Project Proposal

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**Project Purpose**: The purpose of this project is to bring the beautiful anime art style into real life images. In other word I will create a specific image filter with the anime art style which can be applied to any real life images. For this project I will stick with Shinkai Makoto’s style. Shinkai Makoto is a very famous Japanese anime animator/director, he directed lots of famous anime like “Your Name”, “5cm Per Second”, “The Garden of Words”, etc.. His anime art style is very unique and characteristic, which I think is perfect for the purpose of this project.

**Background**: This project is based on exploring image transformation using AI techniques. More specifically, using machine learning, deep learning or Artificial Neural Network(ANN) to build a training model to learn the style of the specific images, and then apply that style to the other images.

**Method**: During my brief research I basically came up with 2 ways of creating this filter. The first one is using Neural Style Transfer (NST), which is a class of software algorithms that manipulate digital images, or videos, in order to adopt the appearance or visual style of another image. The problem with this method is that it can only use a**single image** as the representation of the style, which isn’t quite what I want since applying a style from a single image may not work well with different type of image content scenarios. It does seem to be less computational power hunger and easier to deal with. The second method is using Generative Adversarial Network (GAN), it’s a powerful class of neural networks that are used for unsupervised learning. How it exactly works is a bit complicating to explain here, but in short it needs a domain of images to train on and is consequently able in our case to **capture the style of the artist** in its entirety. That is exactly what I want. However, this method seems to be very computational power hungry and need lots of datasets. I’m not sure how this would work out on my current computer set up and if I can handle all these complexities. Anyway, for right now I’m thinking try both methods.

**Evaluation**: The result I want to see is how well the output images adapted the anime art style. How the different subjects in the images like animals, architectures, natural sceneries and people reflect the corresponding anime art style. I think there is no way I can evaluate its performance in a subjective way since it’s not something like a prediction model. As for the data I intend to use is going to be a large set of images from Shinkai Makoto’s anime. I can either find them on internet or manually screen shot them from the anime. The images should contain vast variety of different subjects and contents for the training purposes.

**The reason** why I’m proposing this project is very much related to my own hobbies. I’m a big anime fan and really appreciate the beautiful art style of the anime. I also like art and design, and my previous bachelor degree was architectural design. I had lots of experiences using different artistic image filters and always wonder how they were actually created. I also find there really aren’t much image filters that related to anime. That’s why I want to create my own artistic anime image filter.

This is a literature review on the topics of image style transfer, which is the core concept of my final project. This paper will discuss the basic idea of image style transfer, different approaches and methods used in some other research papers, and how I can possibly apply those ideas and methods to my own project.