Machine Learning HW1

Logistics

Due date: 10/15 (Sun) 23:59

Submission

- Via LMS (no email submission)
- **TWO FILES**
    1. Zip of your code. (compress your code into **one file**)
    2. Report. (any format)

Problem Description: Linear Regression

A two-column dataset file, data_hw1.csv, is provided. The first column is denoted as x, and the other one as y. The main purpose of this assignment is to write a program that performs linear regression on the given dataset with different models and approaches. Hope this assignment will give you a deeper understating of linear regression.

This assignment has two tasks, each of which uses different models and approaches as follows:

Task1.

Model: $y = ax + b$

Approach: Gradient Descent

Task2.

Model: $y = ax^2 + bx + c$

Approach: Normal Equation

Evaluation Policy (10 pts in total)

Score (10pts) = Report (7pts) + Implementation (3pts)

Penalties

1. Unable to build or run → Implementation = 0
2. **Plagiarism → Score = 0 (will affect your overall grade)**
3. Late Submission → -1 for each day of delay.
4. Missing files and wrong formats (not compressed code, …) → -1

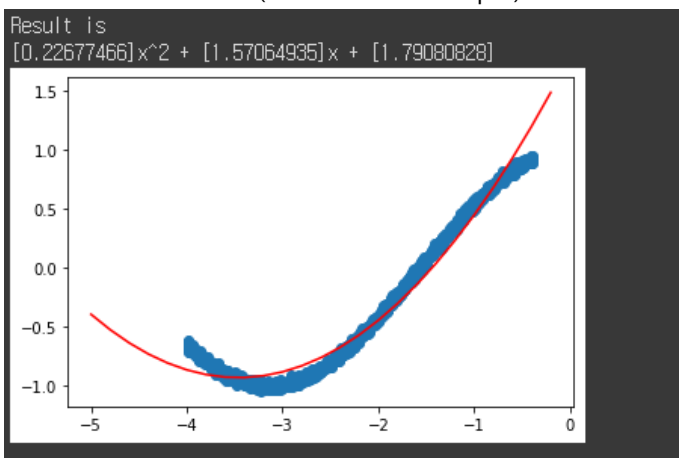
Report

Any format, no template. But the followings must be included:

1. Program description (comments on important code lines)
2. How to run (so that I can test your program)
3. A set of snapshots (of progress, final result, and etc.)
4. Results
   A. Table of parameters (Below is an example)

	a	b	C
Task1	0.001	-0.02	0
Task2	0.0011	0.11	0.1123

   B. Plots of the models. (Below is an example)



5. Conclusion.

Implementation Guide

1. No restrictions on programming languages and platforms.
2. Your program takes the given dataset file as input, and outputs the optimal parameters on the standard output or files.
3. Please do not spend too much time on implementing basic numerical operations. Just import existing math libraries.
4. But, you MUST implement **your own** gradient descent algorithm and normal equation code.