Grayscale Image Colorization via Neural Nets

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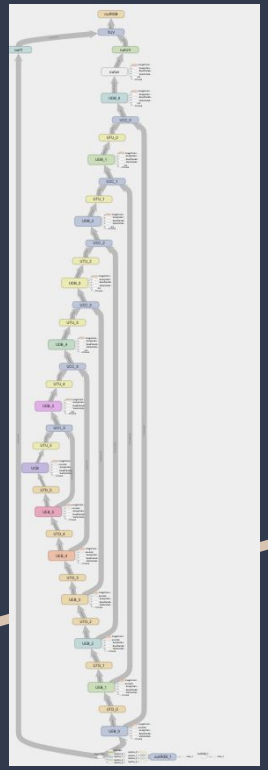
Background

DeOldify Results

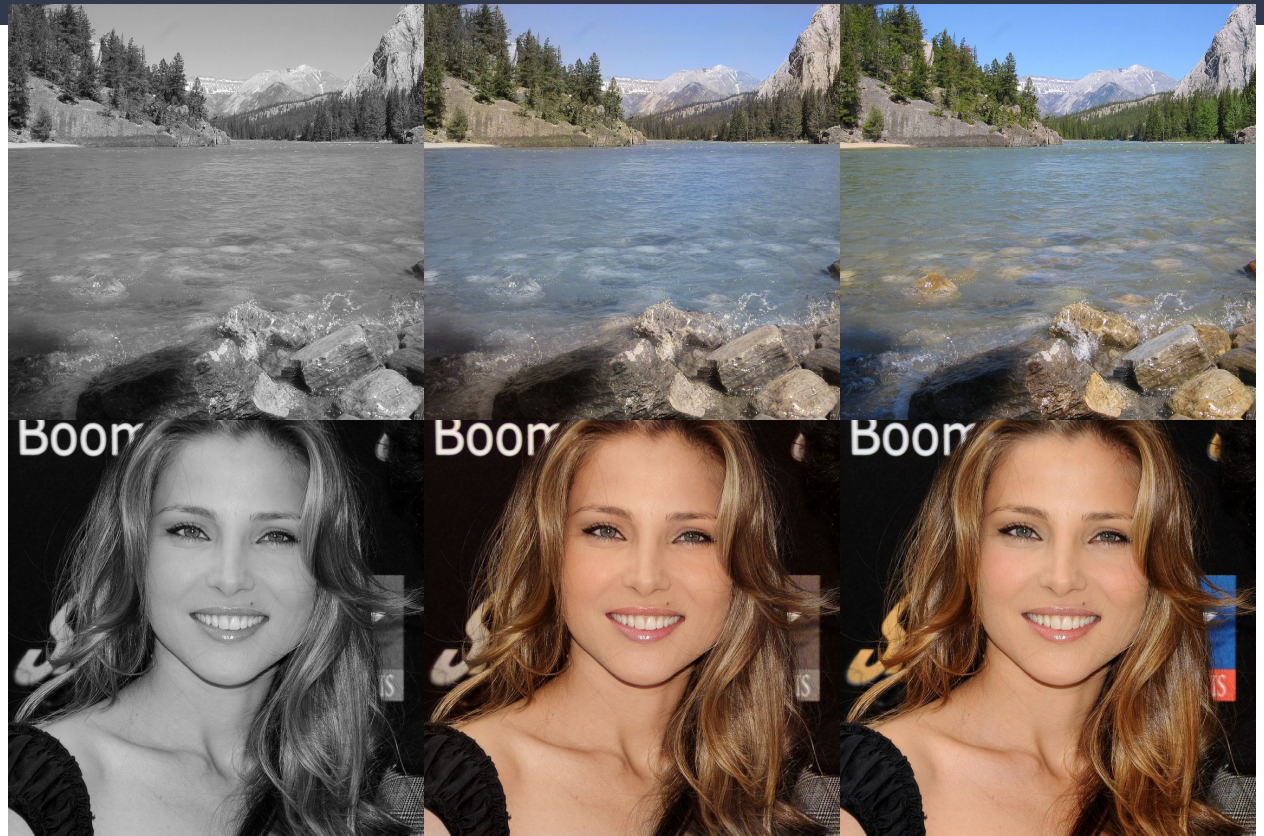
- DeOldify
  - Old grayscale image/video conversion to RGB
  - Notable due to the lack of human interaction in the process
    - No “style” image provided like necessary for style transfer
  - Uses strategy similar to ours
  - Extremely impressive results
- Colorfy Proof of Concept
  - Wanted to see if it was possible to create a model that achieves results similar to that of DeOldify
  - Attempt to generate a full color image from a grayscale one without any human intervention

Network Structure



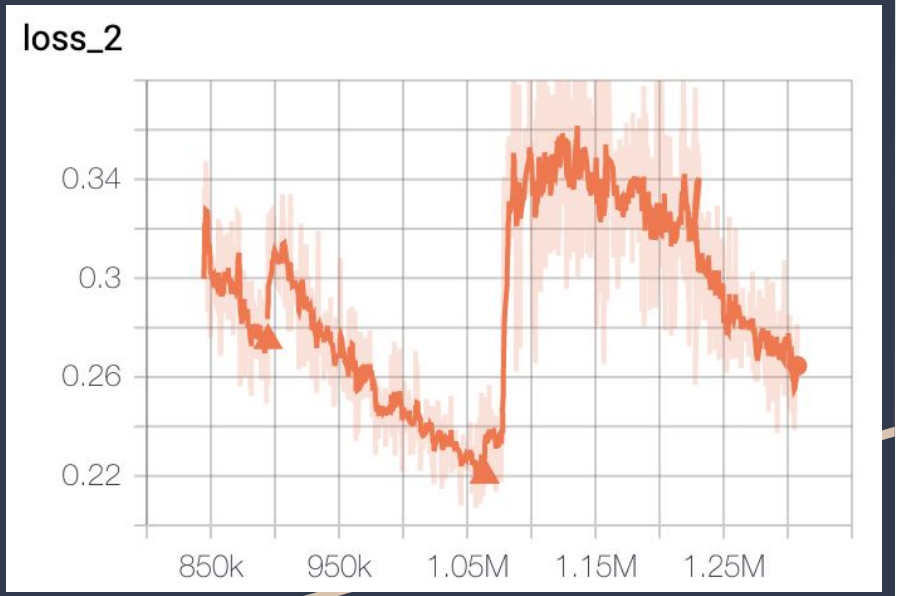
- Very similar structure to that used in Gigapixel, Adjust AI, etc.
  - UNet
- Used Perceptual Loss / VGG Loss
- 5 ‘levels’
  - Consists of two ‘convolutional’ layers
- Input is a one channel grayscale image
  - Data feed takes RGB image and converts it to grayscale
- Initial output is originally three channel YUV image
  - Uses the original input as Y value
  - Generates U & V values
- Final output takes initial YUV output and converts to RGB for end user

Current Results (Good)



Current Results (Needs Improvement)

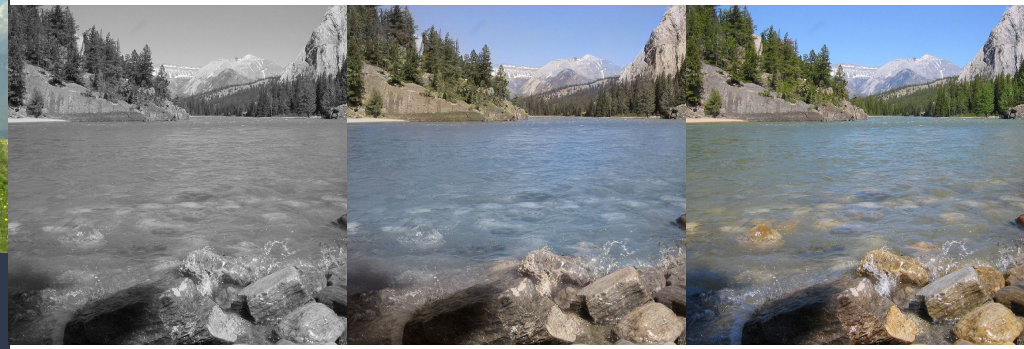
Loss Trends



- With the current network, the loss has been steadily decreasing - with a few exceptions
- First small bump was when the data feed was adjusted
  - Randomized weights for grayscale conversion for input images
  - Adjusted crop & resize methods to include as much of the original image as possible
- Second bump was when we migrated the training from one machine (2 GPU) to another (4 GPU)
  - Very little to no visible loss in output quality
  - Loss continues downward trend

Conclusion

- Out of 24 Images Previewed
  - 17 that were of passable / high quality
  - 7 that were of unacceptable quality
- Very Roughly 70% of images acceptable
  - Most of which were portrait or landscape photos
- 2/7 photos of unacceptable quality still had noticeable amounts of gray present
- Many photos tend to be much less saturated than their real counterparts



Questions?

Thanks!