Image compression using deep learning

- The goal of the project is to create a CNN auto-encoder that compresses and decompresses an image.
- Convolutional layers will compress/encode the images and deconvolutional layers will decompress/decode the image.
Auto-encoder

Convolutional layers

Deconvolutional layers

Input

Compressed Feature Vector

Output
What I have accomplished

- Learned how to create neural networks in tensorflow and keras
- Created CNNs for classification (using the MNIST and Cifar10 datasets)
- These CNNs had two convolution (followed by max pooling) layers and two fully connected layers:
  - MNIST classification accuracy was .9772
  - Cifar10 classification accuracy was .5488
- Tested how different loss functions (cross entropy, $L_2$, and mean-squared error) affected classification
Current Work

- Working on resizing images using CNNs.
- Have CNN with two convolutional layers and one fully connected layer that can scale grayscale images to half size with a ~65% accuracy.
- Currently trying to adjust the implementation to increase accuracy.
Coming Weeks

- Now that I have access to the cluster, I will be able to train a CNN to resize larger images, and will work on color images.
- Once that is complete, I can begin working on the deconvolutional half of the auto-encoder.