

CMPSC 497 - Deep Learning for Computer Vision  
Homework 7  
Professor: Huijuan Xu  
Due: April 24th, 2023 @ 11:59 PM EST

## 1 Assignment details

In homework 7 we will be implementing a contrastive self-supervised learning method, SimCLR ([Chen et al, ICML 2020](#)). Students will get experience in implementing various augmentation techniques, and learn how SimCLR is implemented and trained.

## 2 Getting started

We suggest students complete the networks in Google Colab. If you'd like to complete the assignments in colab, you can visit the [colab website](#) and upload the notebook. To use a GPU, set your runtime to include a hardware accelerator. Students may also complete the homework locally with Jupyter, though training your network will be fairly slow on a CPU.

Also, the data downloading process is automated when you build the dataset, so you don't need to worry about downloading the data yourself.

## 3 Expected output

SimCLR is evaluated in the downstream classification task, and the test accuracy in the downstream classification task will be reported to compare the self-supervised learning performance. A simple baseline of training from scratch in the downstream classification task will be used as comparison, to show the benefit of self-supervised pre-training using SimCLR. Students are expected to show the test accuracy comparison of SimCLR pre-training and training from scratch in the downstream classification task, as marked in the jupyter notebook file.

For submitting the assignment, simply upload the completed ipynb file. Be sure the cells have output from running your code. You do not need to include any other files (checkpoints, images, or h5py).

## 4 Rubric

Transformations: 30%  
InfoNCE loss: 70%

More detailed rubric breakdown is shown in the code.