Generative Adversarial Networks (GANs)

Internship – Task 2

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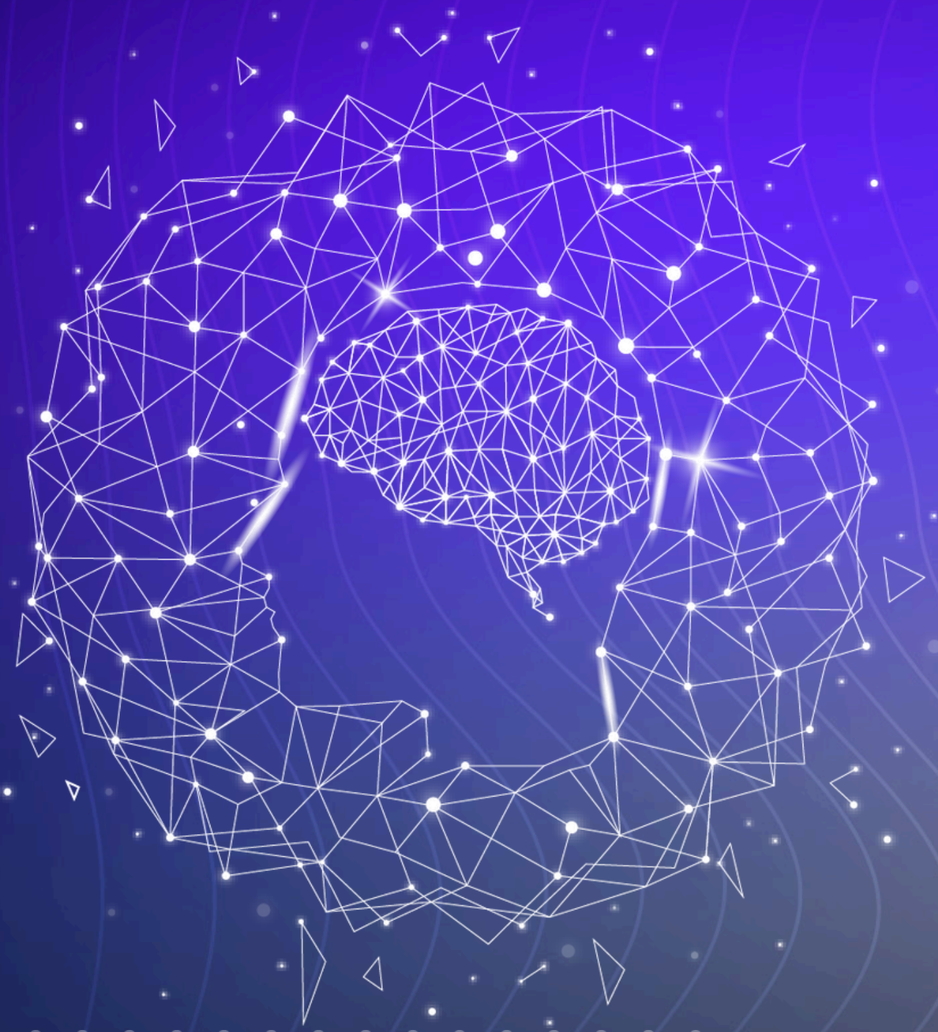


GAN VISUALIZATION

GANs ----> Deep Learning Model.

Use ----> Generate new data;

- Images
- Text
- Music

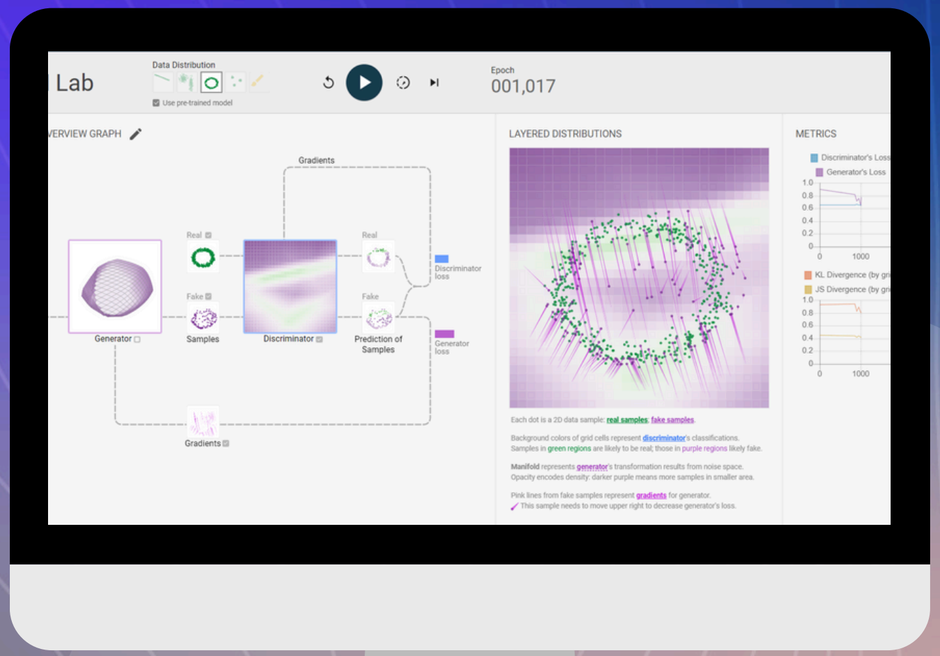
Model consists ----> two parts:

Generator

Discriminator

GAN Visualization and Metrics

- Model Overview Graph
- Layered Distributions
- Loss Metrics
- Divergence Metrics
- Data Distributions
- Epoch Effects



01

GAN Visualization

Generator

Takes random noise as input.

Tries ---> Generate new data samples.

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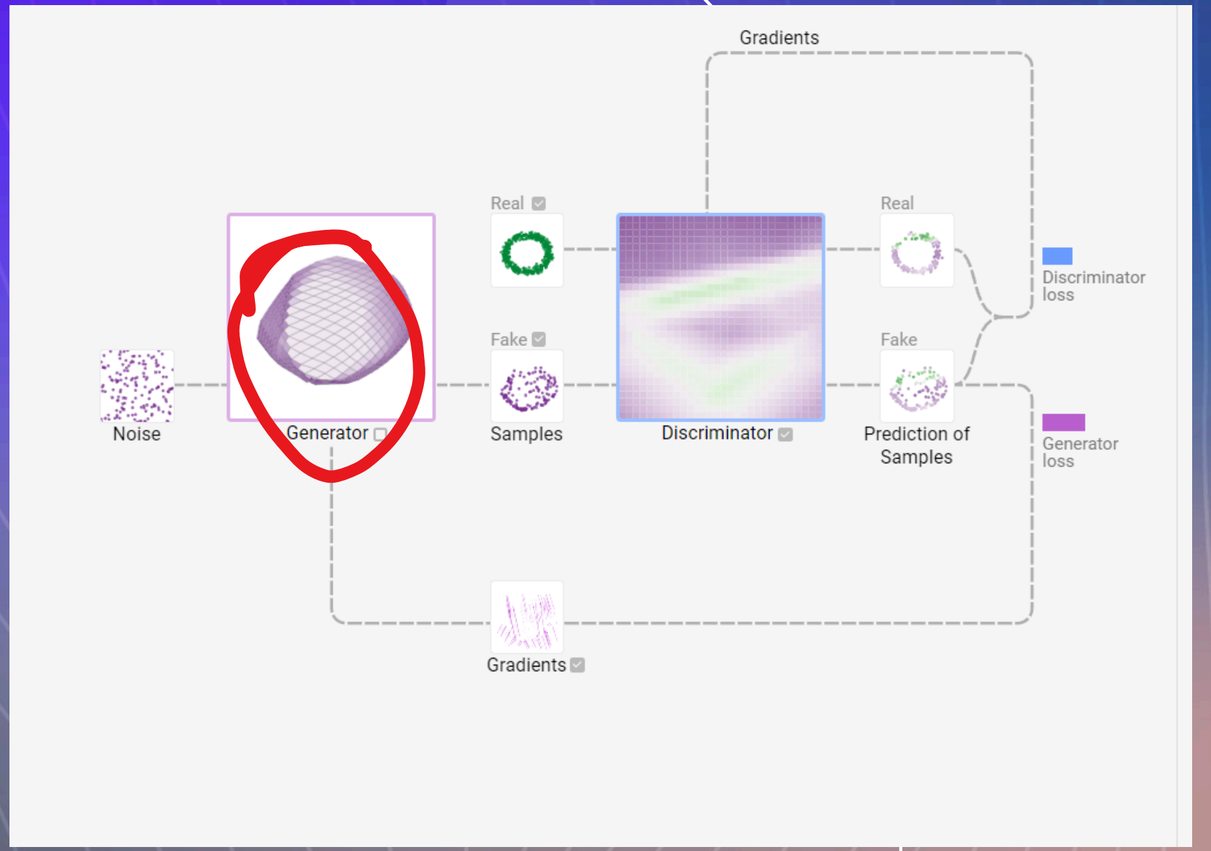
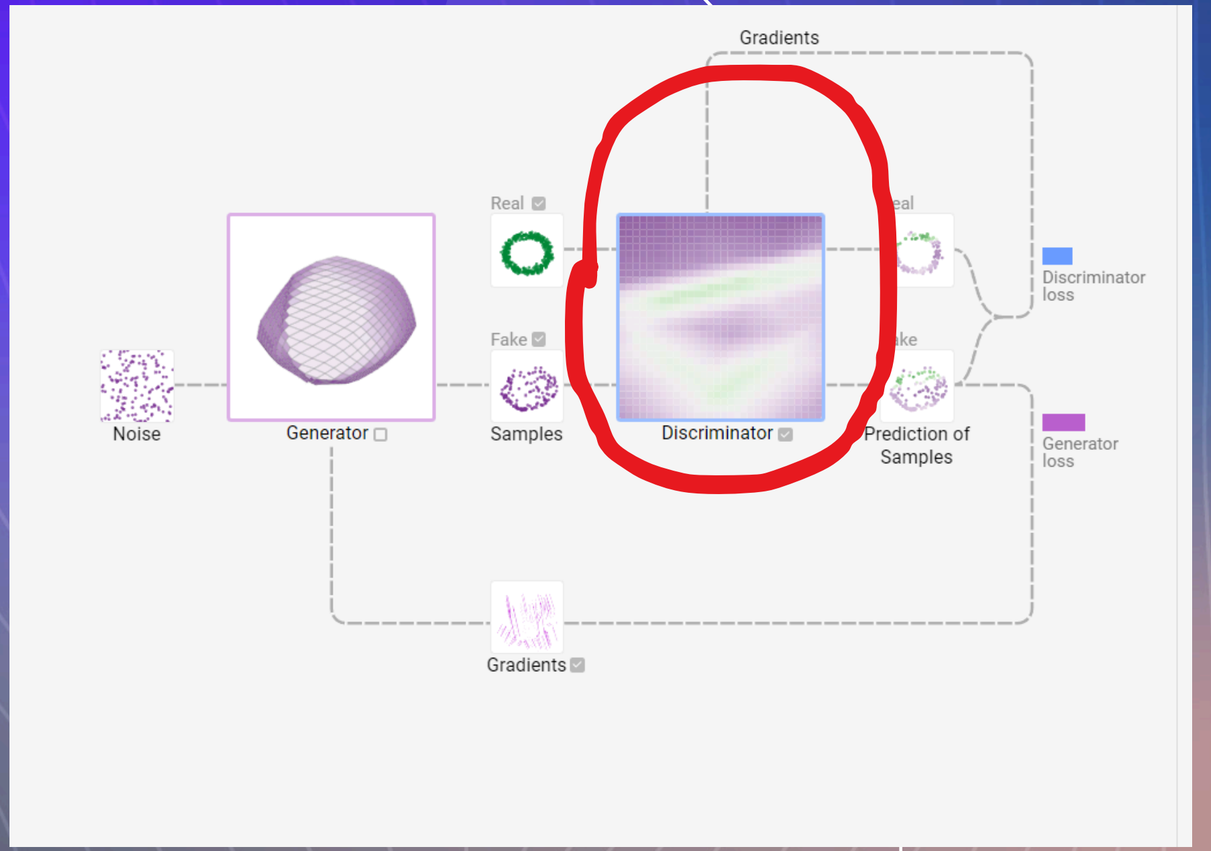
That look like the training data.



Discriminator

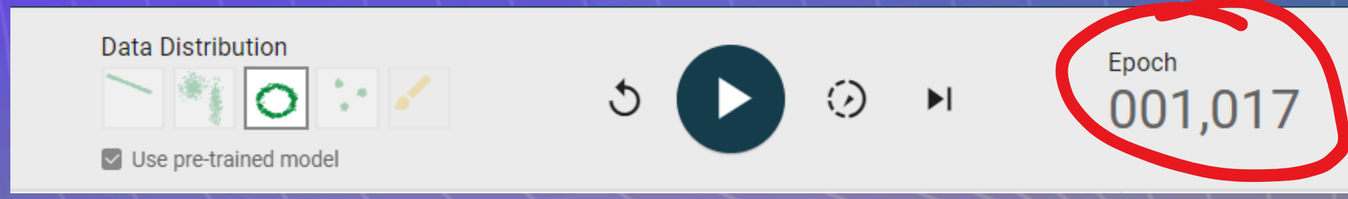
- Determine a Data Samples (Real or Fake)
- tries to improve its ability to detect fake samples.



Epoch

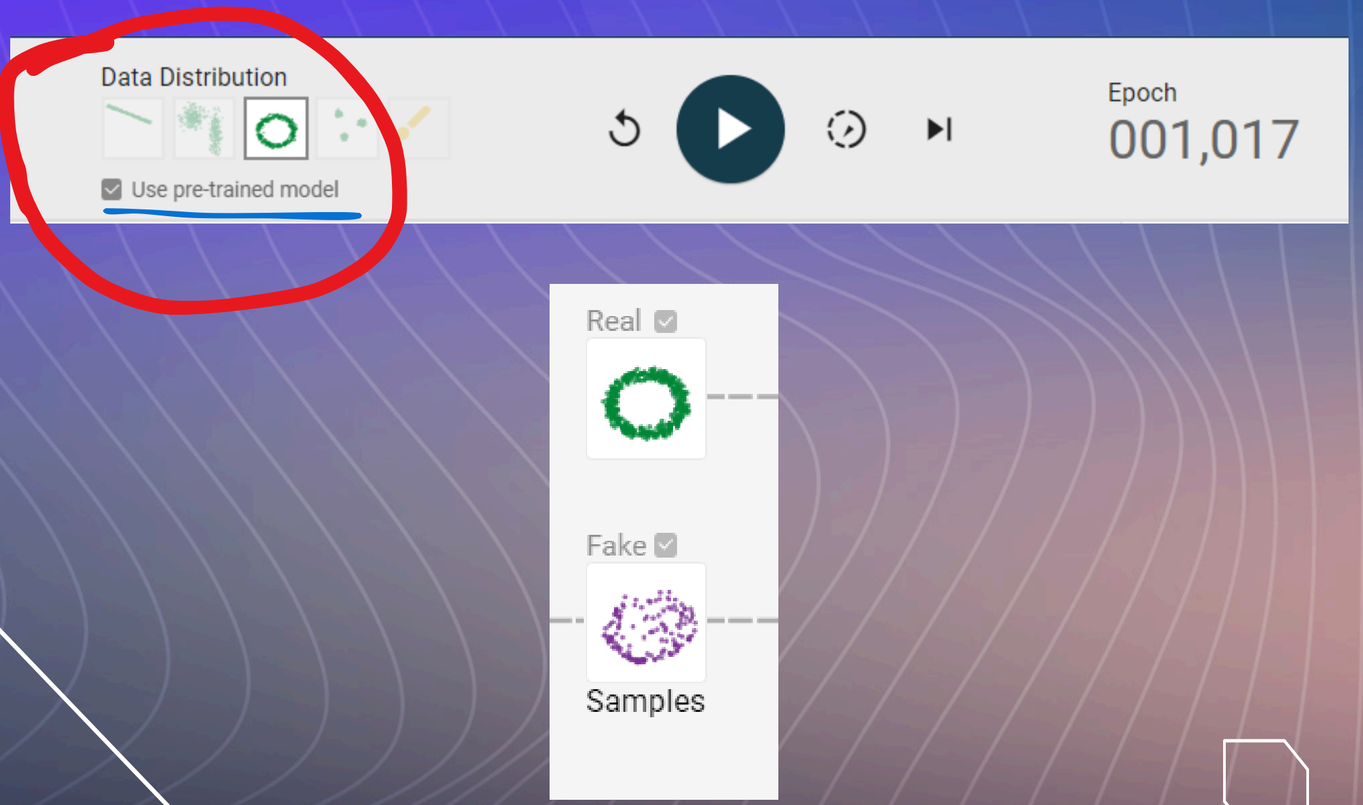
- 001,017 - training for 1017 epochs.
- An epoch ---> One complete pass

  through the entire training dataset.



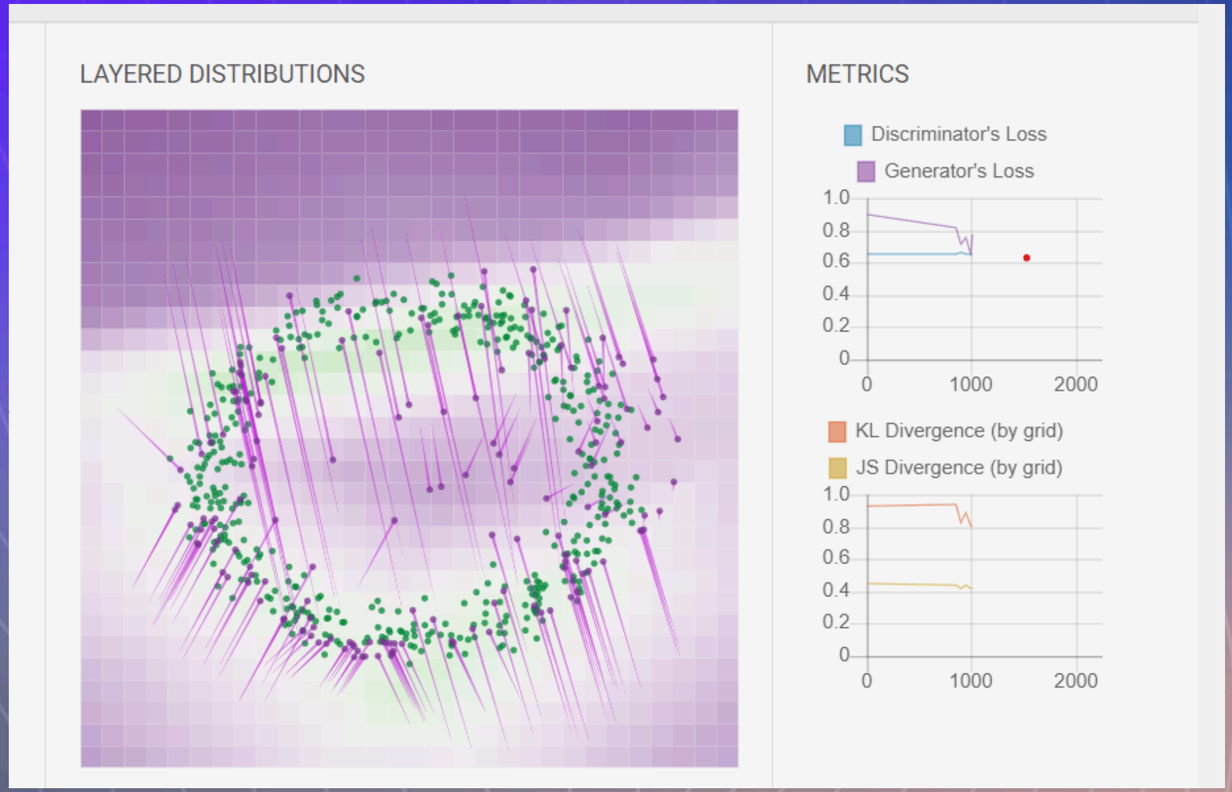
Data Distribution

- Distribution of real and fake samples across ---> different layers of the model.
- Green dots ---> real samples.
- purple dots ---> fake samples.

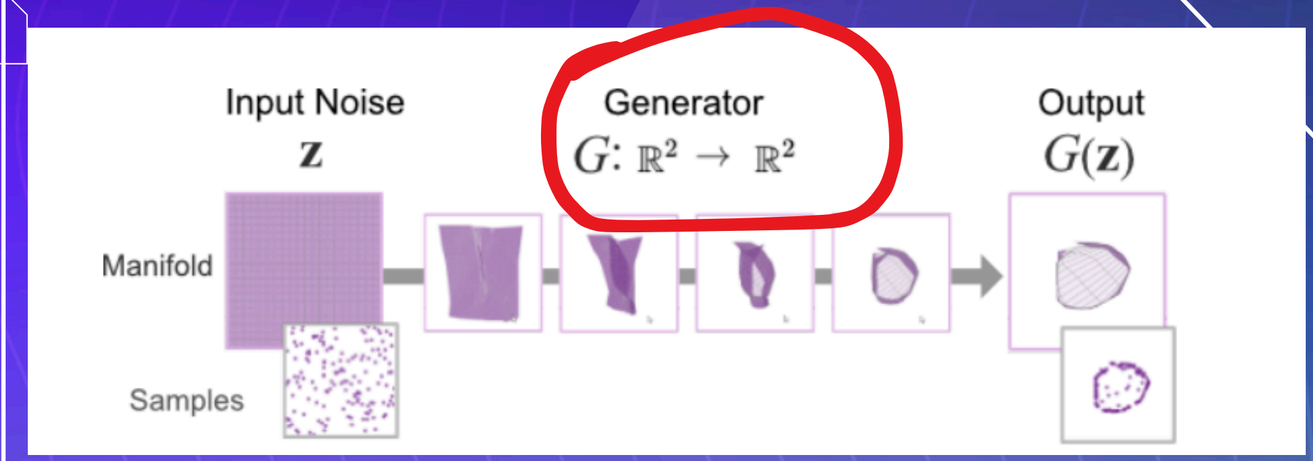


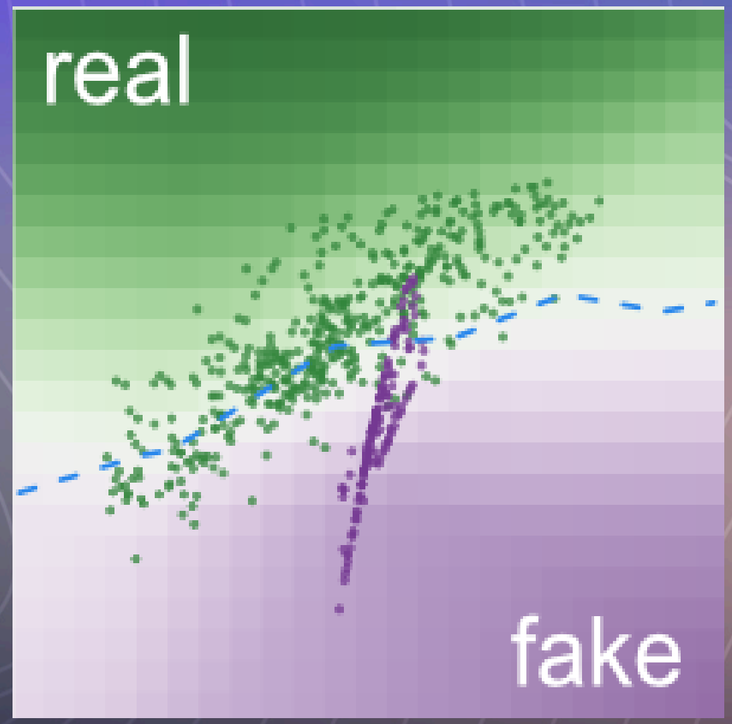
Data Distribution

- Distribution of fake samples ---> closely resemble the distribution of real samples.
- In this case, Distributions are not perfectly aligned --->in the first layer.
- Model is still learning to generate realistic data.



Data Distribution





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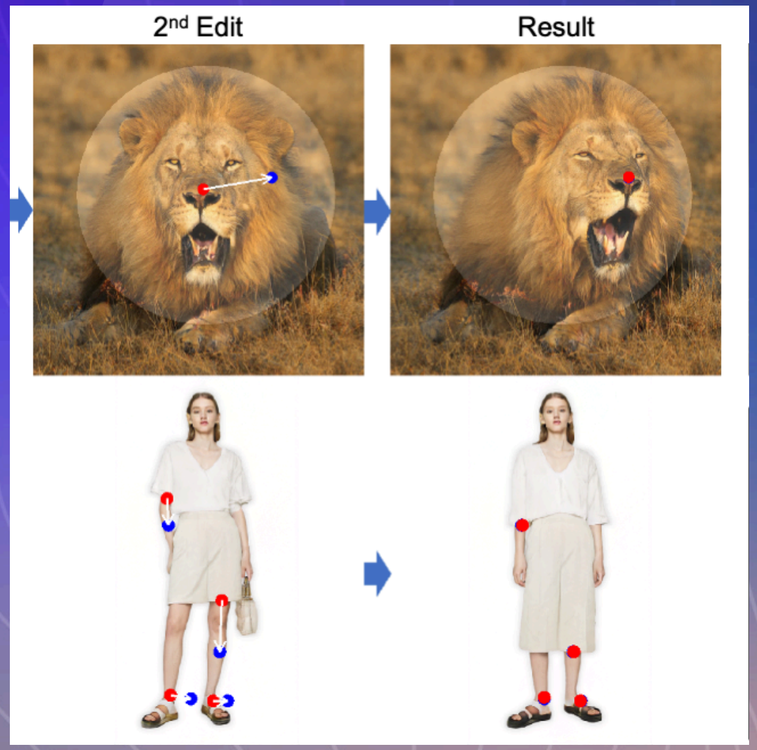
Interactive Features

- Hyperparameter Adjustment---> Adjust hyperparameters such as during training to observe effects in real-time.
- Slow-motion Mode---> Slows down the training visualization to better understand the dynamics.
- Step-by-step Execution---> Allows for manual control of training iterations to observe incremental changes.



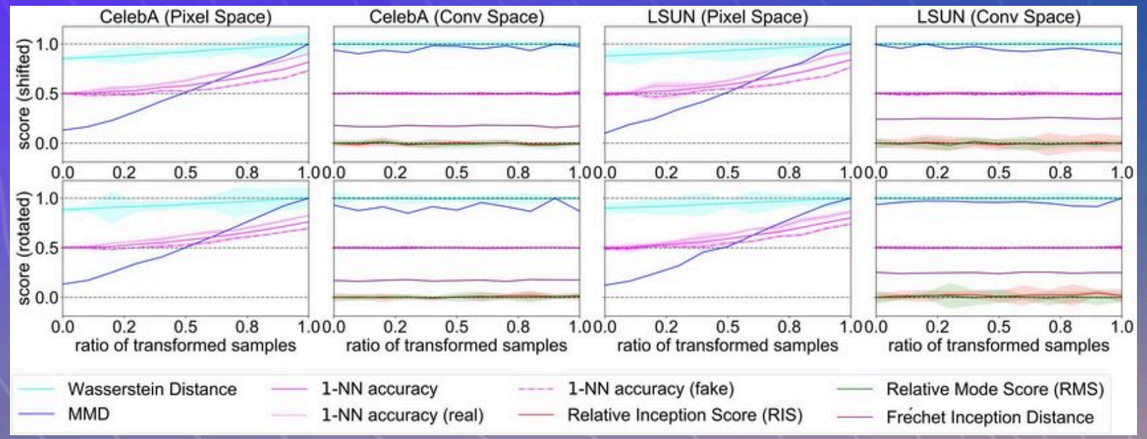
02

GAN Metrics

Metrics In GAN

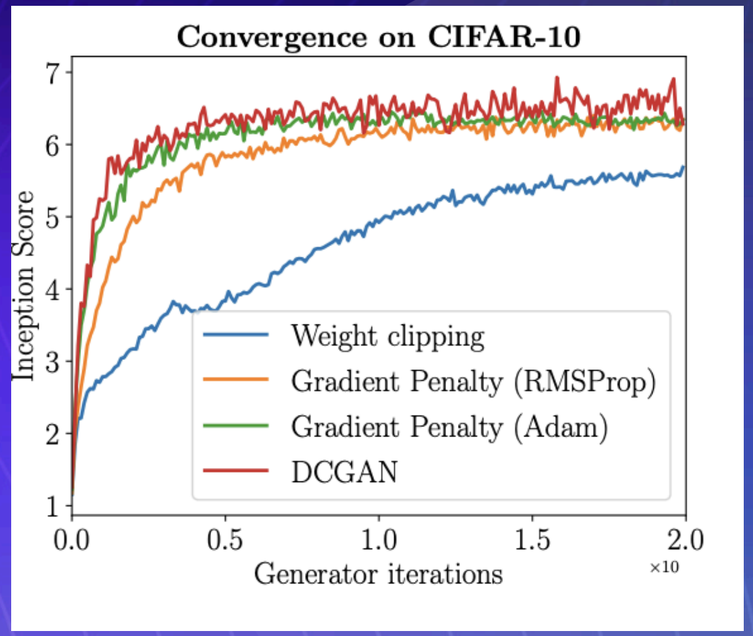
- Compare the feature distribution.
- This section shows the following metrics:

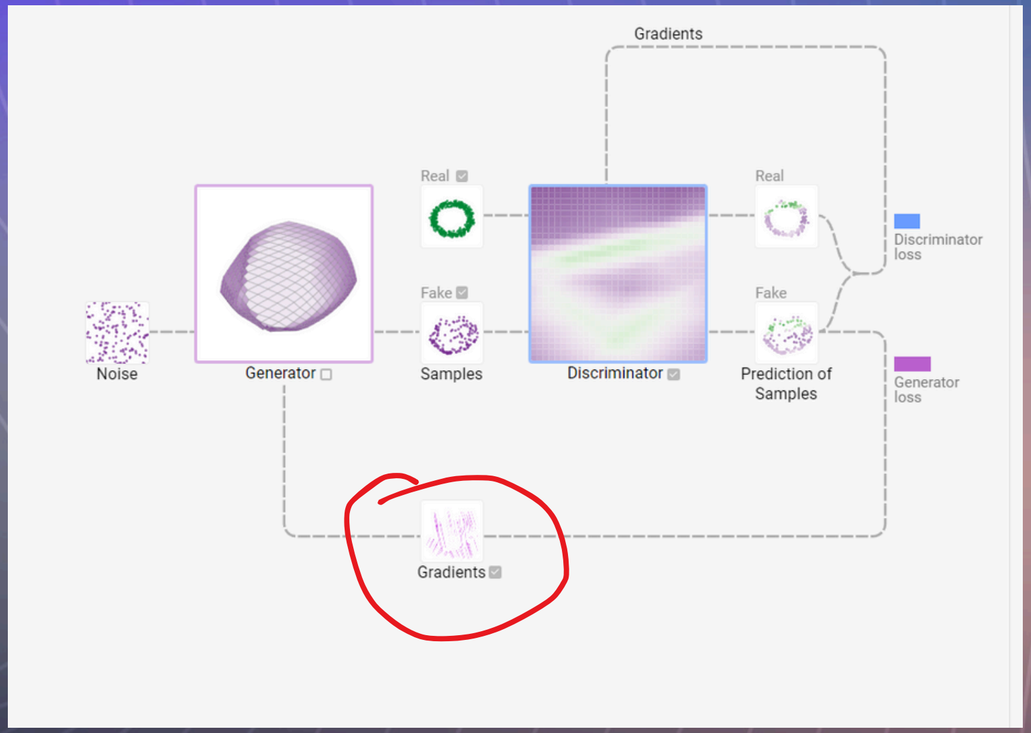
1. Gradients
2. Discriminator loss
3. Generator Loss



GRADIENTS

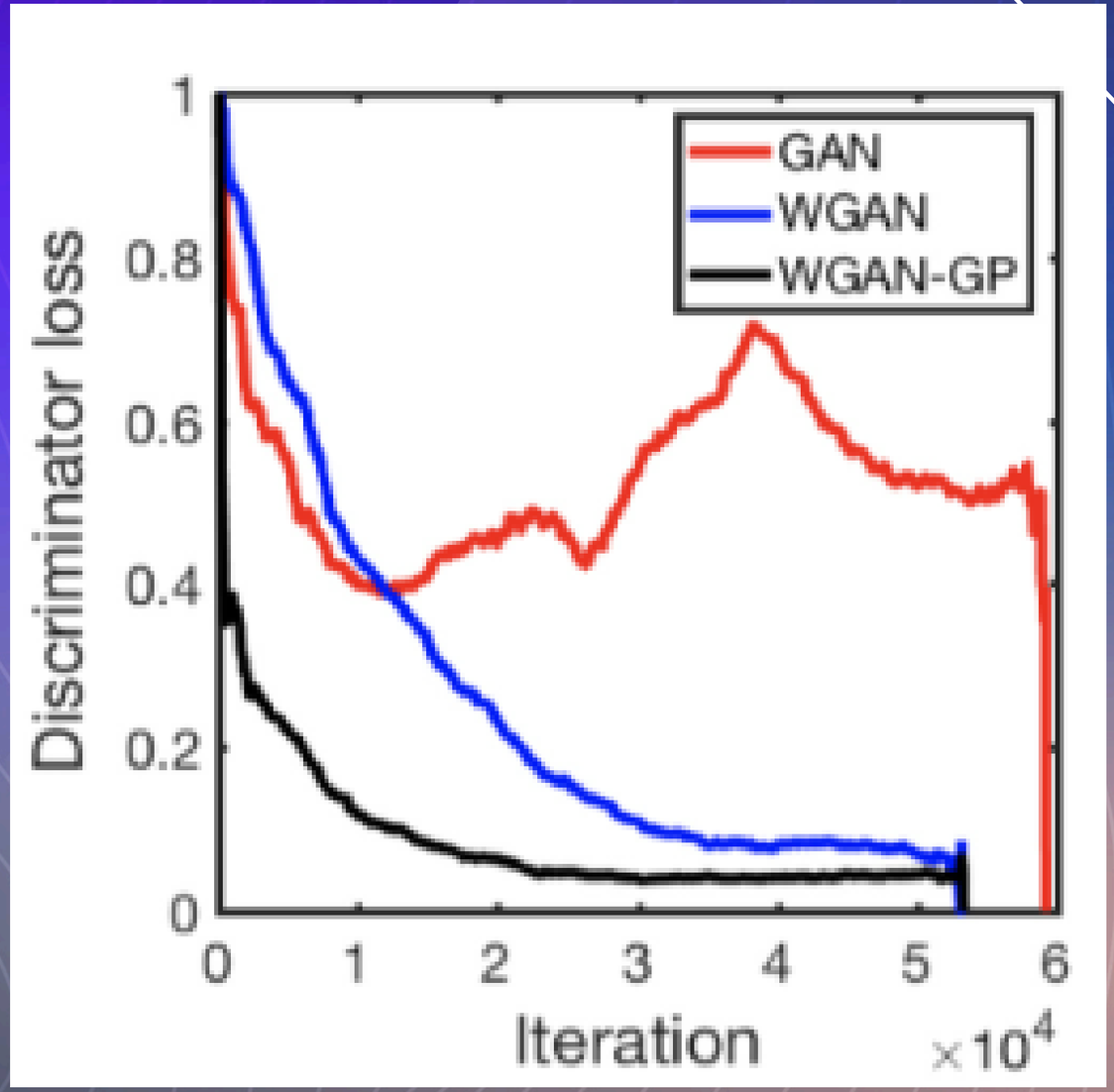
- A soft version of the Lipschitz constraint.
- values used to update the weights of the generator and discriminator during training.





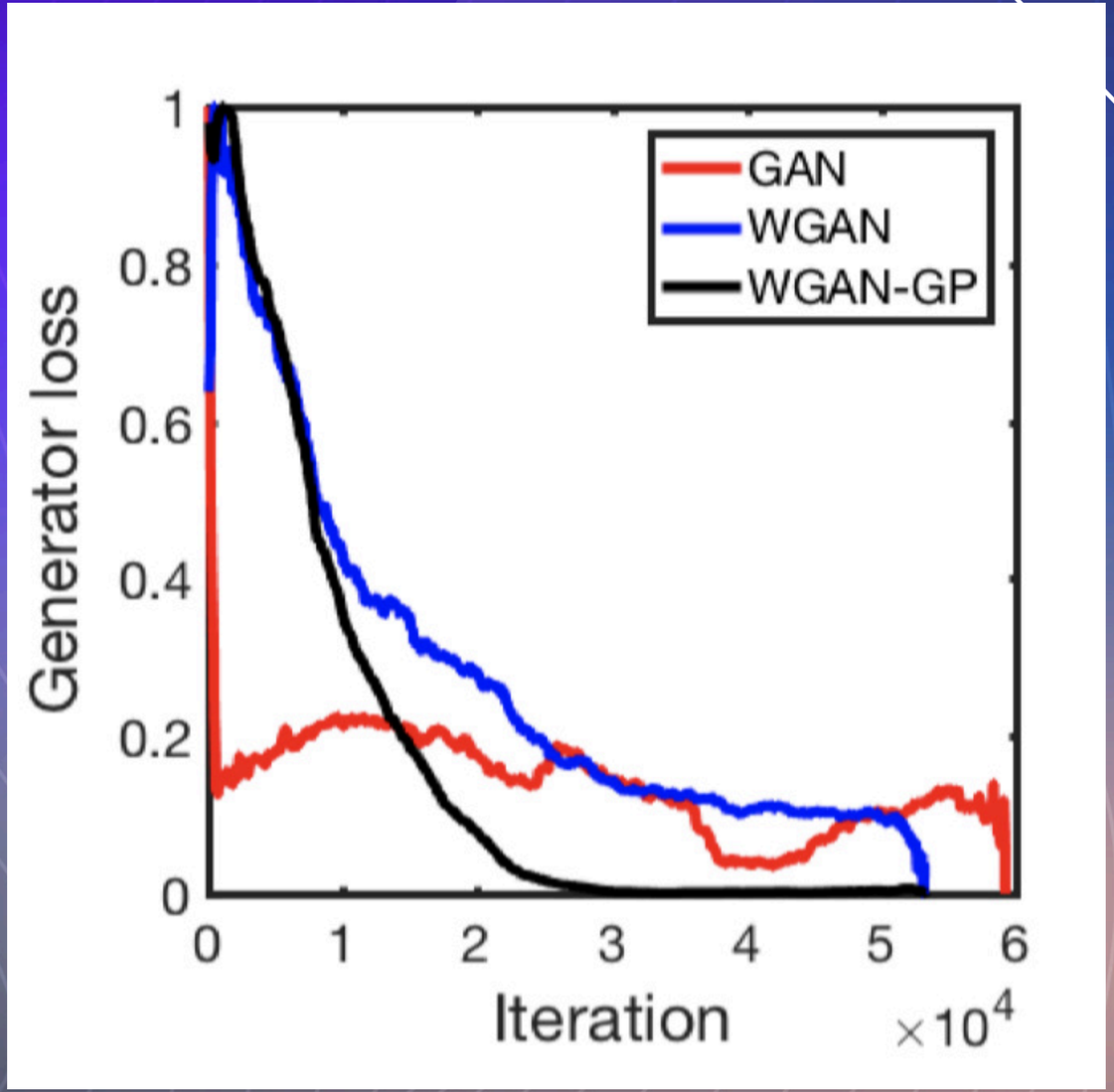
DISCRIMINATOR LOSS

- A measure of how well the discriminator is performing at classifying real and fake samples.
- A lower value indicates better performance.

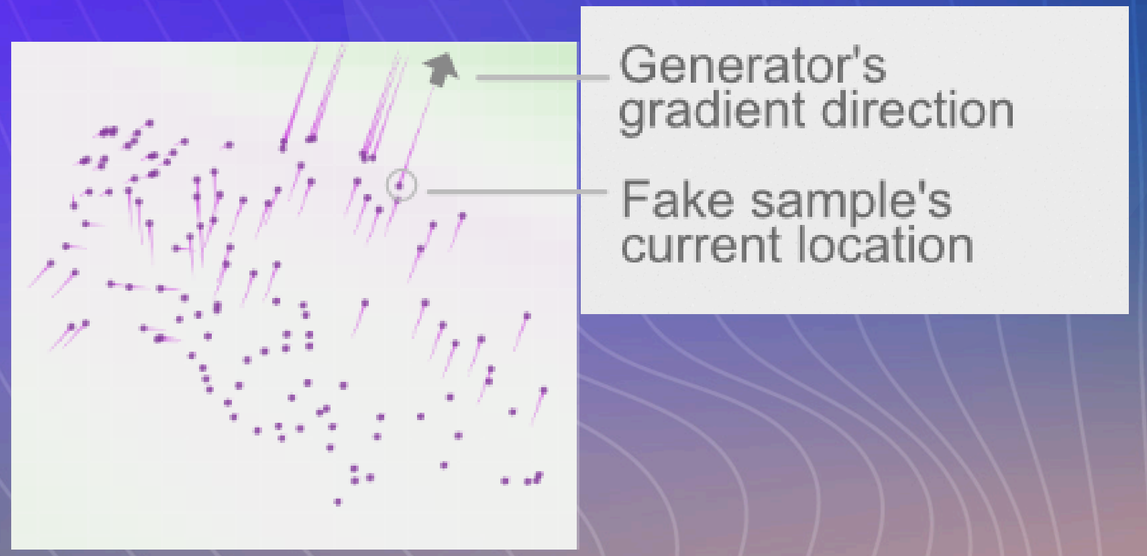


GENERATOR LOSS

- A measure of how well the generator is fooling the discriminator.
- A lower value indicates better performance.



Interplay between generator & discrimininator



- The generator does it by trying to fool the discriminator.
- The generator's loss value decreases when the discriminator classifies fake samples as real.

Thank You!...