# AIP PROJECT PROPOSAL

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Option – 2:

Understanding and analyzing a baseline paper and its extension and analyzing why the extension gave better performance.

## Baseline Paper:

**https://arxiv.org/pdf/1606.03073.pdf**

**Conference: ECCV 2016**

**Abstract:** In this paper, we use deep neural networks for inverting face sketches to synthesize photorealistic face images. We first construct a semi-simulated dataset containing a very large number of computergenerated face sketches with different styles and corresponding face images by expanding existing unconstrained face data sets. We then train models achieving state-of-the-art results on both computer-generated sketches and hand-drawn sketches by leveraging recent advances in deep learning such as batch normalization, deep residual learning, perceptual losses and stochastic optimization in combination with our new dataset. We finally demonstrate potential applications of our models in fine arts and forensic arts. In contrast to existing patch-based approaches, our deep-neuralnetwork-based approach can be used for synthesizing photorealistic face images by inverting face sketches in the wild.

## Extension:

**https://openaccess.thecvf.com/content_cvpr_2017/papers/Sangkloy_Scribbler_Controlling_Deep_CVPR_2017_paper.pdf**

**Conference: CVPR 2017**

**Abstract:** Several recent works have used deep convolutional networks to generate realistic imagery. These methods sidestep the traditional computer graphics rendering pipeline and instead generate imagery at the pixel level by learning from large collections of photos (e.g. faces or bedrooms). However, these methods are of limited utility because it is difficult for a user to control what the network produces. In this paper, we propose a deep adversarial image synthesis architecture that is conditioned on sketched boundaries and sparse color strokes to generate realistic cars, bedrooms, or faces. We demonstrate a sketch based image synthesis system which allows users to scribble over the sketch to indicate preferred color for objects. Our network can then generate convincing images that satisfy both the color and the sketch constraints of user. The network is feed-forward which allows users to see the effect of their edits in real time. We compare to recent work on sketch to image synthesis and show that our approach generates more realistic, diverse, and controllable outputs. The architecture is also effective at user-guided colorization of grayscale images.

## Motivation:

The main difference between traditional Convolutional Neural Networks (CNNs) and Generative Adversarial Networks (GANs) for image colorization is in their approach to generating the colored image.

CNNs are a type of deep learning model that use convolutional layers to extract features from an input image, and then use these features to classify or predict various properties of the image. When it comes to colorization, CNNs typically take a grayscale input image and use convolutional layers to map it to a colored output image. This process can be effective but may not always produce the most realistic or visually pleasing results.

On the other hand, GANs are a type of neural network architecture that use a generator and a discriminator to produce realistic outputs. In the context of image colorization, the generator takes a grayscale input image and attempts to generate a realistic colored output image. The discriminator then evaluates the realism of the generated output image and provides feedback to the generator, which then improves its output. This process continues until the generator produces a colored image that is deemed realistic and visually pleasing by the discriminator.

**Overall, GANs may be better suited for image colorization tasks as they are designed to generate realistic and visually pleasing outputs, while traditional CNNs may be limited in their ability to produce nuanced and visually appealing colorizations.**