GAN Image Generation

Introduction

At its simplest level, a **GAN** is a machine learning model that generates new data based on the dataset that is given to it. It consists of two neural networks that constantly compete with each other: the **Generator** and the **Discriminator**. If the dataset given to the GAN contains images (data like music, text, and videos can also be given), the generator will create a new image that looks real, while the discriminator will try to distinguish the images from real images to images the generator has created. And depending on whether the discriminator can distinguish between real or fake, both of the networks receive feedback on whether they succeeded or failed and use that feedback to improve themselves.

Experiment Summary

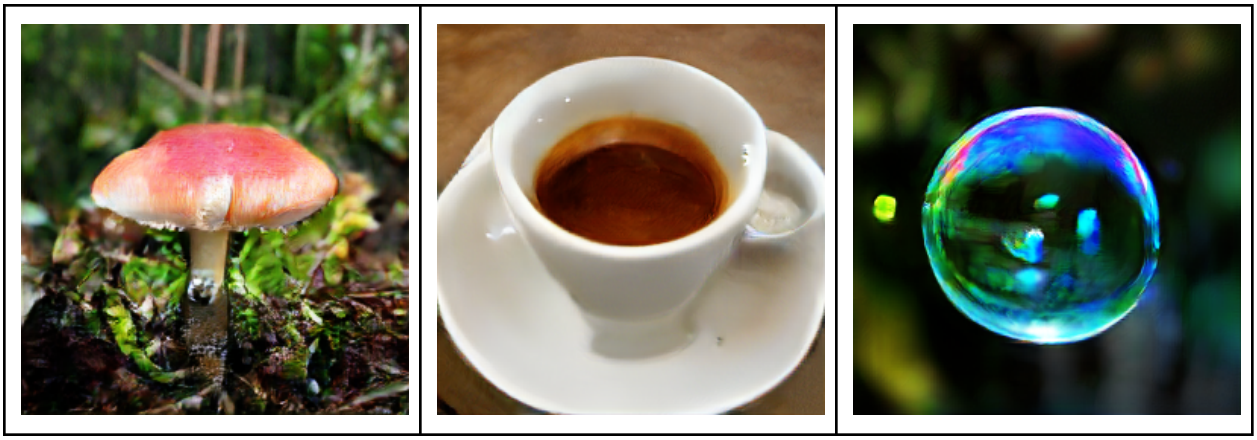
This experiment used the 256x256 resolution pytorch-pretrained-BigGAN to generate images. On each run, three images are generated, which consist of a soap bubble, a coffee, and a mushroom. And depending on the truncation value, the output will generate different outputs.

Observations

As stated in the experiment summary, changing the truncation value will cause the program to generate different outputs for each of the three specified images. A higher truncation will generate a more unique output with the cost of realism and adding distortions, but a lower truncation value will generate a much more realistic output, with the cost of generally providing the same image.

In this set of images, the truncation value is set at 0.9, so the generated images are much more diverse with their output.

In this set of images, the truncation value is set at 0.1, so the generated images are more realistic with the side-effect of less diverse image outputs.



Reflection

I've learned that GANs generate images and provide a more realistic output by using some form of self-reinforcement. They also come with the downside of needing large amounts of data to train and provide good results. But at the same time, even if given a large dataset, the generator typically provides the same type of output even considering the large amount of examples to look over in a specified dataset.