ART AND MACHINE LEARNING
CMU 2022 SPRING
**PROJECT 2**

# Abstract Basquiat Art

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## DESCRIPTION

In this project, I worked to create new Basquiat style art. I initially wanted to do this through the use of a VQ-VAE, however, ended up using a DCGAN to generate new abstract art and couple this with DeepDream to overlay the style of the newly generated art onto existing Basquiat pieces. This change had to be done due to there not being a preexisting Basquiat art dataset which consisted of enough images to train either a GAN or VQ-VAE.

### Concept

I have always found Basquiat's art style to be quite captivating. It blends childlike-imagination with more complex traits from expressionist art. I find this combination to be quite fascinating and wanted to know if it would be possible to recreate this style of art. Having come across data limitations, I then wanted to understand how the introduction of a new artistic style would transform Basquiat's current work.

### Technique

To first generate the stylistic image, I trained a DCGAN on the Kaggle dataset 'Abstract Art Gallery'. Training was done for 100 epochs with an adaptive optimizer to ensure neither the generator nor discriminator trained too fast. After training, an image was sampled from the generator and used as the 'style image' in DeepDream's DeepStyle model. For the base image, I chose a Basquiat style with some whitespace in the background to allow for the resulting image to have some influence from the newly generated abstract art without the resulting piece becoming overwhelming. Also, I like dinosaurs so I had some personal preference towards the chosen piece.

### Process

My first attempt at this project revolved around using Vector Quantised VAEs. VQ-VAEs use a discrete latent space as opposed to continuous. They have been used as generative models for images and audio and the discretization of the latent space has led to interesting phenomena. For example, training two VQ-VAEs on audio snippets from two different speakers and using the encoder from one model and decoder from another was found to preserve the text content of the speech, but in the voice of the model from which we selected the decoder. This suggests that the latent space represents important, interpretable features. This idea was further supported when, for audio samples, the latent space features corresponded with phonemes and partial words [1]. I hoped that using such a model would allow me to capture interesting aspects of Basquiat's style in the discretized latent space. Unfortunately, data restrictions led to me training a GAN on abstract art and pivoting more towards modifying existing Basquiat pieces.

### Reflection

(You may write why the below final result was chosen among your results, how satisfied with your ideas and techniques for this project, any new ideas that came into your mind in the process, any thoughts on trials and errors, and/or what you have learned etc.)

I am somewhat satisfied with the outcome of my project. I think the final art piece that I showed represents an interesting blend of Basquiat's style with abstract art. I would have liked to have a specific Basquiat dataset which would have given me more flexibility in terms of using various models to generate new Basquiat-style art. I think it would have been interesting to experiment with training two VQ-VAEs, one with abstract art, another with Basquiat's art, and taking the encoded Basquiat art and using the decoder for the abstract art. It would be interesting to see what components of Basquiat's art are maintained through the encoder/decoder transformation.

## RESULT

The final result was an interesting blend of Basquiat's neo-expressionist art and abstract art. I think it was insightful to see how people often need to deal with data limitations when it comes to using GANs in the real world. Understanding how they are used theoretically and transforming that to real results can often be hindered by such data limitations.

## CODE

https://github.com/varun646/ArtMLProject2

## REFERENCE

[1] Oord, A. van den, Vinyals, O., & Kavukcuoglu, K. (2018, May 30). *Neural Discrete Representation Learning*. arXiv.org. Retrieved February 28, 2022, from https://arxiv.org/abs/1711.00937