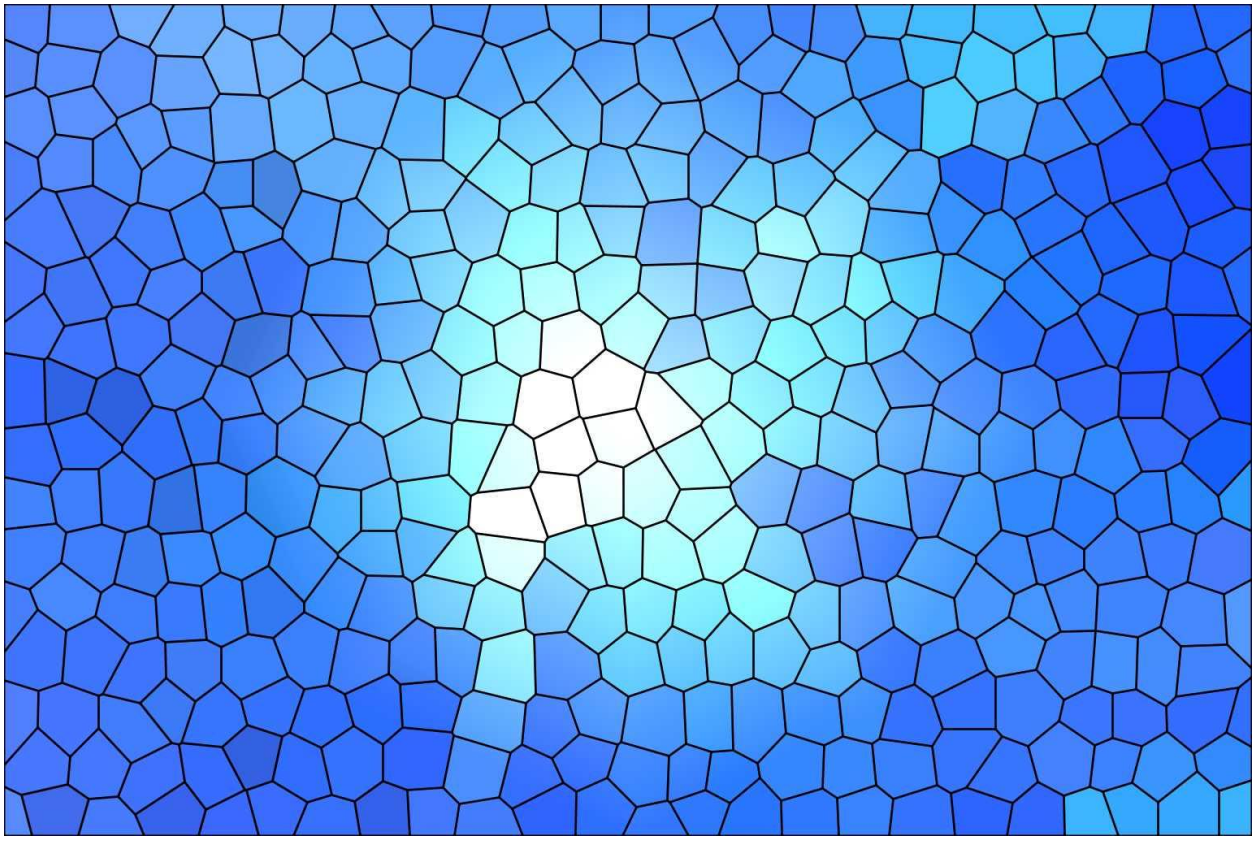
Neural Style Transfer

My project aimed to use neural style transfer to transfer the texture of glass onto a plastic water bottle. The idea was to create an image of something with a different material than it would normally have.

https://github.com/titu1994/Neural-Style-Transfer

I worked off of titu1994's implication to create the images. It uses on VGG 16 or VGG 19 (depending on user choice) for the model type which it derives its weights from.

The mask uses a black and white image as seen above to determine what the style will affect. Everything in white is affected by the style, while everything in black is not. This allows for the preservation of the main subject while changing the surroundings. This can also be used in the opposite ways as I attempted in my project.

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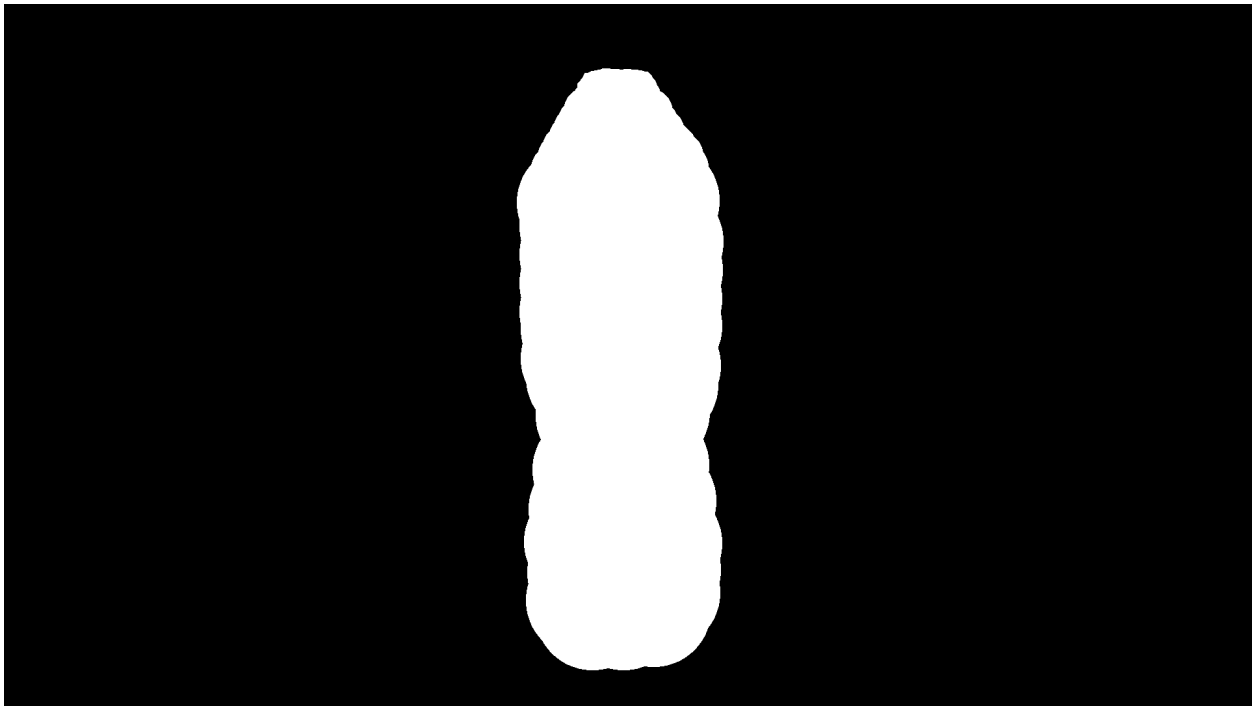
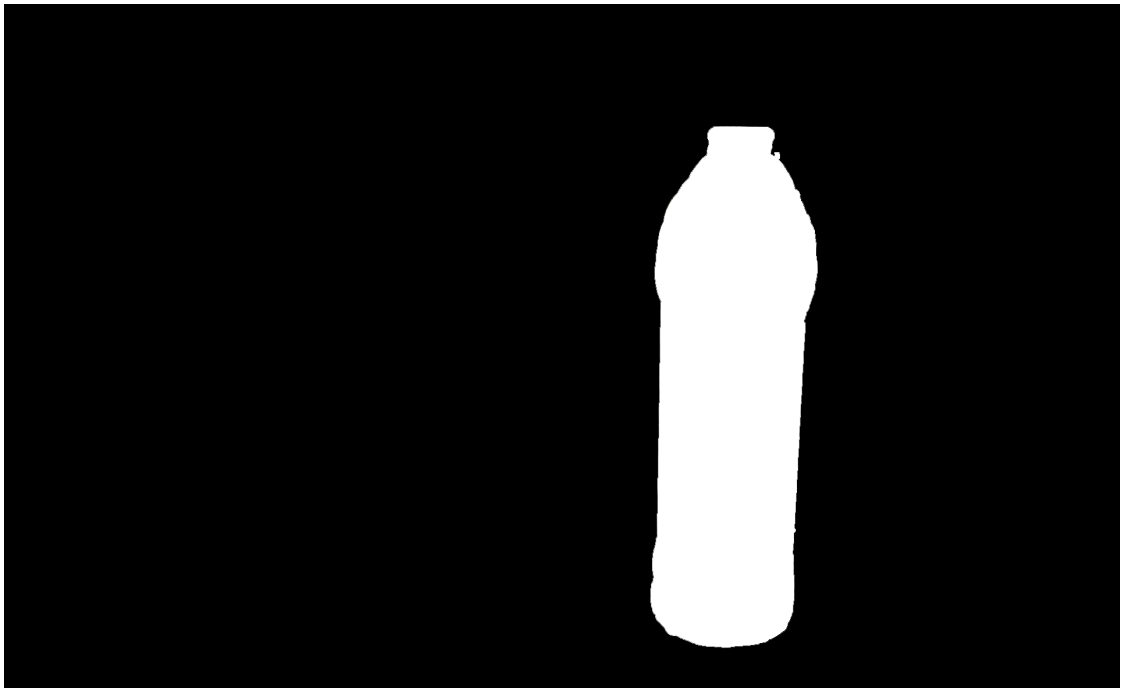


The bottle is marked in white while the background is marked in black. This is to restrict the style to only the water bottle, as the idea was to make only bottles have a material change.


CHOOSE



This is done again, but this time on a bottle of a different material as well as a different style. This was done to create more variety in the outputs.

Some of the troubles I faced while doing this project was trying to get the model to work properly. The required dependencies were difficult to get on Windows so I switched to colab. This also proved to be a challenge as for some reason the colab also wouldn't work and also lacked the mask transfer. So I ended up building a virtual machine with Ubuntu installed to try and work things out there. This seemed like it would work fine, but again I encountered some issues.

The original code for this was built in 2016 and a lot of the code hadn't been updated since 2018. This meant that a lot of the requirements to run this code were based on older versions. Namely scipy and PIL. The project used scipy.misc.imread , scipy.misc.imresize , scipy.misc.imsave. All of these are no longer a part of scipy and PIL, which was supposed to allow those to still work, had changed to Pillow and also didn't work.

Another problem arose with the script helper that came with everything. This was designed to make getting an output easier, but needed a python.exe to run, which didn't exist on Ubuntu.

And I couldn't build to Windows as Windows required Theno to be set up which needed Cuda and cuDNN. cuDNN required an Nvidia Dev account, so I couldn't get it.

This problem also meant that the mask function wouldn't work in colab, or at least I couldn't seem to get it to work.

Unfortunately, this meant I would not be able proceed with the original plan and use masks to apply the style to the bottle only.

I went through multiple installations of ubuntu and windows as well as variety of other models such as https://github.com/cysmith/neural-style-tf by cysmith and https://github.com/leongatys/PytorchNeuralStyleTransfer by leongatys. Both held similar issues to the other model so I'm left with just a mass application of the style to the images.