



# A NEURAL ALGORITHM OF ARTISTIC STYLE

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Paper ID: 61

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ID: 2015B4A70454P

# INTRODUCTION

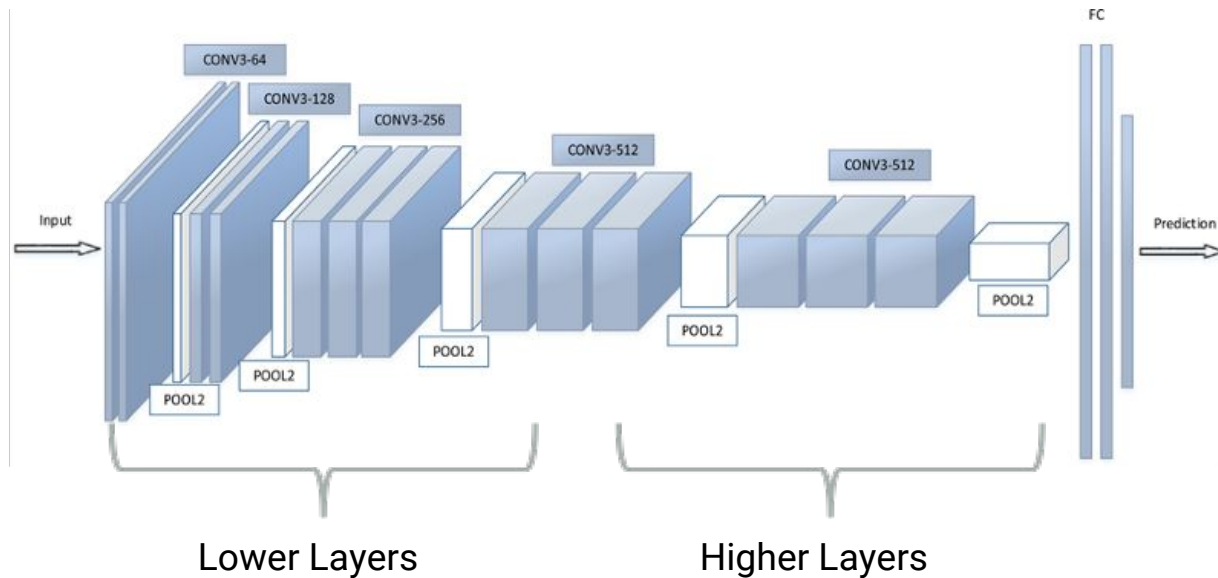


- How do humans perceive and create unique visual experiences?
- What elements of an image create these stimuli?
- Can we take help from the brain's biology?
- How do we create images with high perceptual quality?



Processing

- Objects (**Content**)
- Textures (**Style**)
- Semantic Understanding



These layers take us close to the neural representation of the image



# HYPOTHESES

- CNNs bring us closer to how the human brain perceives the image.
- Image manipulation to a greater extent is possible.
- **Style** and **Content** of an image are separable.
- We can independently manipulate these to create new **meaningful** images.
- Access to these representations is provided by the layers of the CNN.

# METHODOLOGY

- Access the '**content representation**' of the image from the higher layers of a standard CNN like **VGG**.
- Extract the '**style representation**' of the image from the different feature maps from the layers of the network.
- Find a new image that reproduces both the content and style of the image using an appropriate







# IMPLEMENTATION



## Style Representation

- Start from white noise and using gradient descent try to mimic the style of the original image.
- Find correlation matrix for each layer for feature maps in that layer.
- Minimize the difference between correlation matrices.

## Content Representation

- Use higher layers to extract content information.
- Start from white noise and using BPA try to find an image that matches feature response for a certain layer.
- Try to satisfy both content and style constraints at the same time.

# RESULTS

Turing Test Statistics:

- 45,000 people
- 10 pictures
- Average Score: 6.1
- Chance Level : 5

