## HW6: Generative Models

**Programming Assignment:** Due Wednesday, 12/07/2022 at 11:59 PM EST

## **Getting the stencil**

Stencil will be available here. Submit a zip file to the autograder containing the two (or three w/ bonus) completed notebooks and a README which has some questions already written down.

## **Setup**

Work on these components in colab for optimal experience and feel free to treat them as labs. Each component should take roughly that much time as well, so try not to spend too much time on any one part.

## **Assignment Overview**

In this assignment, we will be exploring some fundamental autoregressive models. To keep things simple, we will be specifically focusing on ways of reconstructing and generating MNIST digits, though the techniques can definitely be extended to more complex datasets. Also, some of the architectures will be kept simple (and in the case of the GAN, overly-simple) to keep the training time reasonable. You will be expected to use the Colab GPUs on occasion, so be conservative and strategic with your use of these to avoid getting throttled. The following notebooks are included, and are each about as long as a lab (specifically, the AE component should be shorter, the VAE component should be around average, and the GAN lab is a former lab which, admittedly, was on the harder side).

* **Autoencoder** will cover a simple convolutional autoencoder to compress mnist digits down to a smaller representation.
* **VAE** will introduce you to VAEs and ask you to convert a tutorial VAE into a modularly-designed conditioned one and perform a latent walk through the numerals.
* **GAN** (formerly a lab) will be a bonus for the homework. This will have you train up a generator to output mnist digits by optimizing over an adversarial loss.
  + 2470 students will have an additional requirement for half of the bonus credit.
* ***There will be no written component for HW6.***

## **Grading**

**Code***:* You will be primarily graded on functionality. Your primary deliverable will be the images/gifs you generate as you progress through the notebooks. Your code will also be observed.

**README***:* Your README should contain answers to the little chat questions and will remind you of the requirements for the notebooks.

## **Autograder**

Our autograder will take in your notebooks, but won’t really do anything automatically. The notebooks and README will be graded on manual observation.

## **Handing In**

IF YOU ARE IN 2470: PLEASE REMEMBER TO ADD A BLANK FILE CALLED “2470student” IN THE hw6/code DIRECTORY, WE ARE USING THIS AS A FLAG TO GRADE 2470 SPECIFIC REQUIREMENTS, FAILURE TO DO SO MEANS LOSING POINTS ON THIS ASSIGNMENT.