Semi-supervised training of CNNs

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Image preprocessing changes

- In previous weeks, the only image preprocessing normalizing the input images (dividing all images by 255)
- Now, we subtract the center the mean of each channel, so that the mean of each channel is 0
- Due to this, we changed the auto-encoder’s output function from sigmoid to tanh
- This has improved training of the autoencoders

VGG16 Auto-encoder

- Last week, the output of the SWWAE was greyscale, which we thought was a bug
- After training the auto-encoder for many more epochs, we noticed that the color started appearing in the output, so it was not a bug, it just took the autoencoder time to learn the correct color outputs
- Results are shown on the next slide

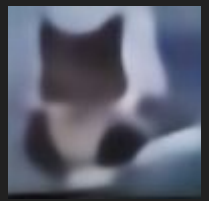
VGG16 Auto-encoder Results

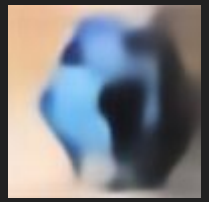
Original





Basic Autoencoder
14 epochs





What-where Autoencoder
15 epochs





VGG16 Auto-encoder Results

- As seen from the images, the SWWAE still has not finished training, since the color is still too dissimilar from the original
- However, the SWWAE seems to maintain the structure of the original image much better than the naive autoencoder
- Currently they are both training, and have a similar L2 loss of about 21,000
    - It is unknown how long this training will take, since these are very deep networks and there are 100,000 training images

Coming Weeks

- When the autoencoders finish training, I will use them for semi-supervised training of a classification CNN
- If I get good results, I will test this method on different datasets to see how it compares to state of the art classification methods