Machine Learning for Large-Scale Data Analysis and Decision Making (MATH80629A): Winter 2022

Homework 1

Completion Instructions

- Make a copy of this notebook by selecting File > Save a copy in Drive
- Rename the copied notebook as your `firstname-lastname-HW-1`. Add your answers to your notebook.
- For text response answers (All of Section 1 and 6 and a few others) complete your answer in the text cells below the question. Look for <ANSWER_TEXT> tags to remind you. **Replace** these tags with your answer.
- For code response answers (Most of Section 2 and 3, 4, 5, and some 6) complete the code **without modifying any comments involving tags** such as ##@CODE_FUNCTION_BEGIN, ##@CODE_FUNCTION_END, ##@FUNCTION_CALL_BEGIN, ##@FUNCTION_CALL_END, ##@CODE_COMPLETE_BEGIN, ##@CODE_COMPLETE_END. These comment tags are important for running your code.
- Please add your imports only between the comments ##@IMPORTS_SECTION2_BEGIN and ##@IMPORTS_SECTION2_END for Section 2. ##@IMPORTS_SECTION3456_BEGINand ##@IMPORTS_SECTION3456_END for Sections 3,4,5,6 (together).
- For completing code blocks between ##@CODE_FUNCTION_BEGIN and ##@CODE_FUNCTION_END fill in your code and reference only the variables provided in the arguments of the function. **You are not allowed to use any other**

external variable nor modify the function signature. Ensure that you use the argument variables and not any fixed values or global variables.
- For completing code blocks between ##@CODE_COMPLETE_BEGIN and ##@CODE_COMPLETE_END, use only existing global variables that you might have created while running cells.

- The cells with ##@FUNCTION_CALL_BEGIN and ##@FUNCTION_CALL_END are meant to be **run without any modification**. If you filled in the CODE_FUNCTION and CODE_COMPLETE blocks correctly and without bugs, these FUNCTION_CALL cells will execute without any error. If they throw an error, you might need to fix your code in the function being called.

- For sections 2-6, ensure that all the cells preceding the cell you are running are executed as they are continuous and use the same global variables.

- If you follow all the above instructions and all your code cells execute without any error, your code will pass while running your code (need not be 100% correct). Any errors you have will cause the code not to run and you will not receive points!

Plagiarism

- This is **individual** homework that you are required to be worked on and submitted **individually**.

- For coding questions, you can work with your peers to discuss high-level ideas and logic of codes but no code sharing is permitted. **Please be sure to credit and acknowledge the person(s) with whom you worked**, in a text cell (or comment) below your solution for a relevant part. This might help you in case of any violations observed.

- Inspiring yourself by online resources is fine, however exact reproduction (ctrl+C and ctrl+V) is **not permitted**.

- Automated tools for checking code similarity with your peers as well as online resources would be applied.

- For questions involving theory or interpretation of results, you are supposed to work on your own. No result of group work is expected in your submission.
- Please refer to this page to understand the university's policy.
- Cases of plagiarism will be dealt with according to the official rules and regulations of HEC Montréal.

Submission Instructions

Deadline : **Mar 08, 11.59 pm EDT** on Gradescope as programming files and PDF.

Refer to this document for further instructions regarding the submission. A video demo is given to you as well.

Checklist

- Ensure that you replaced ?? and <ANSWER_TEXT> in text cells.
- Ensure that you have filled in all the code required.
- Select the option `Runtime > Run all` to run all the cells in order.
- Ensure that there is no error (no exception "thrown") in code when you run the cells in order from the beginning in the previous step.
- Do not clear any output and proceed to the next set of instructions.

You are required to submit **3 files**!

1. **PDF** of your notebook

   1.1. File > Download > Download .ipynb

   1.2. Visit notebook

   1.3. Upload <file_name>.ipynb on this notebook and run the cells after replacing the filename in the command.

   1.4. Navigate the files on the left panel and download the pdf file.

1.5. Submit this PDF file on Gradescope and assign pages for each question. Refer to the demo video if necessary. Without page assignment, your answer will **NOT BE** graded.

Alternatively, we do accept PDFs generated from LaTeX / Word if you prefer to do so. But you are liable for losing points if you miss out on including any necessary answer.

2. **.ipynb** of your notebook from File > Download > Download .ipynb and upload it to Gradescope

3. **.py file** of your notebook from File > Download > Download .pyand upload it to Gradescope