CSE4088 Introduction to Machine Learning

Homework 3

In the below questions, prepare a report explaining your answers. If possible, include plots to explain your solution.

You need to show all your work step by step to receive credit. You may be asked to make a demo of your code.

Part 1 - Gradient Descent
Solve Questions 4-7 in the homework available from
https://work.caltech.edu/homework/hw5.pdf

Part 2 – Logistic Regression
Solve Questions 8-9 in the homework available from
https://work.caltech.edu/homework/hw5.pdf

Part 3 - Regularization with weight decay
Solve questions 2-6 from the homework available from
https://work.caltech.edu/homework/hw6.pdf

Part 4 – Neural Networks
Solve questions 8-10 from the homework available from
https://work.caltech.edu/homework/hw6.pdf

Submission Instructions:

1. Each student should submit his/her own homework. You can discuss the questions with your friends, but you must write your own solutions and code. Group work is not allowed. You can not exchange any written material, code or pseudocode. This also includes material found on the web.

2. Write a detailed report using Word/Latex and convert it to a pdf file. The report must include explanations about each part in each question. You should solve some of the questions by pencil and paper. Then, you can scan your solution and add it to your report as an image. (you can use free Mobile applications such as Adobe Scan). As an alternative, you can also print and hand in your homework during class hours to the instructor.

3. Explain how your scripts and functions work, i.e., which parts of your functions/scripts accomplish which task and how it is accomplished. Include the outputs of your functions and figures to your report. Each figure should have a caption and should be explained in the text.

4. You can use MATLAB or Python for programming assignments. Don't forget to put detailed comments into your functions/scripts to explain what your code is doing. Also indicate the inputs and outputs in the comment section.

5. Combine your report and codes into a single zip file. Plots and figures should go into the report.

6. Name your zip file as "CSE4088_name_surname_hw_no.zip". For example, a student whose name is Ayşe Çalışkan will name her file as: "CSE4088_ayse_caliskan_hw1.zip" for the first homework. Also, write your name, surname and student number as comments at the beginning of your codes.

7. Submit your homework via the class web page at classroom.google.com before the deadline. As an alternative, you can also print and hand in your homework during class hours to the instructor (you should still submit your code via the class web page).

8. Late submissions will loose 10 points for each day after the deadline.