

Images Style Transfer Using CNN

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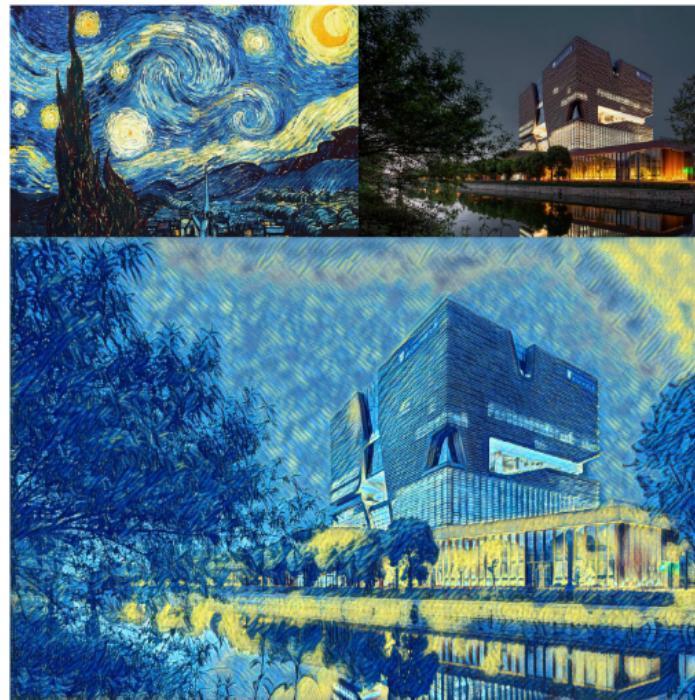
Training Data Source

Style Photo:
22 oil painting images

Content Photo:
80 thousands Photos of
figures and still-lives

Introduction

- Style transfer is the technique of recomposing original images in the style of target images.
- CNN can learn the style, content and generate new image.



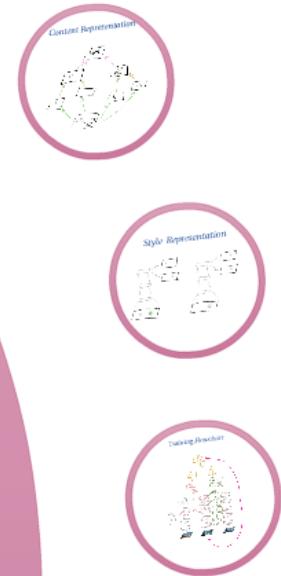
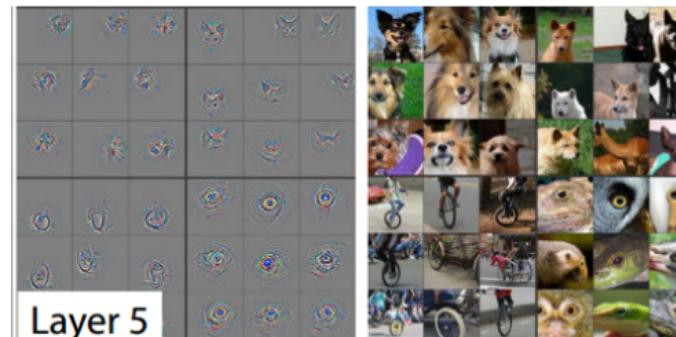
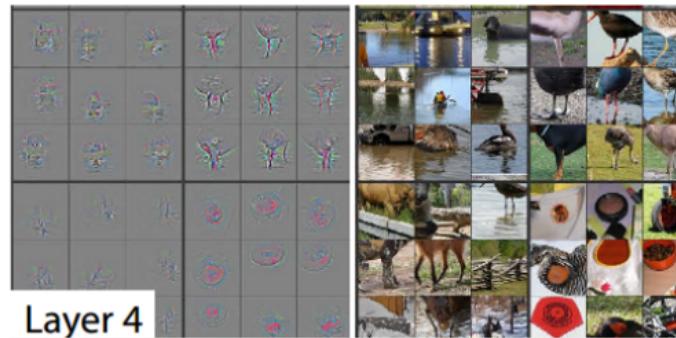
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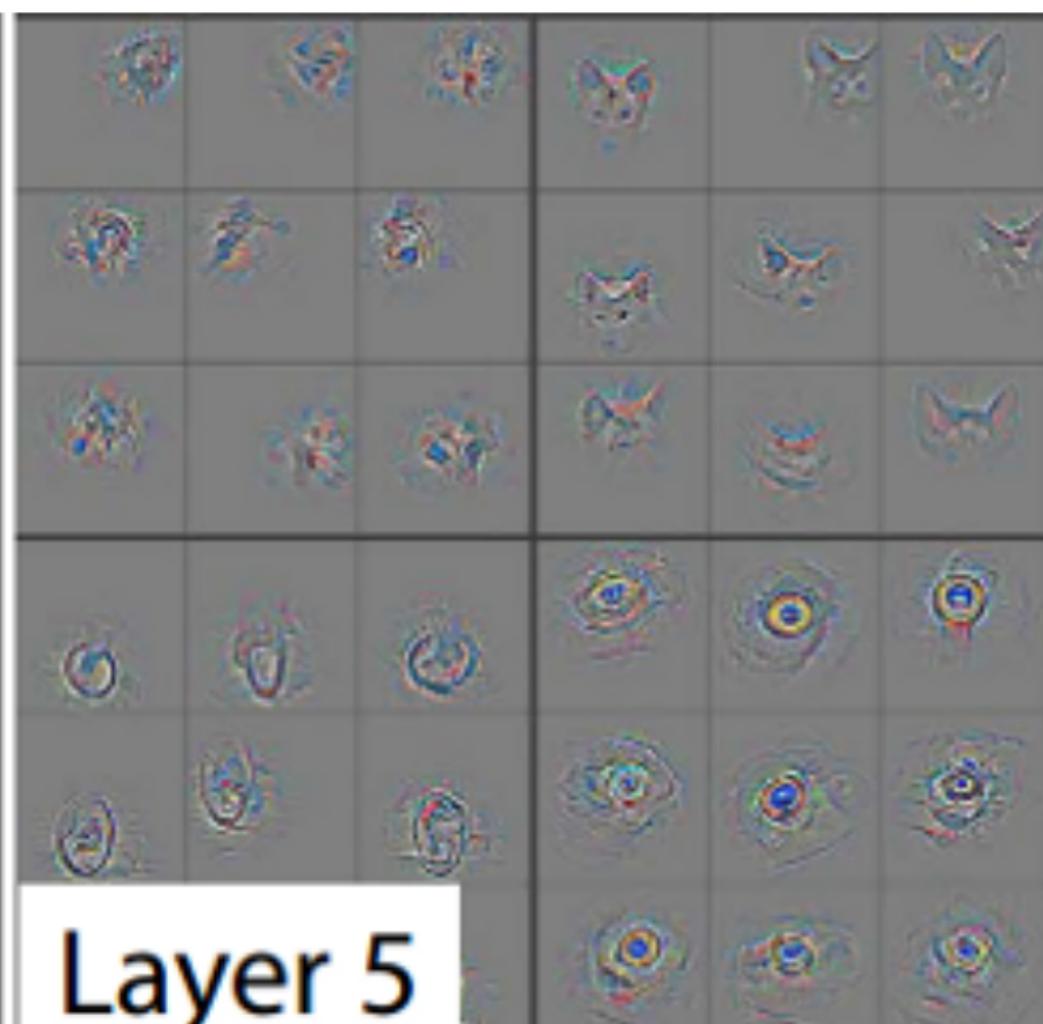
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Representation of Content and Style

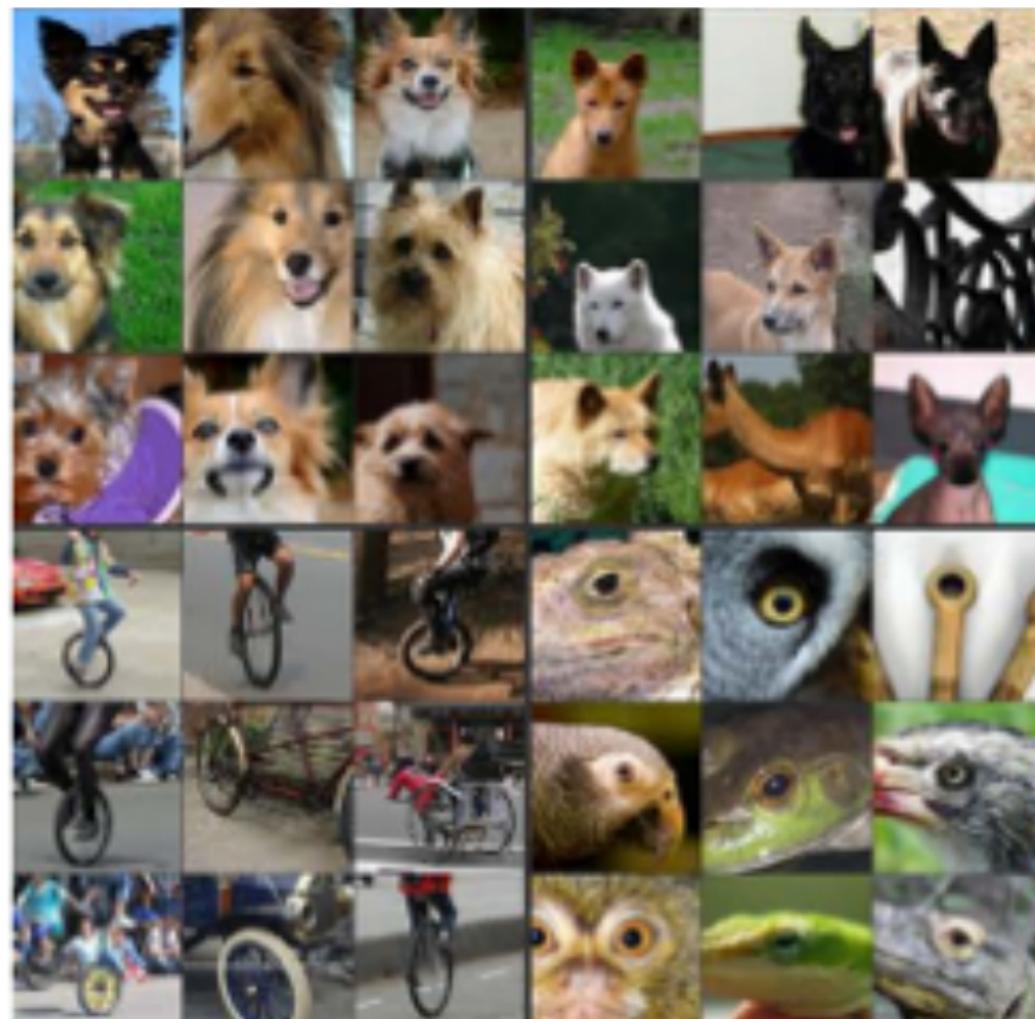
- Pre-trained deep CNN outputs high-level feature of the image.
- Higher level features approximated the objects that human can recognize.



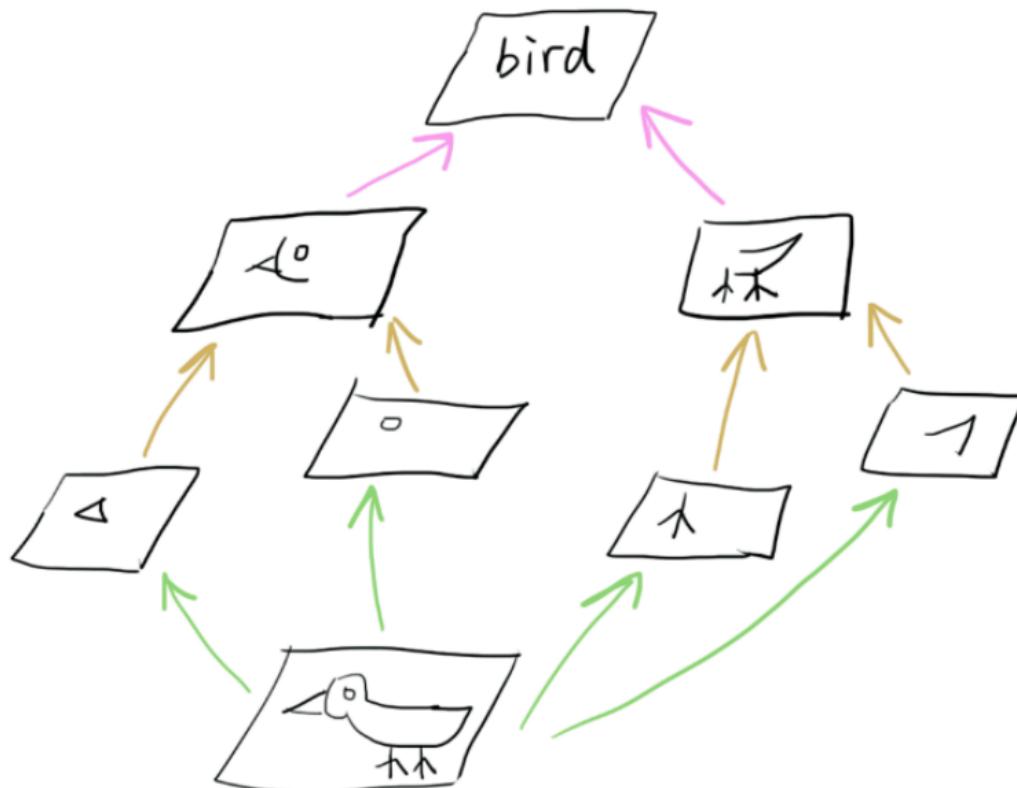
Layer 4



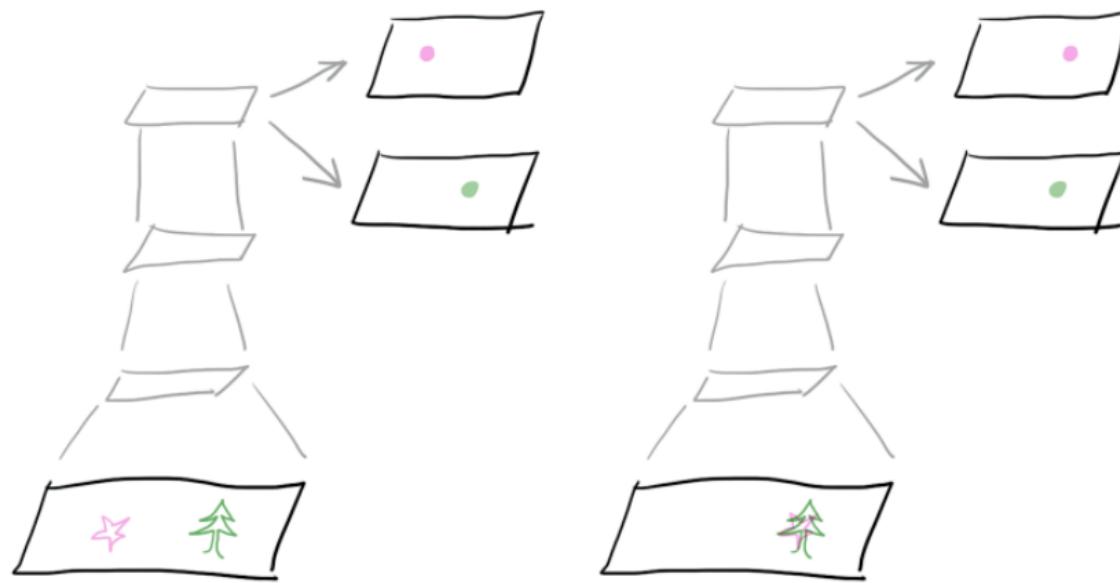
Layer 5



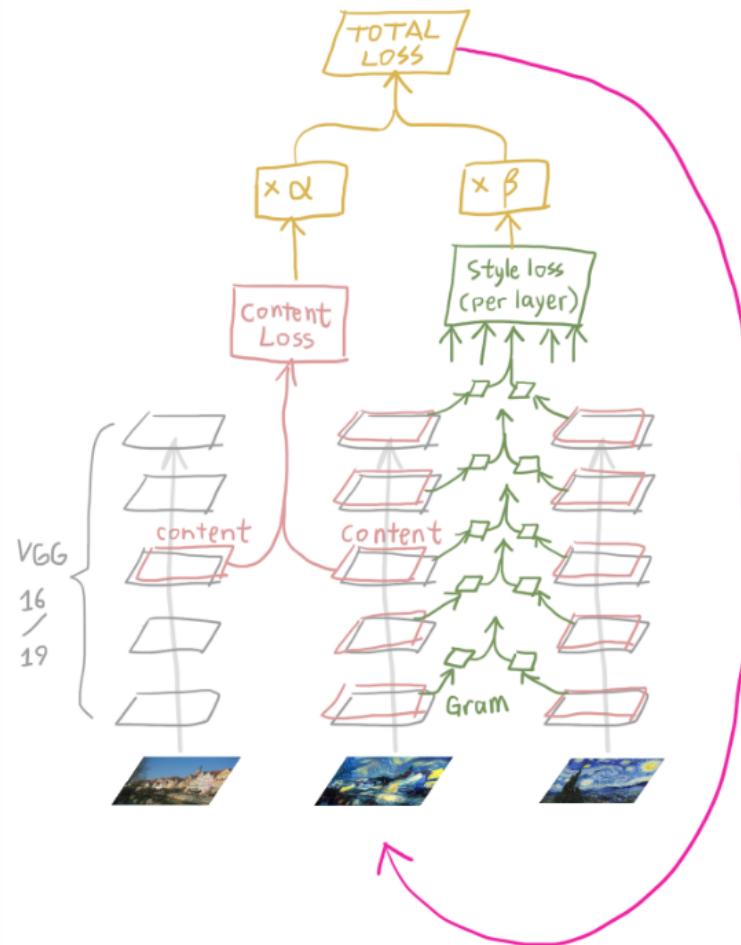
Content Representation

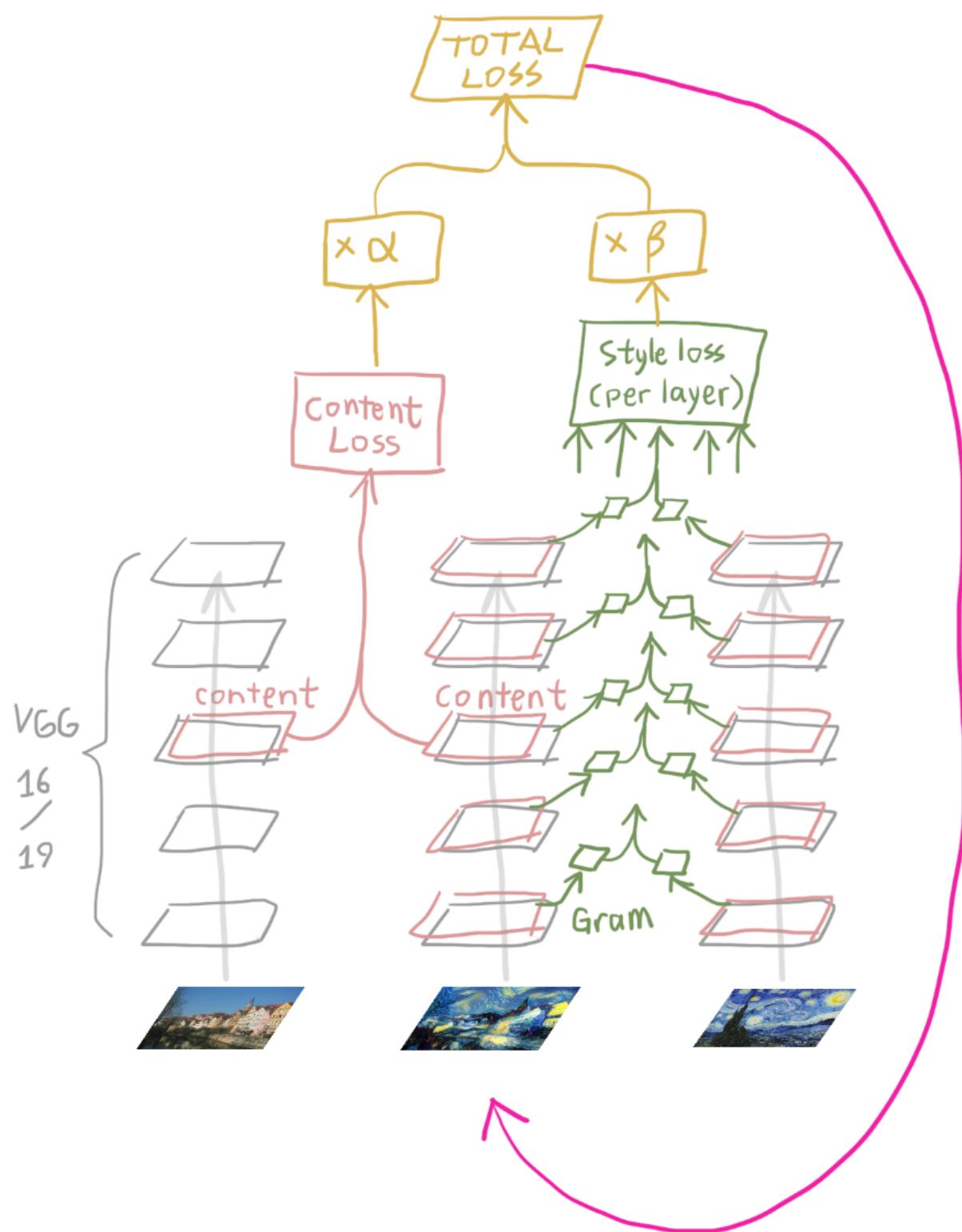


Style Representation

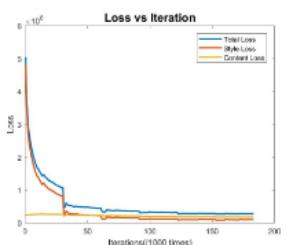


Training Flowchart



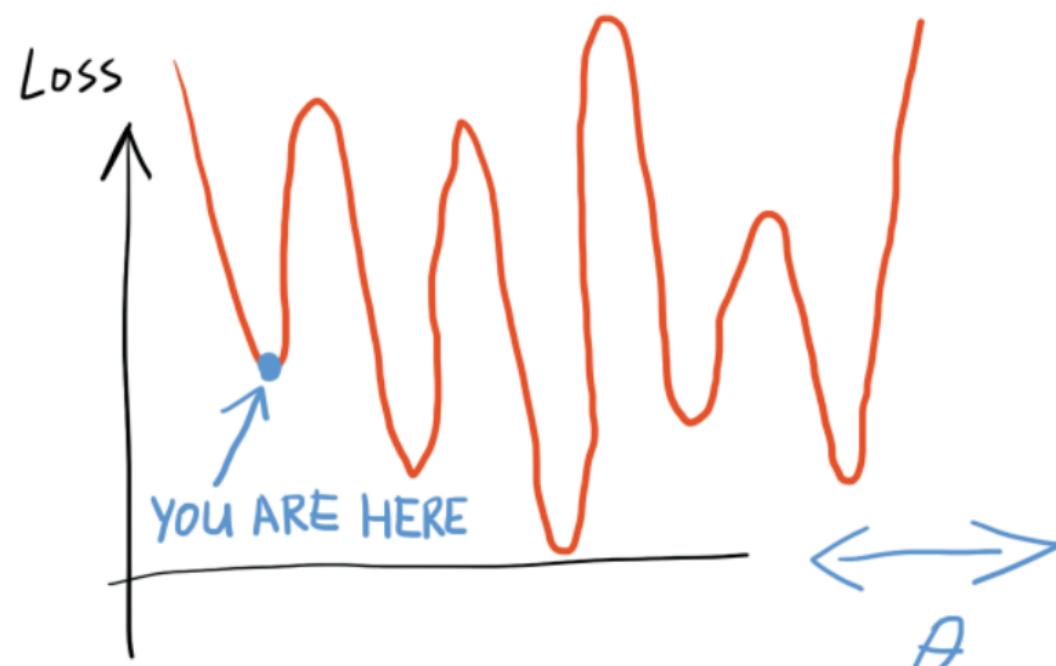


Training Loss Plot

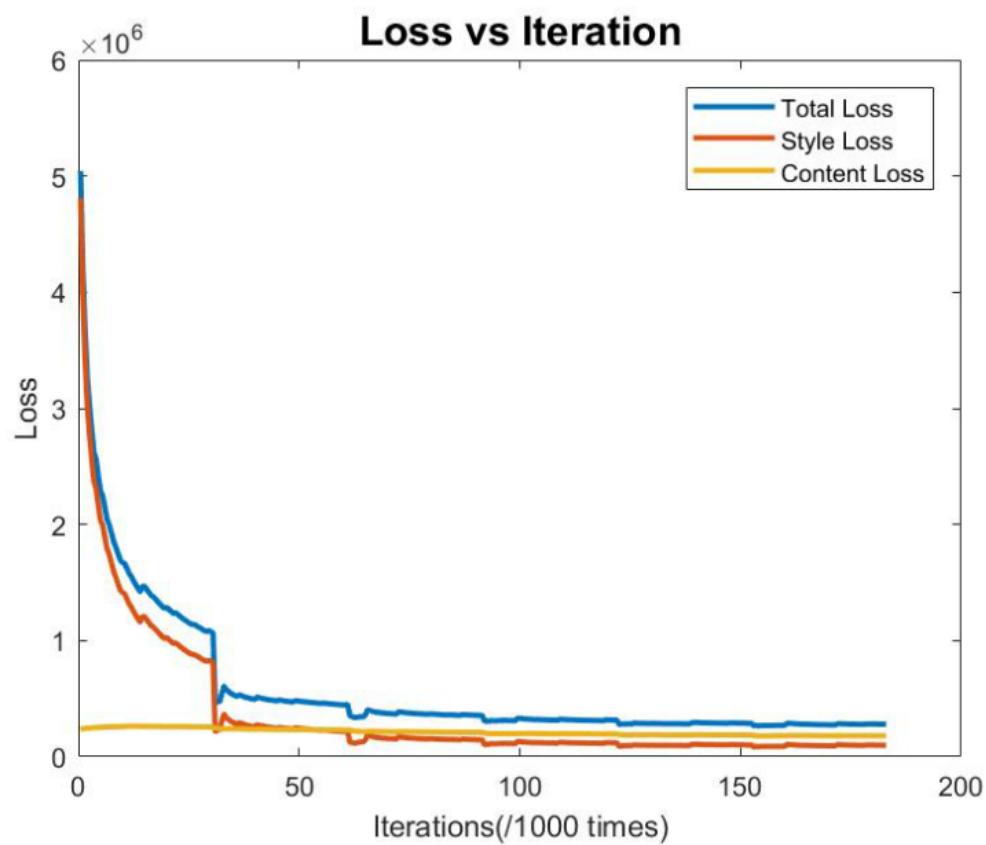


Loss Definition

Minimize: $\text{Total Loss} = \alpha \times \text{Content Loss} + \beta \times \text{Style Loss}$



Training Loss Plot



Demo

Content Image + Style Image =
Style Transfer Image

Content Video = Streaming Images + Style Image =
Style Transfer Video

Transfer Photo

Content & Style



Output



Transfer V

Original Video:

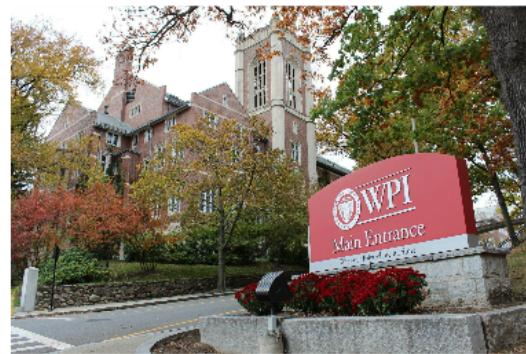


Transferred Video:



Transfer Photo

Content
& Style

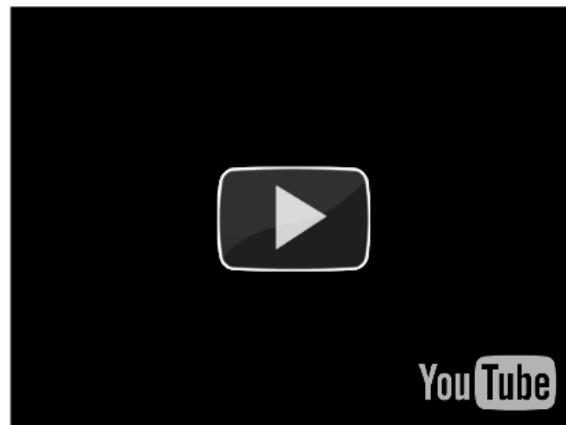


Output



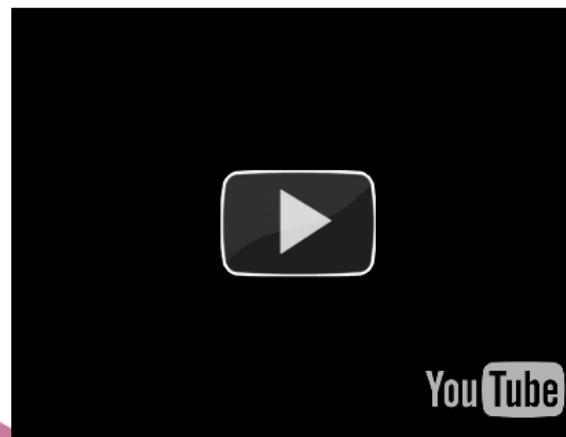
Transfer Video

Original Video:



[www.youtube.com/watch?
v=z8k4ntdx7aY](http://www.youtube.com/watch?v=z8k4ntdx7aY)

Transferred Video:



www.youtube.com/watch?v=5

Conclusion

- VGG 16 was used to extract the feature and reconstruct images.
- Minimize the total loss
- Use Adam optimizer, learning rate = 0.001
- Training the network takes very long time, a light CNN may be used for time reduction.
- The tune of parameter α and β to modify the output



Thank you

Questions & Answer