Capstone Project II: Implementation: ArtiGaN

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**1. Vision statement**

Arti-GaN is an Artificial Intelligence-based Image Generator. Using Generative Adversarial Networks and small datasets of images, we are able to create an AI capable of generating similar, but unique images, and through human interaction train those same AI’s to generate more aesthetically pleasing images.

**2. Introduction**

For our product, we intend to use a Generative Adversarial Network (GaN) that can synthesize new aesthetic images (though research may lead us down a different path by which to accomplish what we want). We will train the GaN to achieve this by taking in a dataset of images and outputting a new, but unique image. Users will be able to go to the website and will be presented with a sample image generated by the GaN that we trained.

**3. Component Overview**

1. Website
2. GaN

**4. Tool overview**

1. Angular
   1. Used as the framework for the website
2. Node.js
   1. Used to run the website
3. TypeScript
   1. Used to code in the Angular Framework as the ‘Backend’
4. HTML
   1. Used as the front end of the website to display what was done on the Angular framework
5. CSS
   1. Styling language used for HTML
6. Python
   1. We used python for the backend to create the script for our GaN to train on and generate images.
7. Tensorflow
   1. Used to create Neural Networks. We used this to create our GaN.
8. Numpy
   1. Used to store and manipulate images in a simple way to train the GaN.

**5. Project Repository**

<https://github.com/IUS-CS/Capstone-Project-Arti-GaN/tree/main>

**6. Installation for new install**

Our project was more of a research project, so some of the software will not be made available for people to install. There were some security concerns when it came to abusing the GaN to generate harmful images. This guided our decision to not allow direct access to the GaN, only to the website to see the progress the GaN was making.

**7. Further development statement (if I had another year to do this I would …)**

If we had more time, we would continue to make changes to the GaN to get better results. We would also start utilizing alternative datasets. As we moved further along in the project, we realized processing images bigger than 64x64 pixels was not very feasible using our current hardware. In the future, we would want to get access to better machines that could handle larger images/input sizes and do so at a faster rate.   
 Also adding more interactivity with the website to help train the model of the GaN such as allowing users to see an image outputted by the GaN and give feedback of whether or not they thought the image was aesthetically pleasing or not.

Extra time would also allow us to experiment with different external systems, such as Ru-dalle in hopes of getting better results/more complex systems for interaction and image generation, like Ru-dalle’s text-seed feature.