Artificial Intelligence As Tools for Artists

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Abstract

The use of artificial intelligence (A.I.) image synthesis has developed rapidly within the past few years. Our goal in this study was to understand whether or not these new technologies are a necessary skill for future artists to utilize and understand. We employed Stable Diffusion, a recently developed model that utilizes generative adversarial networks to produce high-quality images based on text or image prompts. Our study further explored how the generated images can be utilized in more complex production chains. This included generating holographic animations with a Looking Glass device as well as stereoscopic imagery for virtual reality headsets. We were able to produce visually pleasing results through our use of these various technologies that would have been incapable without their existence. However, we found that the generated imagery is heavily dependent on one's ability to create thorough prompts tailored towards each model. Apart from that, the generated images provide lots of utility as inspiration or reference material for artists' other creative ventures. Overall, we feel that A.I. image synthesis has vast potential as a versatile tool that artists can use to achieve various artistic goals. As well, that prompt engineering is a skill that many artists should learn to utilize effectively moving forward.

Background Information

Our goal with our research was to explore potential use cases of A.I. image synthesis and how it could be utilized in a useful manner by artists. Image synthesis involves creating new images with artificial intelligence algorithms, commonly done with Generative Adversarial Networks (GANs). GANs use two neural networks, a generator and a discriminator, to create realistic images. The generator produces new images while the discriminator evaluates if they are real or not. Through adversarial training, the generator learns to create high-quality, desirable images.

Stable Diffusion is a newer method that improves upon traditional GAN models. It uses diffusion to generate images, gradually diffusing an initial random noise image into a target image through multiple iterations using a multi-dimensional vector space called latent space. To guide the generator towards a desirable image, Stable Diffusion employs a second natural language model that transforms text inputs into a desired point in latent space. Once the final point is determined, it is decoded into a displayable image.

Methods

In order to explore image synthesis and it's use cases, we utilized a handful of different technologies:

1. Stable Diffusion - The text-to-image model being utilized to generate imagery from text prompts.

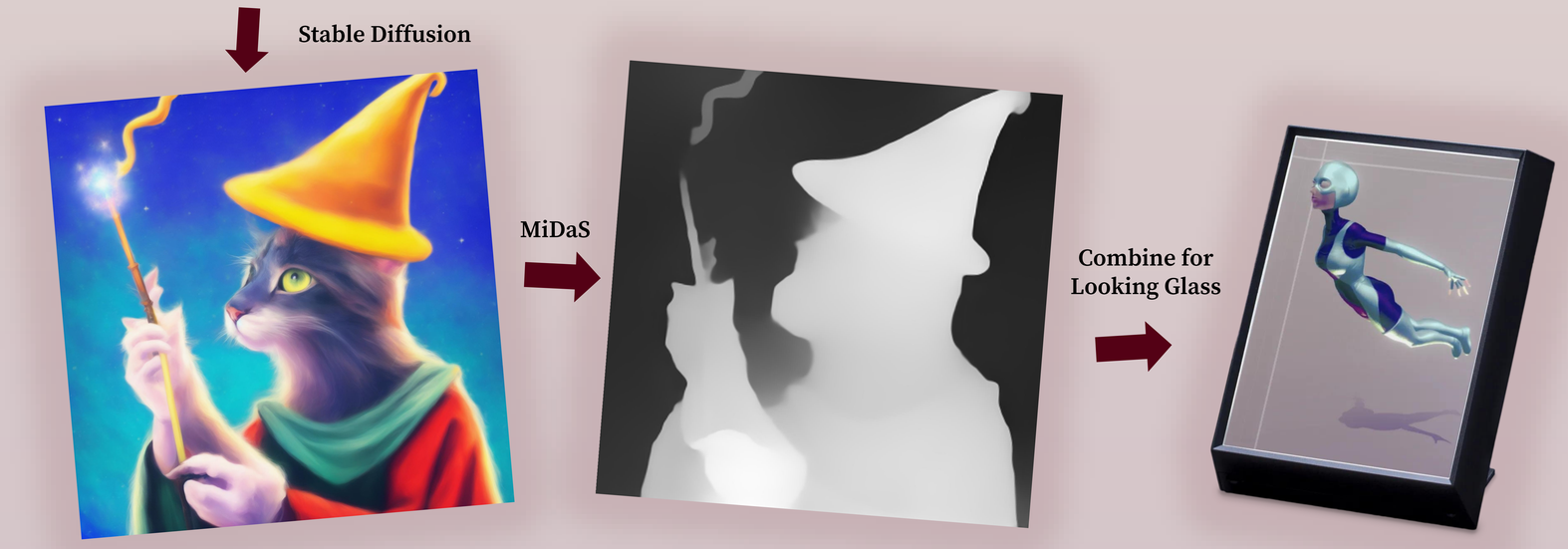
2. Google Colab - Colab is a service from Google that provides the ability to run python (Jupyter) notebooks in the cloud, utilizing their powerful GPUs to process the images rapidly.

3. Deforum - A python notebook created by the A.I. art community that provides powerful functionality on top of the traditional Stable Diffusion toolchain. This gives the ability to create animations and much more control over the final image.

4. MiDaS - A machine learning model that estimates the depth found in any given image and provides an output image that represents depth through a white-to-black color gradient.

Through all of these different technologies, we were able to create holographic animations using a device called a Looking Glass. As well as create stereoscopic 360° imagery.

A feline wizard wearing a pointed wizard hat casting a spell with a wand, high fantasy, stylistic oil painting, vibrant



Discussion

A.I. image synthesis can be an immensely powerful tool for artists moving forward. In its current state, the images generated by tools like Stable Diffusion are able to synthesize images with great fidelity and character. Additionally, their outputs could be utilized in more intricate production chains such as with our Looking Glass showcase. However, there are shortcomings in terms of the amount of control the artist has over the final image. Though, this lack of control could be harnessed to provide artists with a source of inspiration and reference material. Overall, image synthesis is a tool that artists can utilize within many different scopes.

References & Acknowledgements

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