

## Homework 3

## INSTRUCTIONS

- The homework is due at 9:00am on April 18, 2020. Anything that is received after that time will be considered to be late and we do not receive late homeworks. We do however ignore your lowest homework grade.
- Homeworks need to be submitted electronically on ETL. Only PDF generated from LaTeX is accepted.
- Make sure you prepare the answers to each question separately. This helps us dispatch the problems to different graders.
- Collaboration on solving the homework is allowed. Discussions are encouraged but you should think about the problems on your own.
- If you do collaborate with someone or use a book or website, you are expected to write up your solution independently. That is, close the book and all of your notes before starting to write up your solution.

## 1 Setup [0 points]

1. In this homework, we will build and experiment with softmax loss, stochastic gradient descent, and MLP neural networks. You must use [Google Colab](#), which provides free GPUs.
2. For this homework, we will use subset of tasks from cs231n from Stanford.
3. First, upload hw3 files to your Google Drive.
4. If you are a 컴맹, I suggest you watch this [Workflow tutorial video](#) for the overview setup process.
5. You'll implement some functionalities in .ipynb files and cs231n/\*.py files. Once you have completed the assignment question (i.e. reached the end of the notebook), you can save your edited files back to your Drive and move on to the next question. For your convenience, we also provide you with a code cell (the very last one) that automatically saves the modified files for that question back to your Drive. Repeat the steps for each remaining notebook.
6. Note, you need to make sure to properly set the path to the Drive files. I've attached my example path in the following figure.

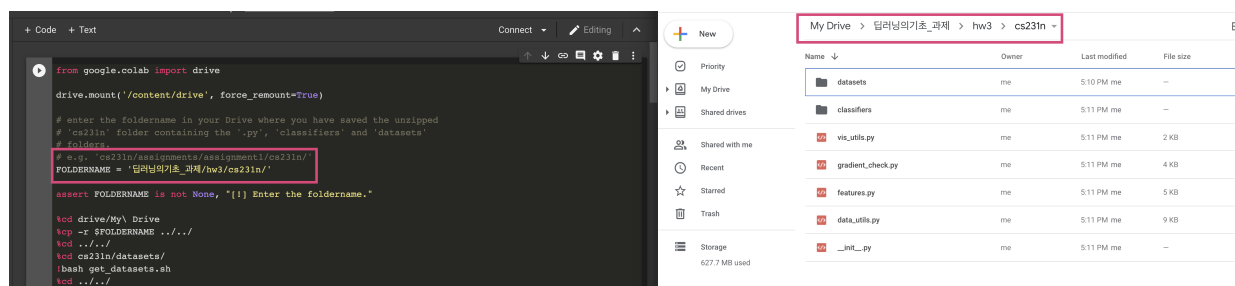


Figure 1: Make sure to set the path appropriately.

7. Please make sure that you work on the Colab notebooks in the order of the questions (see below). Specifically, you should work on Softmax, then Two-layer Net. The reason is that the code cells that get

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executed at the end of the notebooks save the modified files back to your drive and some notebooks may require code from previous notebook.

8. Related to above, ensure you are periodically saving your notebook (File → Save), and any edited .py files relevant to that notebook (i.e. by executing the last code cell) so that you don't lose your progress if you step away from the assignment and the Colab VM disconnects.
9. Once you have completed all Colab notebooks except `collect_submission.ipynb`, open `collect_submission.ipynb` in Colab and execute the notebook cells. This notebook/script will:
  - Generate a zip file of your code (.py and .ipynb) called `a1.zip`.
  - Convert all notebooks into a single PDF file.
10. Submit the resulting PDF and the zip file to ETL.

## 2 Softmax loss and SGD [30 points]

Follow and complete `softmax.ipynb`.

## 3 Two-layer MLP network with softmax loss [70 points]

Follow and complete `two_layer_net.ipynb`.