

# Artistic Style Transfer Network

## Project Proposal

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### Project Description

Our project goal is to apply convolution neural network (CNN) to design and develop an artistic style transfer tool. Users will need to provide an image and select an artistic filter, and the tool will style the image by adding the chosen artistic filter to it.

It will be exciting to compare and find a proper network design for the artistic transfer tool. The transfer works by using a deep CNN trained on broad image classification dataset, like ImageNet. With the intermediate layers of the CNN, it is possible to extract both the *content* and *style* of images. Then, we can define a custom loss function that optimizes for some combination of the original image's content and the selected artistic filter's style. We can try as many different types of networks, hyperparameters, and artistic styles as possible if time allows. By the end of this project, we expect to get a network that successfully transfers a set of random images and generates into styled images efficiently with minimal noise.

We did some research on image style transfer using neural networks. We are going to take reference to the following related papers.

1. [A Neural Algorithm of Artistic Style](#)
2. [Perceptual Losses for Real-Time Style Transfer and Super-Resolution](#)

### Proposed Approaches

#### Back-end

- Use PyTorch to train image dataset. Consider if different image datasets for pretaining steps
- Find and improve a network using CNN for style reconstruction
- Consider various input image sizes, preprocessing steps, hyperparameters, and custom loss functions

Make the project cooler → Front-end: A Simple Web Interface (Live Demo)

- Input: Upload an image, select an artistic style
- Output: A stylized image for download

## Dataset

The dataset will be **a collection of images with various artistic styles** (van Gogh, Monet, ink water painting, etc.). Additionally, we'll use a standard Image Classification benchmarking dataset such as **ImageNet** to train a deep CNN. The intermediate layers of this CNN (without the fully-connected layers) will allow us to perform the content and style transfer.

## Time Schedule

Week	Task	Due Date
Week 7	Dataset preparation and cleaning	
Week 8	Finish the first basic network for testing	
Week 9	Refine and improve network. Data training	
	Develop an interactive interface for demo	
	Project milestone	November 20 11:59pm
Week 10	Model improvement and possible extensive work	
Week 11	Poster session	December 4 3:30-6:30pm
	Project writeup	December 4 11:59pm