Image (Re)-Colorization Project

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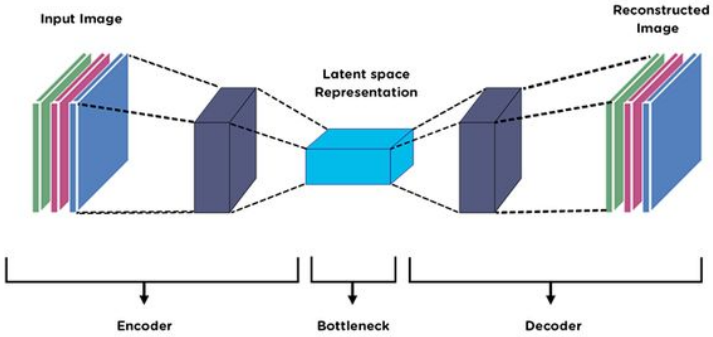
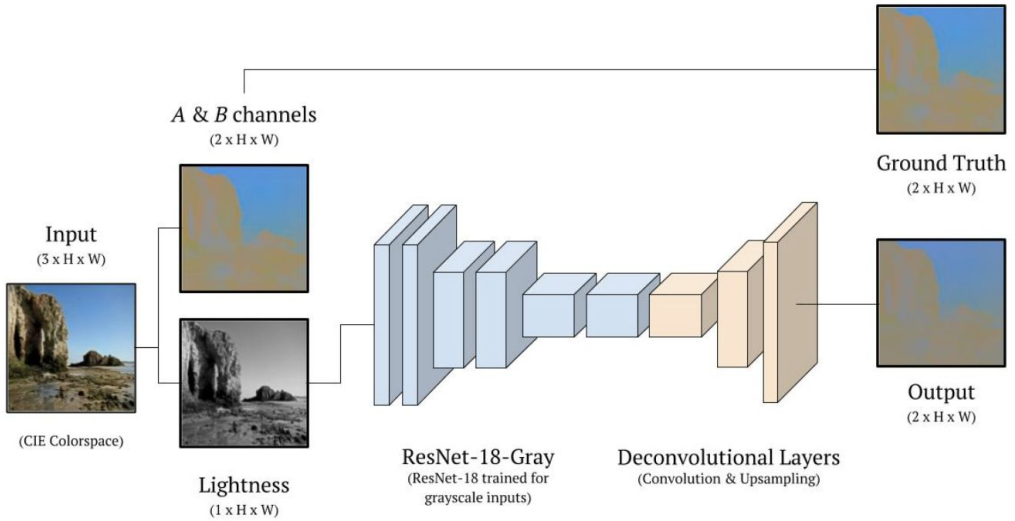
Background

- Goal was to create model that can add color to a black and white photo
- Baseline: Convolutional Neural Network
- Decomposition of images into light portions
  - Lightness, green-magenta, blue-yellow
- Train models using b/w image as input feature, color portions as targets
- Build models from scratch but heavy influence from pre-existing models



Baseline

- Used a convolutional neural net model from 2018
- 18 layers that reduce and then resize the photo
- Validates used MSE
- ReLU activation function used



Baseline Output

- Same validation image, different epoch results:
  - Epoch 8:

  - Epoch 90:

- Epoch 8 seems to be very little more than random guessing of colors, while epoch 90 (still not great) does manage to properly color some parts of the image

Baseline Output

- Additional example of the success of our baseline model: able to recognize and colorize the grass as green

Challenges

- Determining additional methods of convoluting images in order to train model
- Neural net is very time consuming to train - even with use of DGX
- Potential for better use of activation functions / loss function - tanh function and
- Larger batch sizes in training could be beneficial for model but simply adds on even more training time

Next Steps

- Tune hyperparameters
  - Number and size of kernels in each layer
  - Size of layers in pooling layer
  - Size of stride
- Possibly change training set batch size
- Re-train the model
- Rinse & repeat

References

- https://lukemelas.github.io/image-colorization.html
- https://github.com/richzhang/colorization

Thank you!

Questions?