set(GD). For example, batch size can be 1, 10 or dynamic from Page 48 of Lecture 6 SGD.

- How to choose learning rate? (15pt)
  - Any reasonable learning rate is acceptable.

- How to terminate? (15pt)
  - Any terminal condition including loss threshold or the upper bound of iteration is acceptable.
  - However, the curves in the figure should be relatively flat before termination (10pt).

- Demonstrate the impact of different learning rates on the accuracy of the solution. In other words, your program should output an image similar to the image on page 34 of the Lecture 6-SGD PPT. (30pt)
  - The figure should be generally descending with the increasing epoch.
  - There should be at least three curves with different learning rates in the image. Each curve is worth 10pt.