Computational Photography Research Proposal

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1 Introduction

For my project I would like to look into the field of Deep Dreams/Inceptionism using as a base, Google's Deep Dream project.

Currently, Deep Dream uses a neural network to extract and enhance certain features of a photo depending on what it's been trained to look for.

2 Proposal

For my project I would like to attempt to recreate images which can be created Deep Dream however, I will try to avoid using a neural network approach since this has already been accomplished.

As a continuation, I will try to find the key-components of what makes Deep Dream produce these images and possibly create a simple filter which can be applied to any image which will create an Inceptionism effect to it.

3 Reason

The reason why I would like to solve this problem is because I personally find the resulting images of Deep Dream something incredibly interesting and unique and being able to produce images like that myself is incredibly appealing.

4 Plan

My plan for going about solving this problem is use and analyse Deep Dream to find out how/where in the neural network features are extracted and enhanced resulting in the output image.
Once I have this I will try to recreate this by either creating a filter or another machine learning model to create similar looking image.

As a starting point I am considering the use of a Sobel filter to get a representation of all the lines/edges in the image and then apply a simple linear function to apply a range of RGB colours to give an initial Inceptionism style affect.

For Machine Learning techniques, multiple decision trees could potentially work well with each model looking for particular features relating to a particular art style or features of an animal and then extrapolate where its been found in the image to create an effect. This would be similar to how the neural network of Deep Dream works.

- By October 12: Fully understand how Deep Dream works and what the important parts of the neural network are.
- By October 31: At least a basic image processing system which given an input, will output the same image in an Inceptionism style.
- By December 3: A system which can produce impressive, Inceptionism style images without using a neural network.