Paper reports – Mohammad Osoolian

Paper Title: Image Synthesis with a Single (Robust) Classifier

Paper Link: [\[1906.09453\] Image Synthesis with a Single (Robust) Classifier (arxiv.org)](#)

Submit Date: 6 Jun 2019

What is paper about: This paper discusses the tradeoff between adversarial robustness and shows some advantages of robust models in being human understandable

Abstract:

The article explores an innovative approach to address complex challenges in image synthesis using a fundamental classification framework. Unlike existing advanced methods, the approach introduced in the article is notably straightforward, relying on a single, readily available classifier to tackle various image synthesis tasks. The key aspect of this approach is the training of the classifier to possess adversarial robustness.

Background:

- Image Synthesis
- Adversarial Robustness
- Image generation techniques
- Image manipulation techniques

Challenge:

Traditional approaches in image synthesis often require intricate models and techniques tailored for specific tasks. This article seeks to overcome this challenge by demonstrating that a single, off-the-shelf classifier can be used for a range of image synthesis tasks

New Ideas:

A single, off-the-shelf classifier, trained to be adversarial robust, can be used for variety of Image Manipulation and Image Generation tasks. That is based on the idea that adversarial robust models generate meaningful instances of classes by maximizing the loss on an input class.

Results:

The article provides some techniques for Image Generation, Inpainting, Super-resolution, Painting with features, Image Translation and Sketch-to-Image.

The results are not perfect and can be improved. However, they are pretty good for just a single robust classifier.

My Idea for the challenge:

To simplify the Image Generation processes, it is a good Idea to develop frameworks and new algorithms for each of Image Manipulation tasks. The goals of each task differs from others Therefore, we can work on each task separately and optimize it.

My Idea to improve this article:

Image generator and Sketch-to-Image techniques of this robust classifier could be used in data augmentation.