CS 475/675 Machine Learning: Homework 4

Due: Friday, November 15, 2024, 11:59 pm US/Eastern

100 Points Total Version 1.0

Make sure to read from start to finish before beginning the assignment.

1 Homeworks

Homeworks will typically contain two parts:

1. **Analytical:** These analytical questions will consider topics from the course. These will include mathematical derivations and analyses. Your answers will be entirely based on written work, i.e. no programming.
2. **Practicum:** In the practicum portion of the assignment, you will apply machine learning concepts to gain experience working with data from different domains. Practicums could involve Python notebooks, applied explorations of topics covered in the class, or programming assignments. Please note that the use of any form of AI assistance is strictly prohibited in this assignment.

   Click here for the Practicum Google Colab Notebook

The point total for each portion of the homework will be listed in the assignment. Written assignments will be submitted as PDFs. See below for more details about what to submit.

1.1 Collaboration Policy

The course policy is that, *unless otherwise specified*, all work must be your own.

1.2 What to Submit

For this assignment you will submit the following.

1. **Analytical**. You will submit your analytical solutions to Gradescope. **Your writeup must be compiled from LaTeX and uploaded as a PDF**. The writeup should contain all of the answers to the analytical questions asked in the assignment. Make sure to include your name in the writeup PDF and to use the provided LaTeX template for your answers following the distributed template. You will submit this to the assignment called "Homework 4: Analytical".
2. **Practicum Python Notebook.** You will submit the notebook (*.ipynb) to the assignment titled "Homework 4: Practicum".

You will need to create an account on gradescope.com and signup for this class. The course is `https://www.gradescope.com/courses/835426`. Use entry code `BK5K8K`. **You must either use the email account associated with your JHED, or specify your JHED as your student ID.** See this video for instructions on how to upload a homework assignment: `https://www.youtube.com/watch?v=KMPoby5g_nE`.

1.3 Questions?

Remember to submit questions about the assignment to courselore: `courselore.org/courses/9582956601/`.

2 Analytical (70 points)

Please see the accompanying `2024_homework4_analytical.tex` file for the analytical questions for this assignment. There is space provided in that file for you to type your answers in LaTeXafter each question. **Do not edit the file in any way except to add your answers.** Gradescope assumes that the PDF will exactly match our template except for your solutions.

3 Practicum (30 points)

In this assignment, you will need to implement **sum product** and **K-means** algorithms. Since we focus more on the analytical part this time, there are no discussion questions to reduce the workload, however, we don't provide much algorithm description compared to the previous homeworks. You will receive full credit for the practicum if passing all the Gradescope test cases.

You will hand in the Python notebook, which contains your implementation. Please see the instructions on how to submit the notebook.

Click here for the Practicum Google Colab Notebook