

# GENERATIVE ADVERSARIAL NETWORKS

Jasmine Bilir

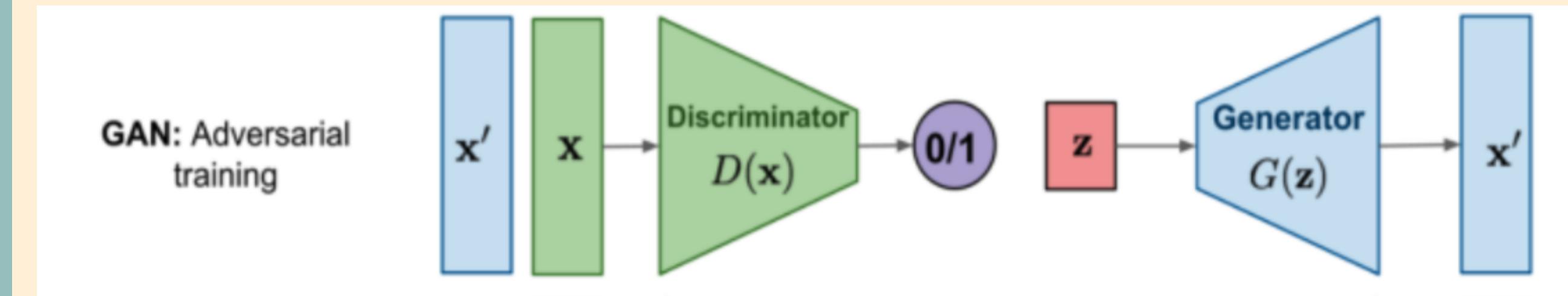
[GitHub: jasminebilir/Ferris-GAN](#)

## Conceptually covered in Lecture 14

Building off knowledge from assignment 7

[Image from Lecture 14](#)

# CLASS CONNECTION



- Composed of Generator and Descriminator CNNs
- Generator receives noise input and creates a fake image
- Descriminator receives generated / real images and must label
- Train against each other
- Based my network structure off of the work done in assignment 7 as well as DCGAN Structure



Chihuahua or Blueberry Muffin Meme

# PRELIMINARY EXPLORATION

## MNIST Data Set

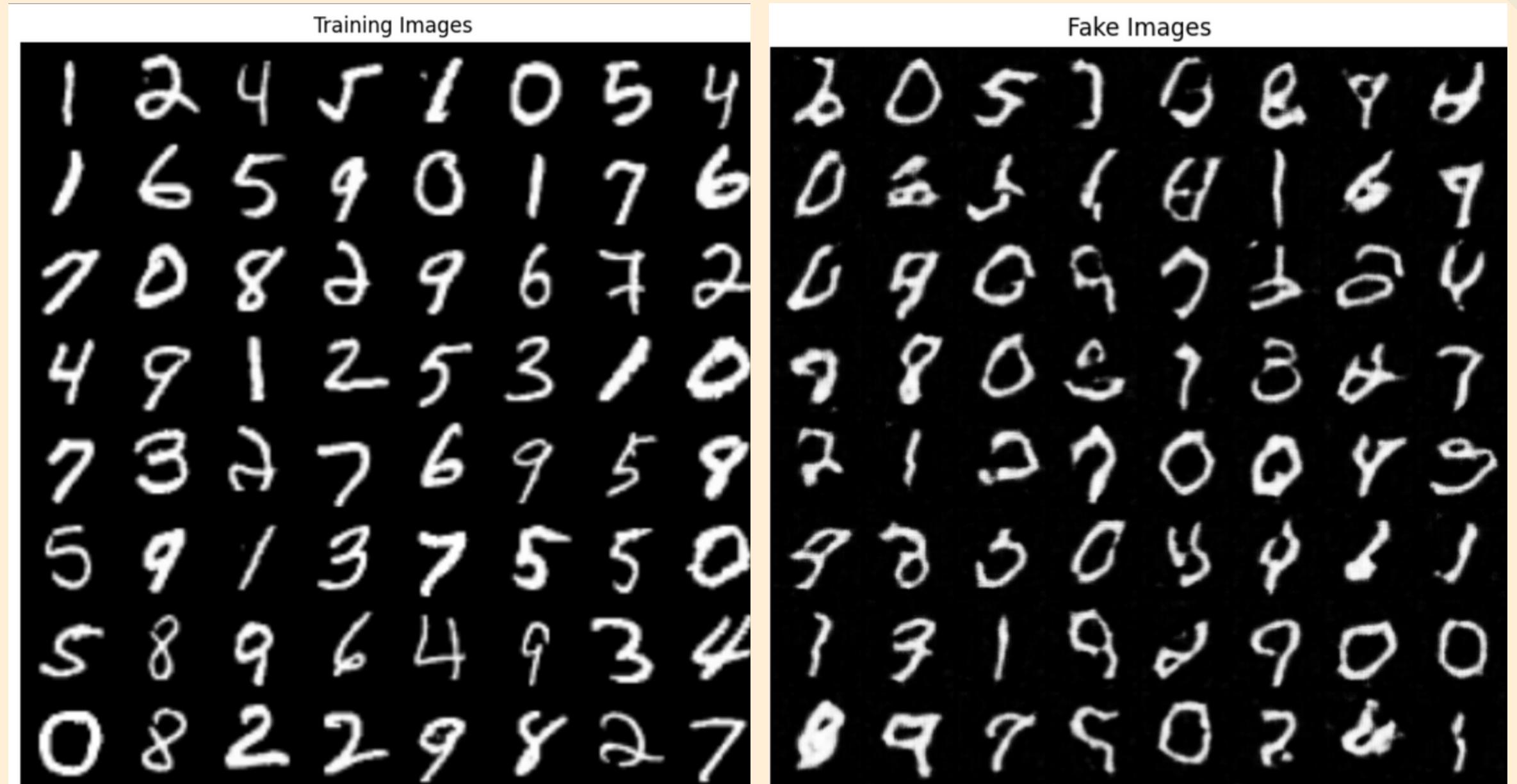
Utilized open source data set typically used for classifying handwritten digits.

Pros:

- Grayscale and small file size
- 60,000 available examples

Training involved

- Learning Rate of 2e-4
- Training Epochs 10
- Adam optimizer
- BCE Loss Function



# NETWORK STRUCTURE

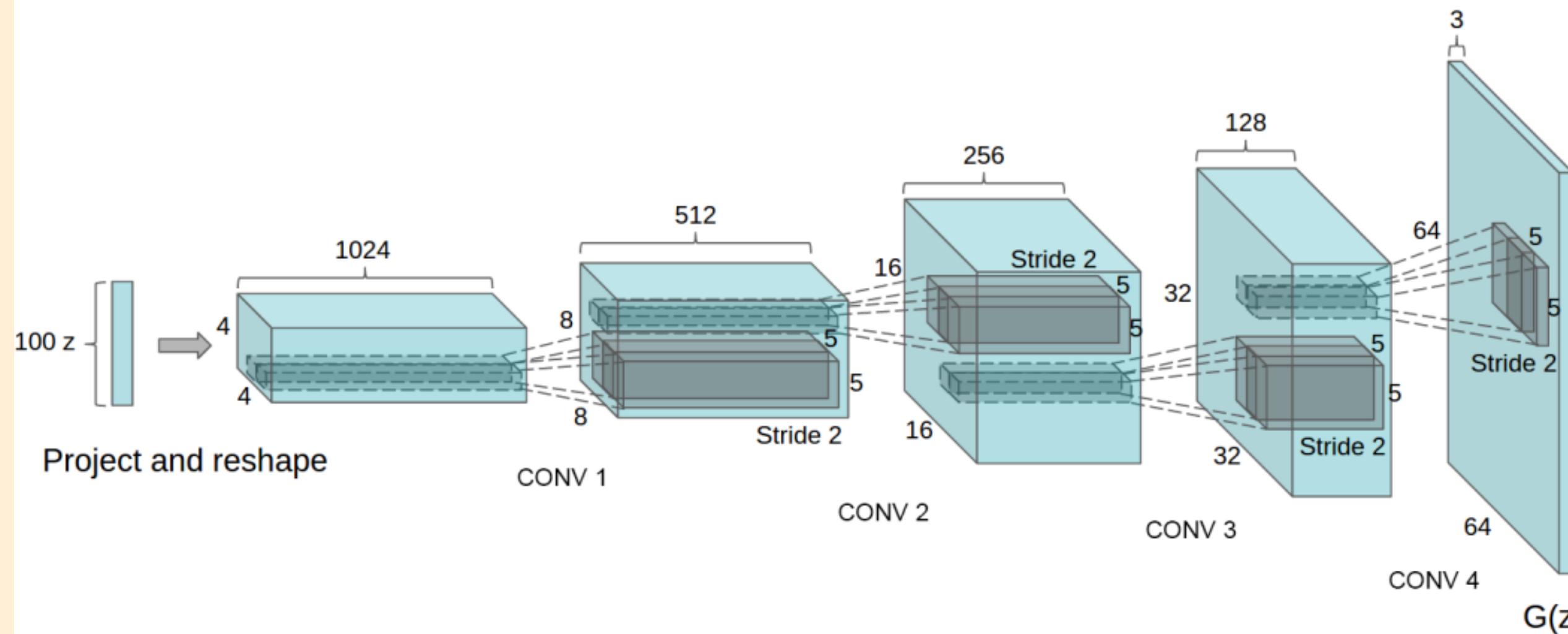
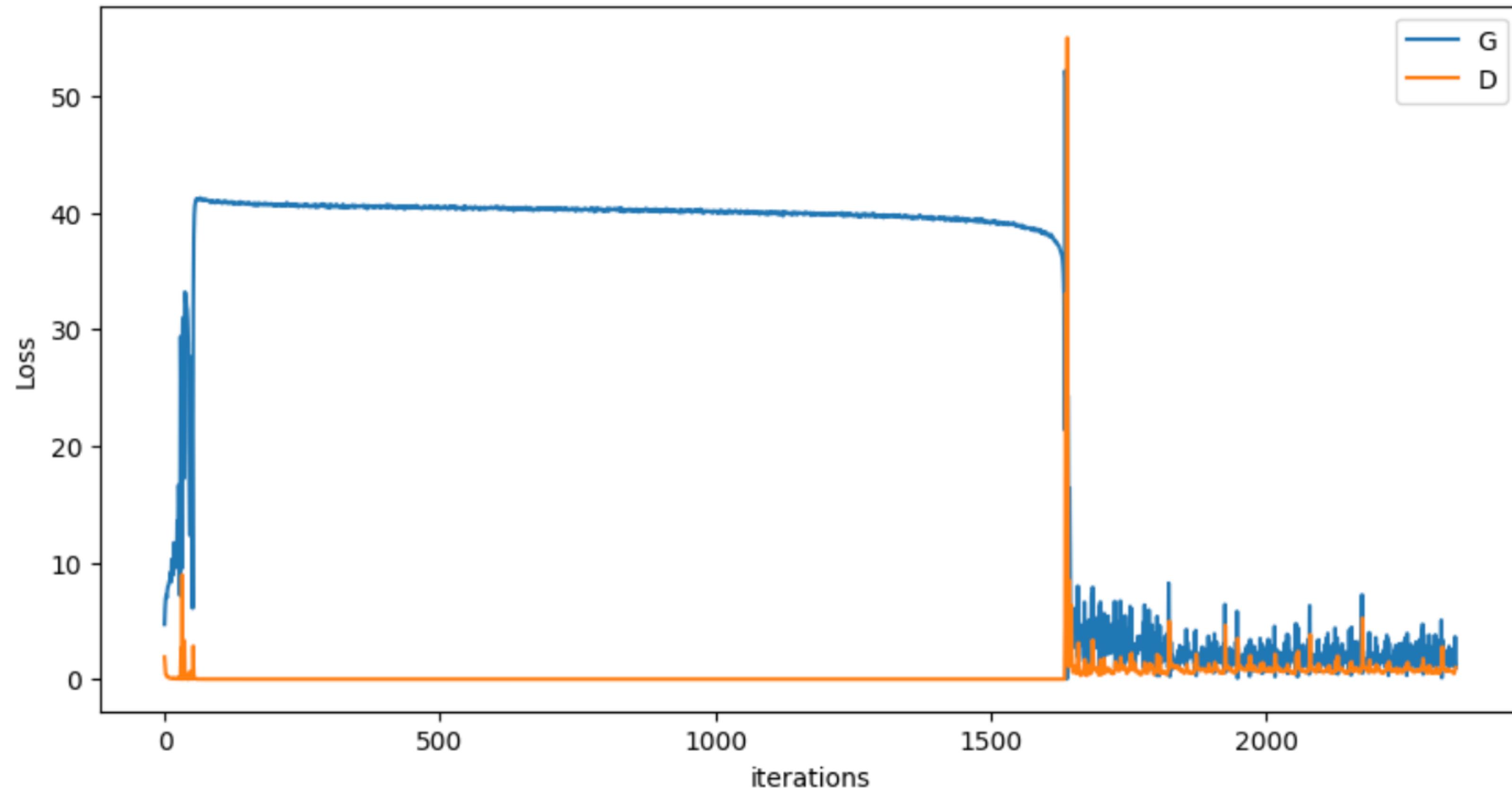


Image and Architecture

## Generator and Discriminator Loss During Training



Convergence indicates adequate training

# REPLICATING FERRIS

## Ferris Data Set

Developed personalized dataset using family photos

### Characteristics

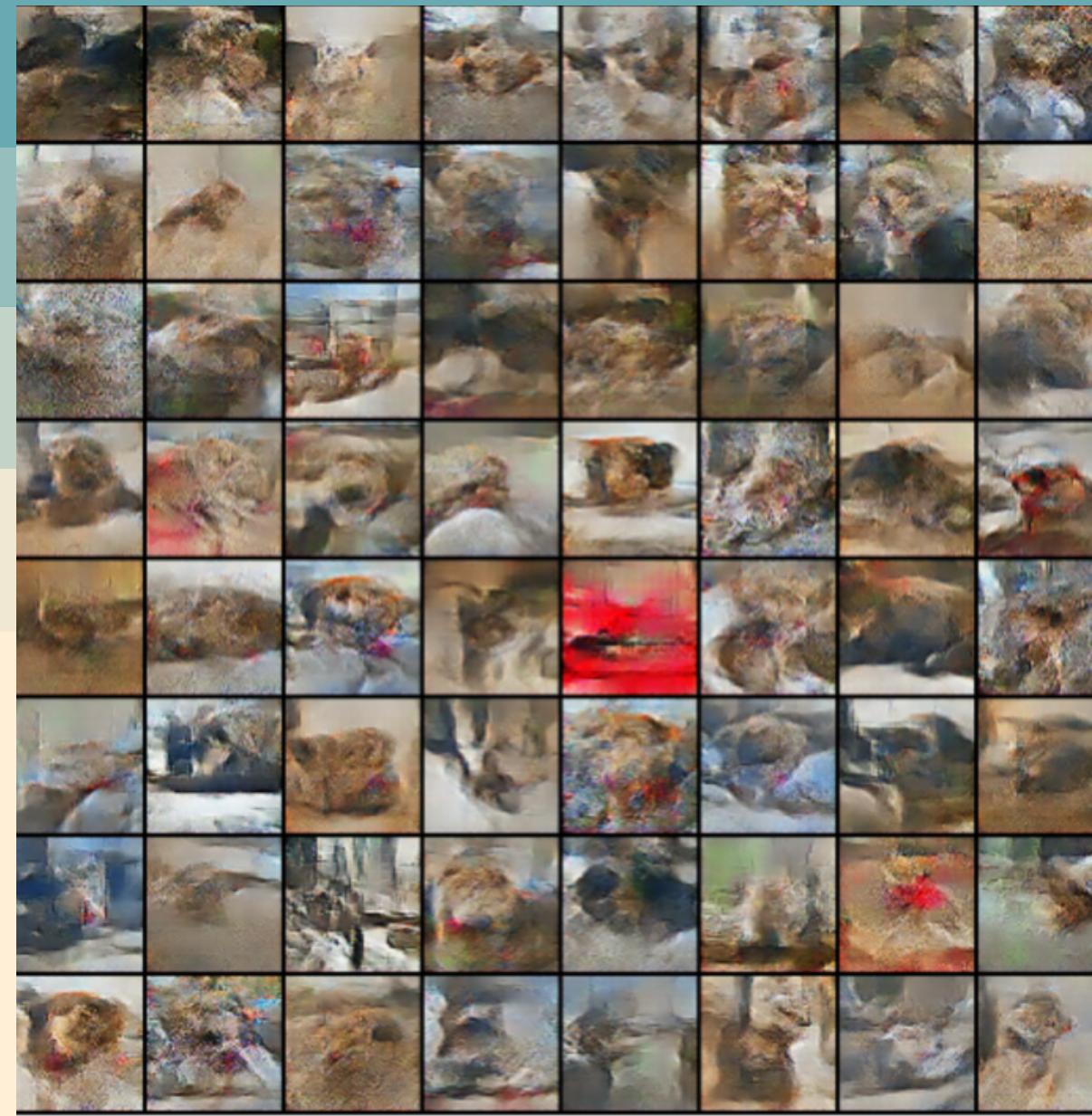
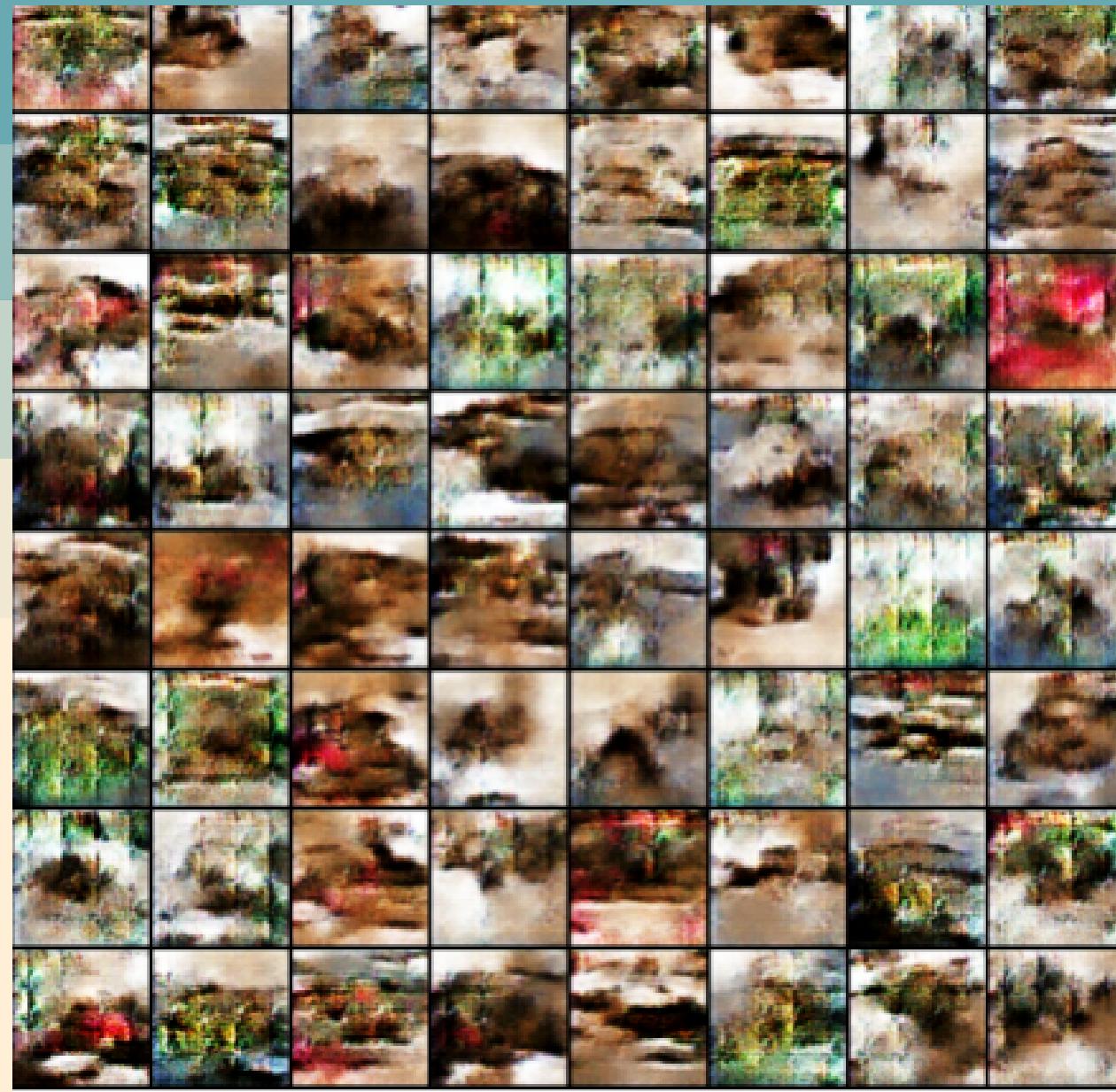
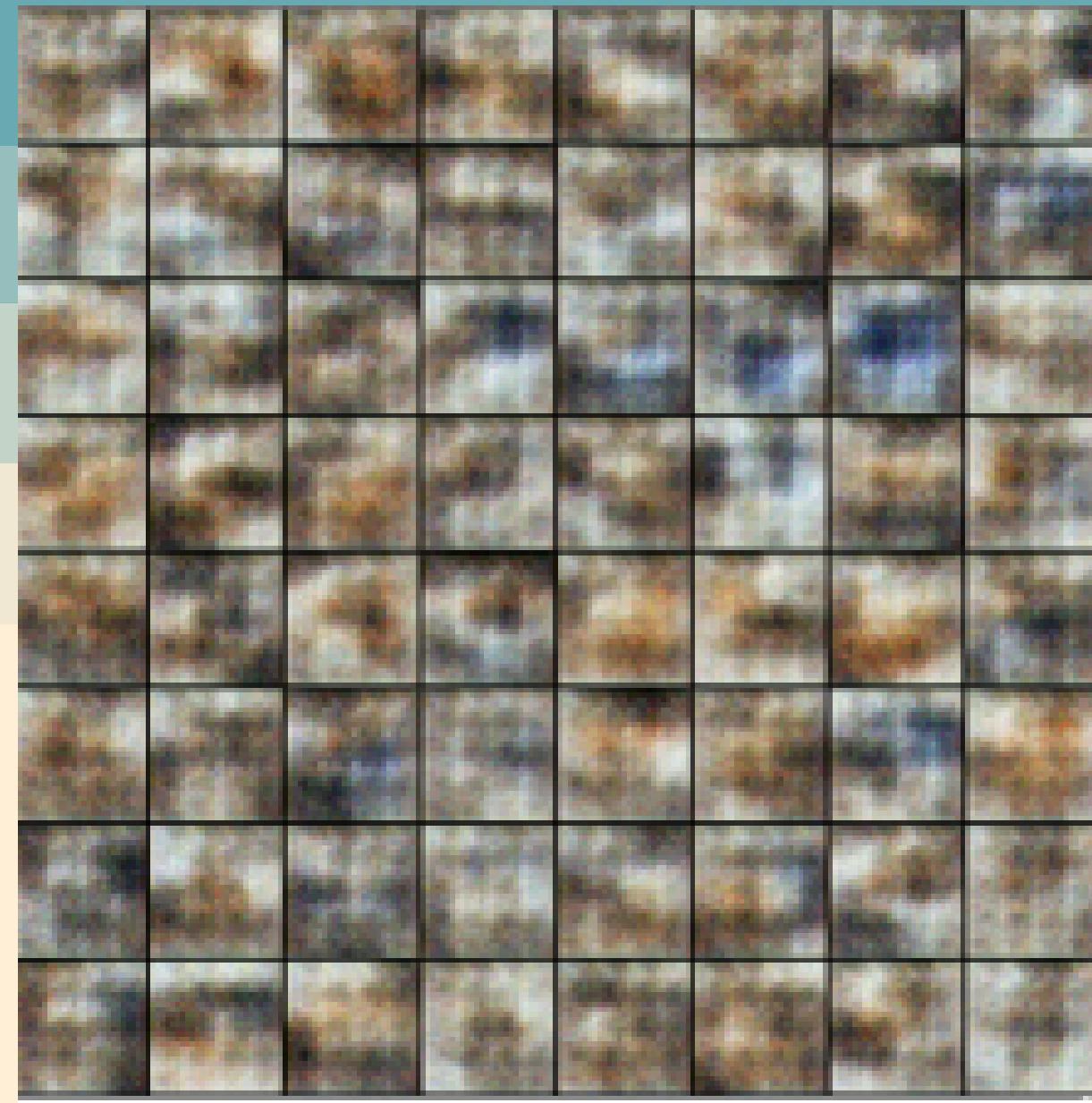
- 2,000 images
- 1,000 unique photos
- 2,000 developed through data augmentations
  - Horizontal flip
  - Adding noise signals
- Additional normalizations

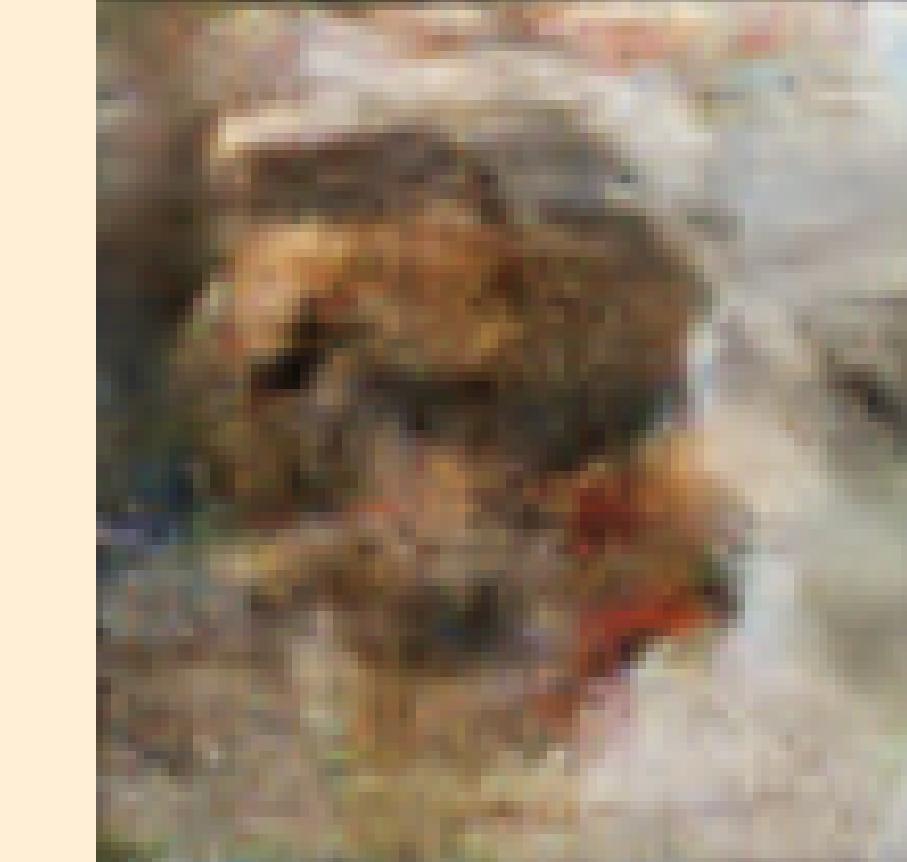
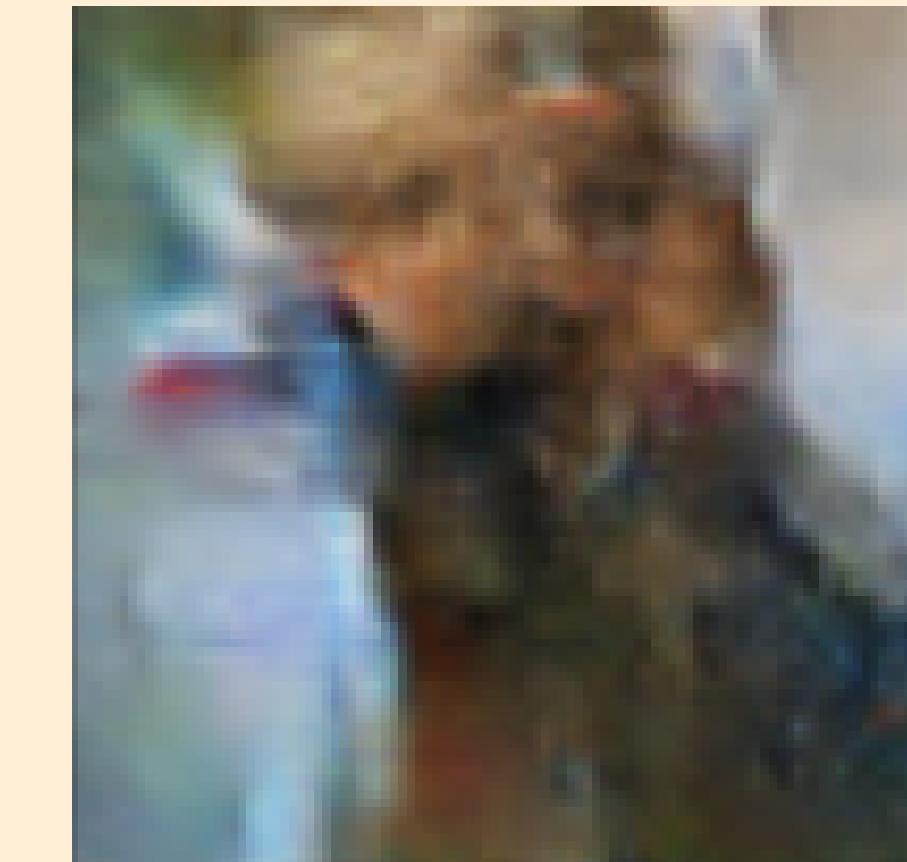
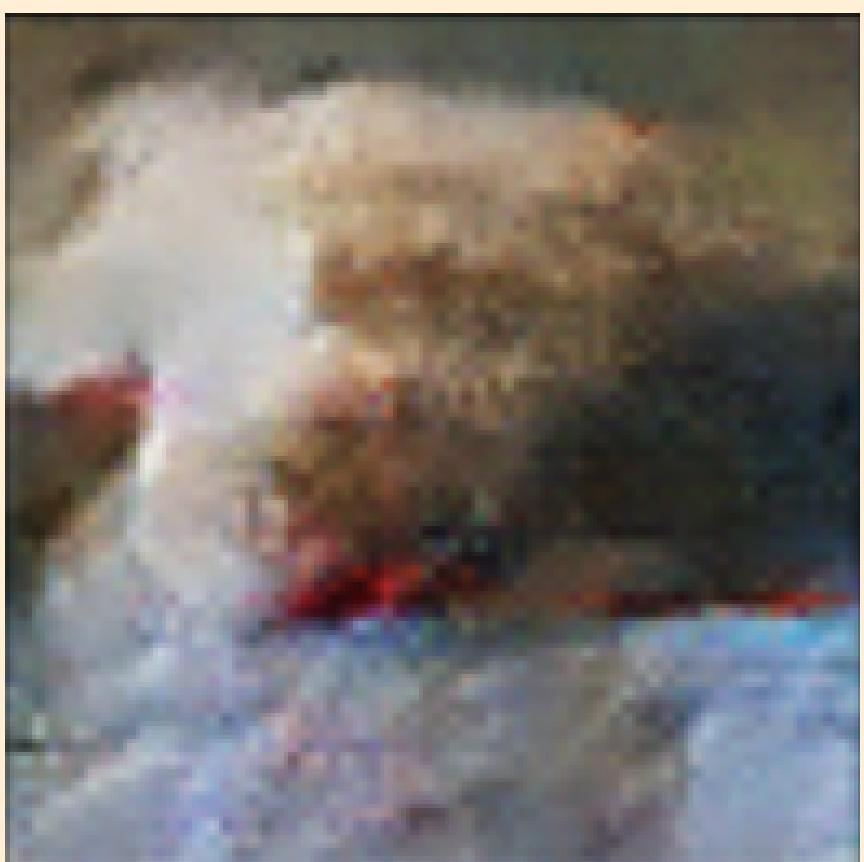
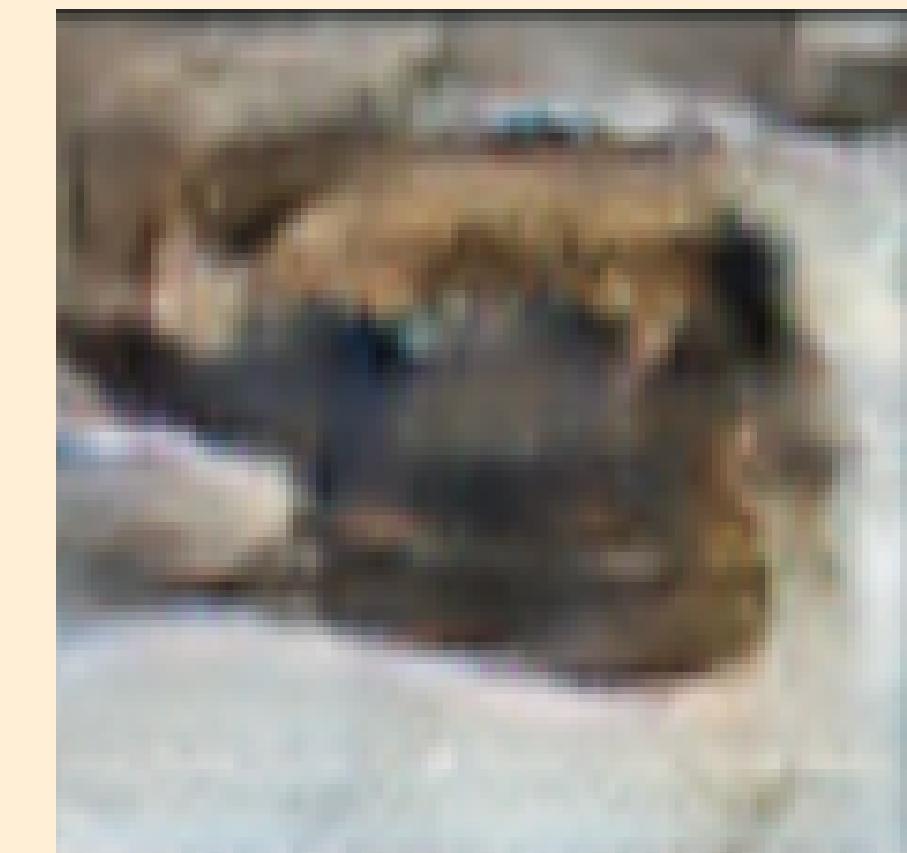
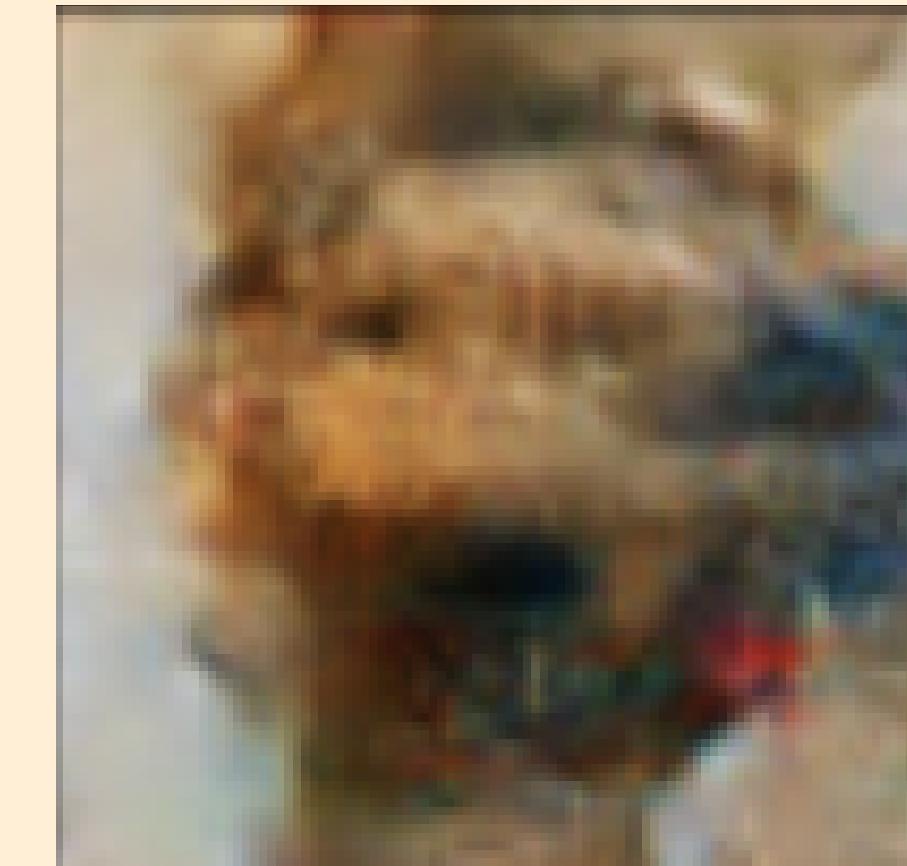
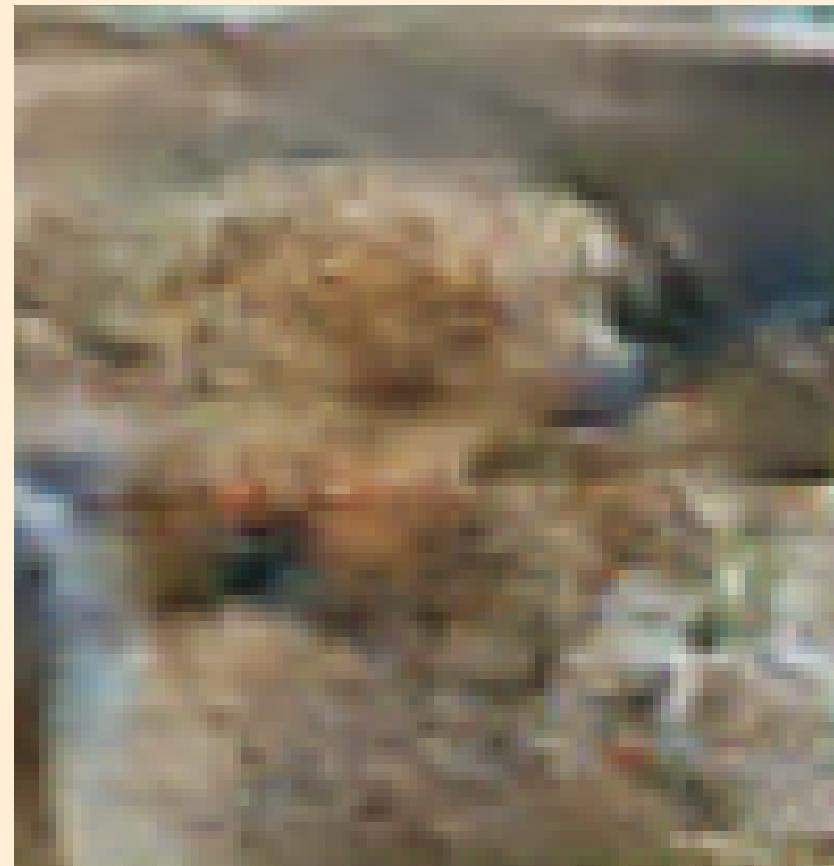
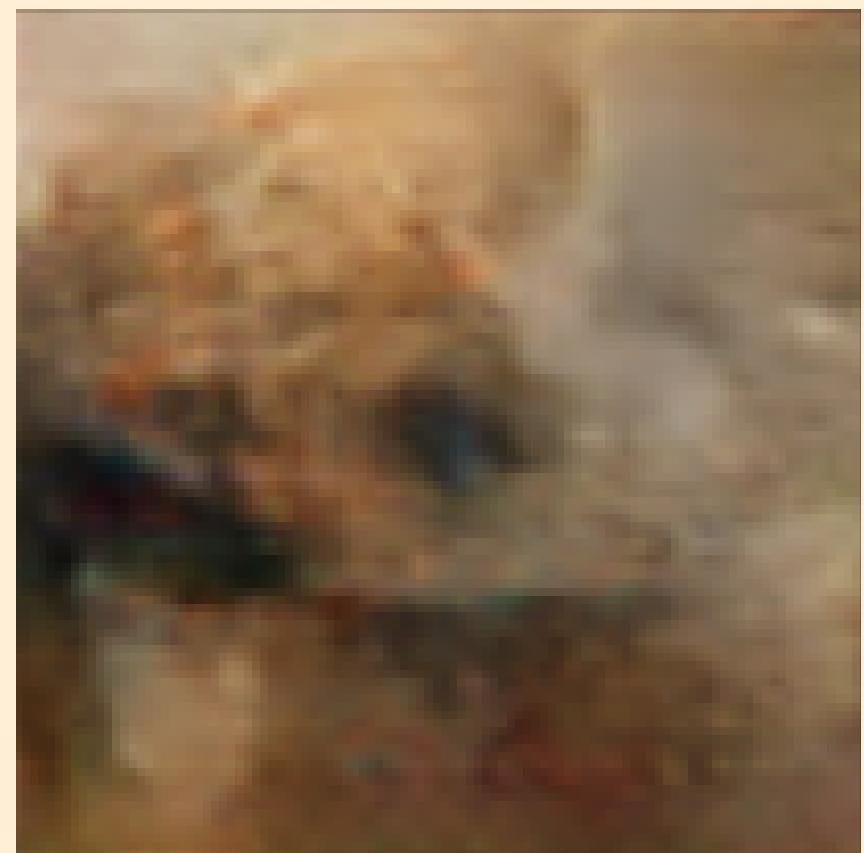
### Hyperparameters

- Experimentation included altered learning rates, loss functions, etc
- Final-Tuned Iteration included
  - Learning rate of 1e-4
  - BCE Loss Function
  - ~1000 Epochs

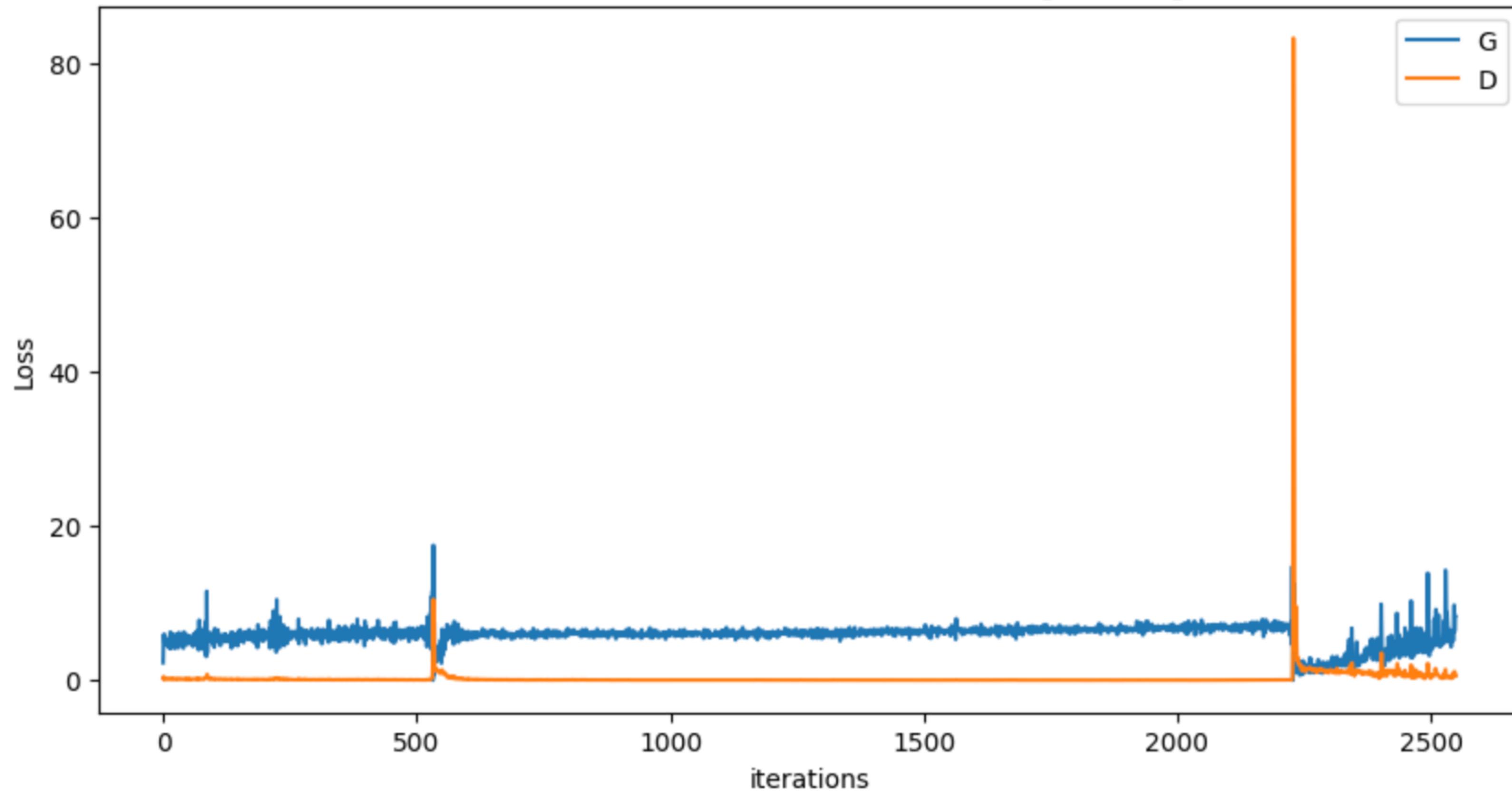


# PROGRESS





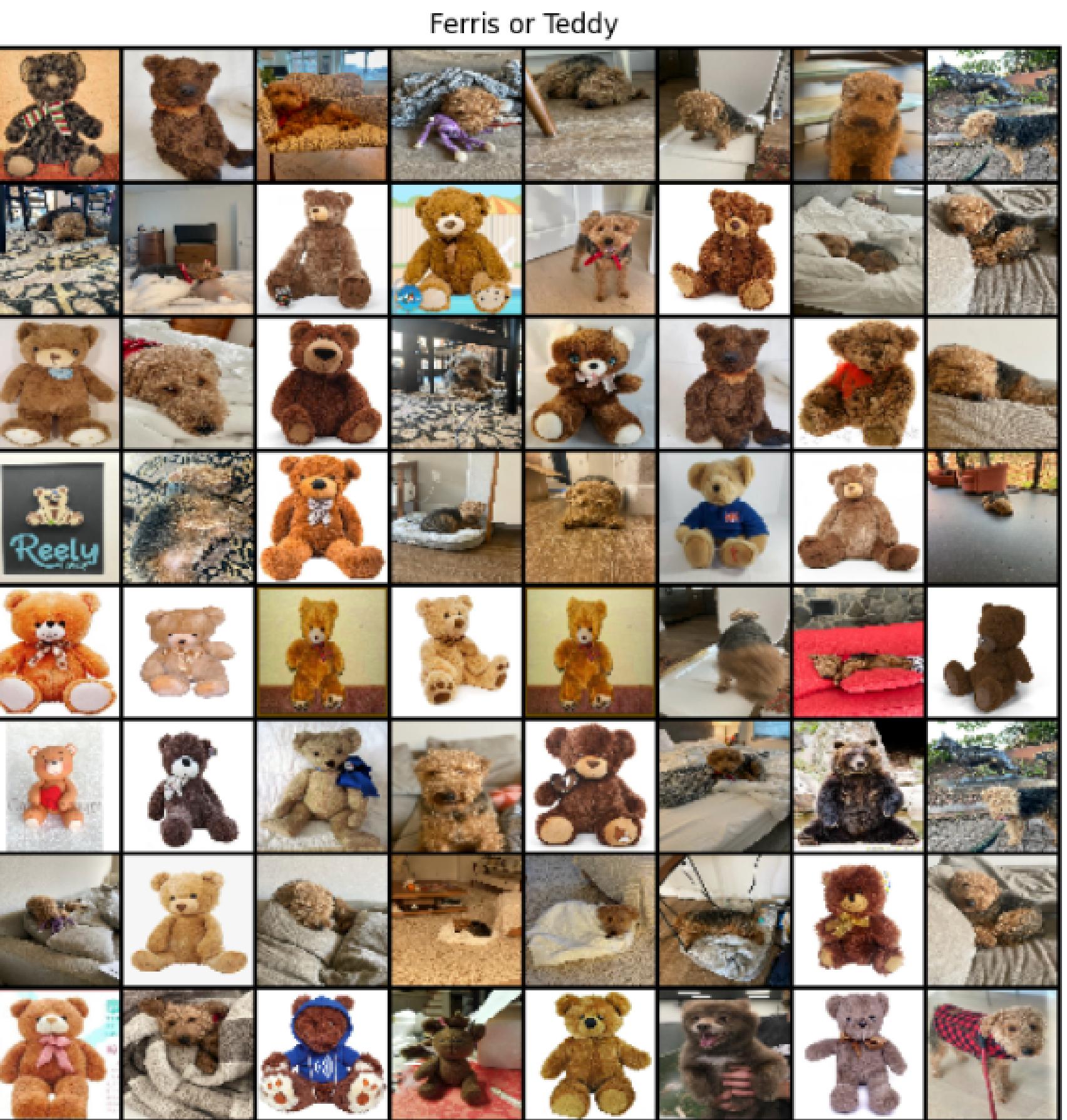
## Generator and Discriminator Loss During Training



Divergence indicates more training could be helpful

# DISCRIMINATOR PERFORMANCE

- Correct Identification: 99%
- Correct Ferris Identification: 100%
- Correct Bear Identification: 98%



# CONCLUDING REMARKS



## **Novelty**

Created my own GAN, hyperparam tuning, personalized data sets



## **Relevance to Existing Work**

GANs are an area of ongoing research in AI as well as in the world of Computer Vision.



## **Results / Performance**

I used multiple data sets and relied on quantitative and qualitative metrics of performance



## **Future Development**

Further training, ever-expanding dataset, more exploration of normalization techniques.