

Abstract: Recognizing Art by Period and Movement

Advik Iyer Guha, Jessica Liang, Kevin Paeth, Ian Reardon, Ankit Shah

Many computer vision experiments seek to classify fine art paintings by their compositions (“portrait”), artist (“Da Vinci”), and style (“Renaissance”); others exist that seek to simulate or replicate given paintings. We instead sought to use machine learning and computational vision techniques to classify art paintings primarily by time period in two perspectives - **period** and **movement** - to see what statements we can make about the data and/or our tools. For example, given our tools and understanding thus far, how accurately can we classify paintings from the Impressionist period (1865-1885), and does this correlate with our ability to classify paintings from the 19th century?

Training and test data was sourced from the Metropolitan Museum of Art’s open collection of 419,000+ works. We featurized this data using Convolutional Neural Networks (CNNs) through the MatConvNet Toolbox, experimenting with two pre-trained 37 and 43 layer VGG¹ CNNs, based on Gatys et. al.² and other papers. We used around 350 images per category for century-based classification and around 2000 images per category for movement-based classification.

In a further step, we tried to “trick” our classifiers by generating images “dreamed” from other paintings. In doing so, we attempted to learn what characteristics of a painting our classifiers were sensitive to, and discern if they were actually learning the features that we perceive subjectively. If our classifier achieved good accuracy on the dreamed images, we could be convinced that the classifier was truly learning the stylistic features of movements.

¹ Visual Geometry Group at Oxford University

² *A Neural Algorithm of Artistic Style*, Gatys et. al. [arXiv:1508.06576v2](https://arxiv.org/abs/1508.06576v2)