A Neural Algorithm of Artistic Style and Classification

Final Project Proposal

Chih-Ching Chang, Junwei Su

1. Introduction

The research of visual perception of object and face recognition in computer vision area has successful progress recently. Several successful products about face recognition are widely used now. There are algorithms that can generate the content we want based on the feature learned from different objects.

However, there isn't a successful improvement on producing a content with certain kind of artistic style while humans or artists have mastered the skill. To solve this problem, we would like to utilize the learning algorithm, Deep Neural Networks, to extract and classify different artistic styles; we would like to use it to separate and recombine different images and generate a new image with selected artistic style as well.

2. Related Work

Convolutional Neural Networks is a type of artificial neural networks where it consist of layers of small computational units that process visual information hierarchically in a feed-forward manner. Recent studies have shown that this machine learning technique can produce promising results in image and video recognition applications (Krizhevsky et al., 2012; Simonyan et al., 2014; Sermanet et al., 2014). In addition to object recognition, (Gatys et al., 2015) had demonstrated that this kind of neural networks have the ability to separate an image's style from its content. In this study, you can mimic the styles of some of history's greatest painters by merging an existing photograph with a painting.

3. Technical Part

We will use VGG convolutional neural network to extract content and style in different images. The extracted feature of style images from VGG-network will be used to classify the input artwork images to different artistes. Besides, we will apply the extracted style to the target image by building the style representation on different subsets of neural network layers. This will create images with the chosen style on an increasing scale while discarding information of the global arrangement of the scene.

4. Timeline

Date	Goal
Feb 22	Search more related works, start implementing
Feb 29	Implement Deep Neural Network (VGG-network)
Mar 7	Implement Deep Neural Network / Image synthesis
Mar 14	Implement Image synthesis (if we have extra time, then do multi-style)
Mar 21	Finish basic framework for the tool
Mar 28	Finish writing Midterm Report
Apr 4	Build user interface
Apr 11	Add more features / Improve the tool / Improve UI (if at all)
Apr 18	Add more features / Improve the tool / Improve UI (if at all)
Apr 25	Preparing for Final Presentation / Writing final report
May 6	Finish writing Final Report

5. Reference
[1] L. A. Gatys, A. S. Ecker, and M. Bethge, "A Neural Algorithm of Artistic Style".
[2] Y. Shih, S. Paris, C. Barnes, W. T. Freeman, and F. Durand, "Style Transfer for Headshot Portraits"
[3] K. Simonyan and A. Zisserman, "Very Deep Convolutional Networks for Large-Scale Image Recognition"
[4] K. Siegel, "Picasso's Marilyn Monroe and Other Blends: Neural Style in TensorFlow"
[5] A. Blessing, and K. Wen, "Using Machine Learning for Identification of Art Paintings".
[6] A. Vedaldi, and A. Zisserman, "VGG Convolutional Neural Networks Practical"