

CS 482/682 Machine Learning: Deep Learning

Flipped Classroom Instructions: It's not working! Help!

Flipped Classroom, what does it mean?

In the flipped classroom environment, you will be asked to familiarize yourself with some educational material at home in the days leading up to the lecture, while in lecture you will practice the concepts studied at home using the guidance of the teaching staff.

Preparing at home and following the instructions provided here is critical to the success of these sessions and your learning experience. So please take preparation seriously.

What you will do in class:

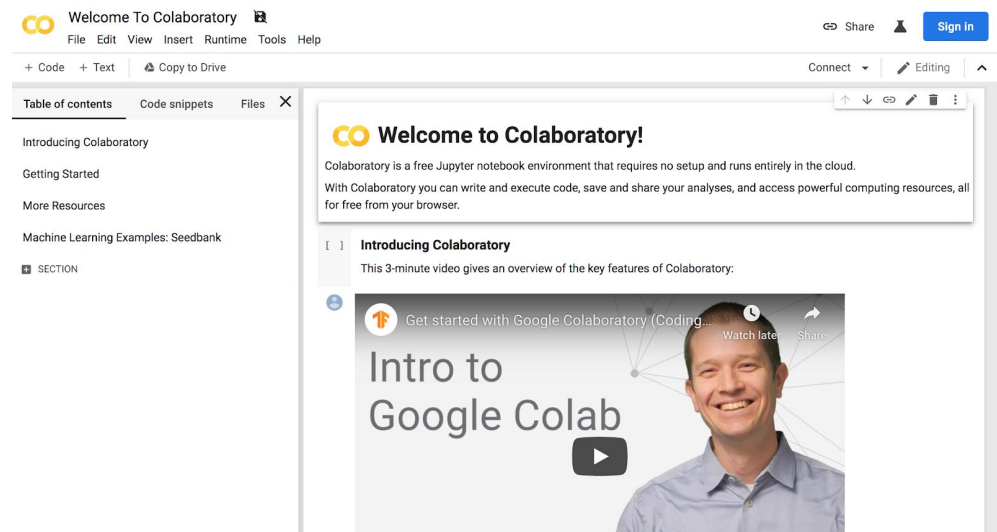
- This flipped classroom will happen on Tuesday, October 1st during class hours.
- During regular class hours, you will be working in groups to debug problems that are typically found when doing machine learning in practice.
- You will be doing the following exercises, each with separate Google Colaboratory notebooks:
 - L-9-1: Debugging a Training Set-up
 - L-9-2: Image Segmentation with DICE Loss
 - L-9-3: Fixing the Data Processing Pipeline
 - L-9-4: Test Performance is Too Good!

Note, that there is another Google Colaboratory notebook **L-9-0: General Set-up**, that must be completed before the in-class portion at home. This will ensure that you have your Google Colaboratory environment up and running.

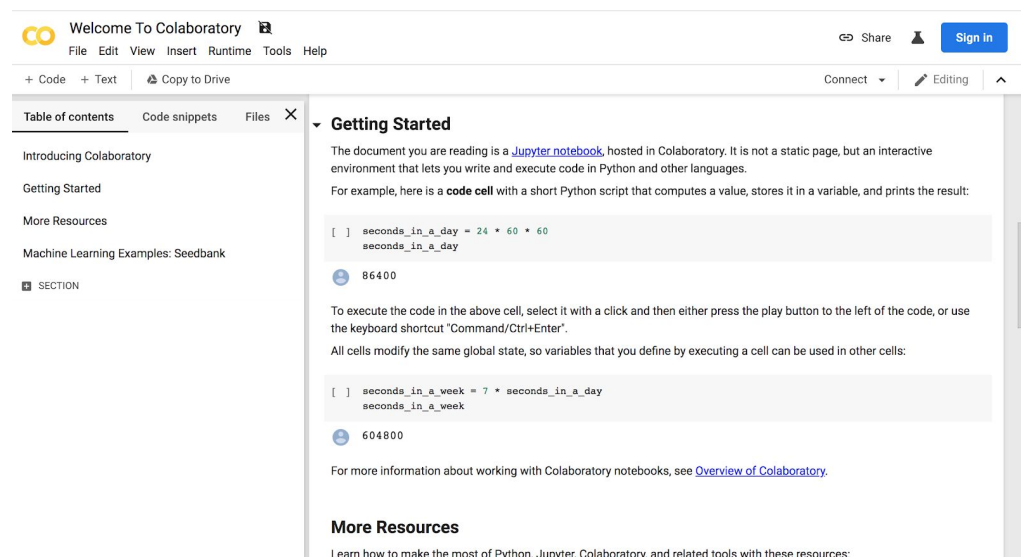
What you will do at home to prepare: Step by step instructions

1. Setting up Google Colaboratory:

- a. Visit <https://colab.research.google.com> and sign in with your preferred gmail account ("Sign In" is the blue button in the upper-right).



- b. In “Getting Started”, click on and run the ``seconds_in_a_day`` and ``seconds_in_a_week`` code blocks to make sure code is executing properly.



- c. Feel free to checkout “More Resources” if you want to learn more about Colaboratory.

2. Running L-9-0 notebook:

- a. Open the L-9-0 notebook:
https://colab.research.google.com/drive/1i7gNiJurEFqA1QXnZ-2sW5jw968Ki_u2B
- b. As stated in the notebook itself, before starting work,

Click in the upper-left:

File -> Save a copy in Drive...

This will start a new personal notebook file that you can save and edit. If you

don't do this step and are only executing in "Playground Mode", your progress will not be saved!

- c. Read through and execute the code blocks in the notebook. Make sure you are able to plot an MNIST digit.
- d. Feel free to play around with the MNIST dataset for additional practice.
- e. Software-wise, that's all you need to get started in class! The four topics listed above will comprise a total of 4 colab notebooks (L-9-1 through L-9-4), which you will go through, edit, and develop as was done for L-9-0.

3. Reading:

- a. This inverse classroom is designed to help you become familiar with the tricky debugging nature of deep learning. This blog post covers the topic in-depth. We recommend reading through this and giving it some thought before coming to class: <http://karpathy.github.io/2019/04/25/recipe/>
- b. Image segmentation and Dice loss are recommended reading material as well, since L-9-2 will cover image segmentation with Dice loss:
 - i. Wiki:
https://en.wikipedia.org/wiki/S%C3%B8rensen%E2%80%93Dice_coefficient
 - ii. Seminal paper:
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1415224/>