

Project 3

Deep Learning

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Plan

1. Diffusion U-Net
2. GAN
3. Vanilla Pixel Diffusion



Vanilla Pixel Diffusion

Core Concepts:

- Diffusion Process: Adds noise to an image in a forward process and then reverses this process to generate images.
- Noise Schedule: Controls how noise is added and removed at each step.
- Denoising Network: A neural network trained to remove noise step by step.

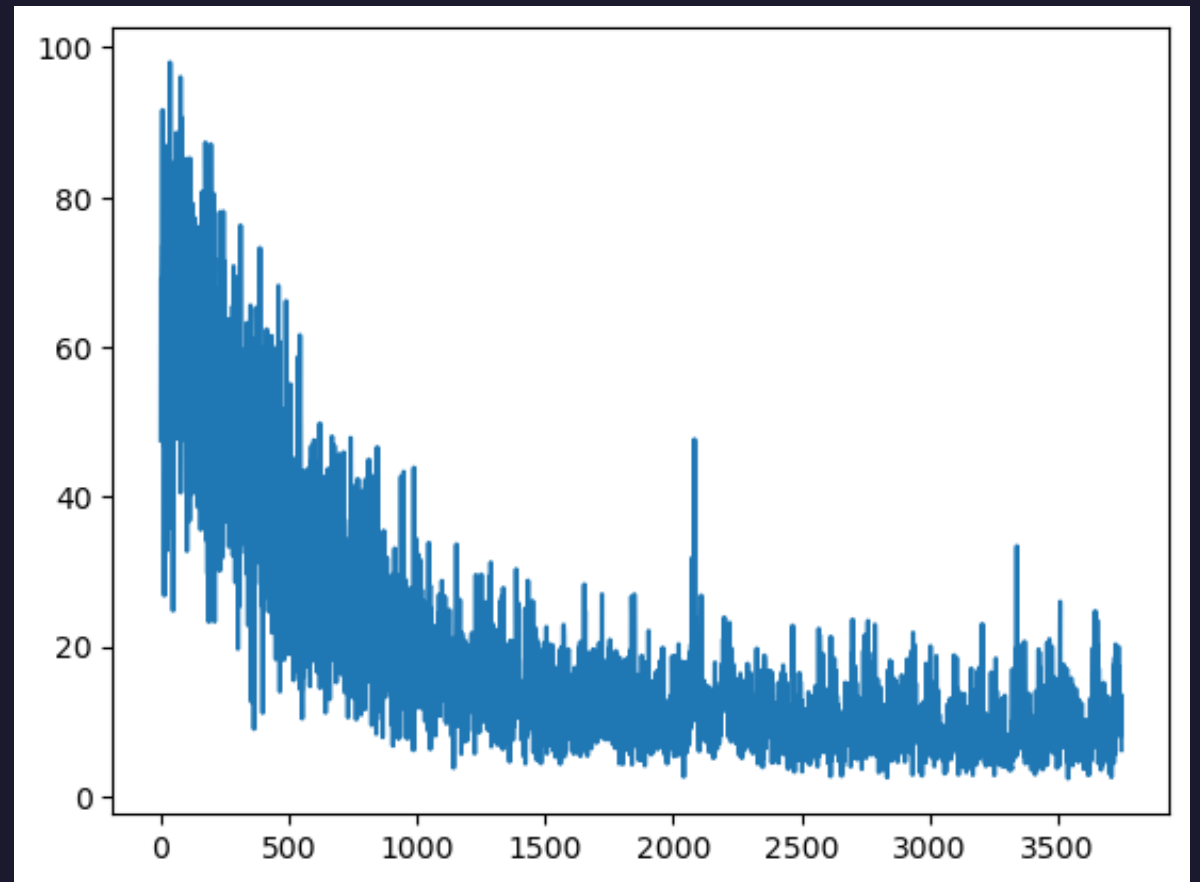
Steps:

- Initialization: Start with a noisy image.
- Forward Diffusion: Add noise to an image over several steps.
- Training: Train the network to predict and remove noise.
- Reverse Diffusion: Iteratively denoise the image to generate a clean image.

Failed due to computing power and limited access to GPU.

Diffusion Unet

Loss function during first epoch



Diffusion Unet



Only blurry images regardless
of the batch size and image
size.



GAN

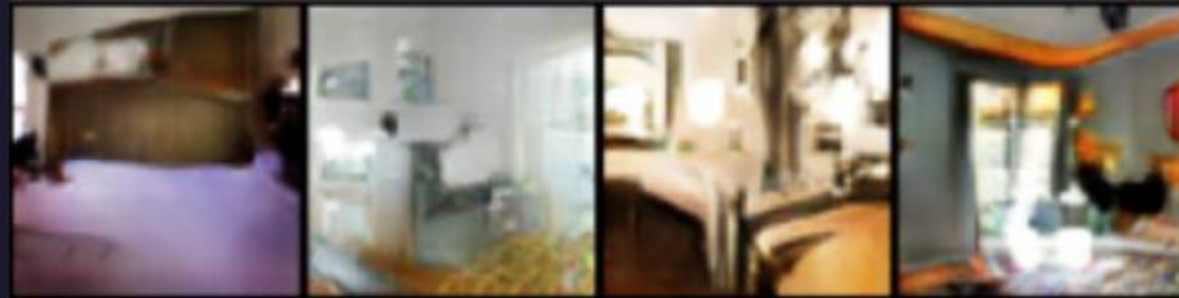
Batch size: 128



Batch size: 64



Batch size: 32



Batch size: 16



GAN

G: Relu

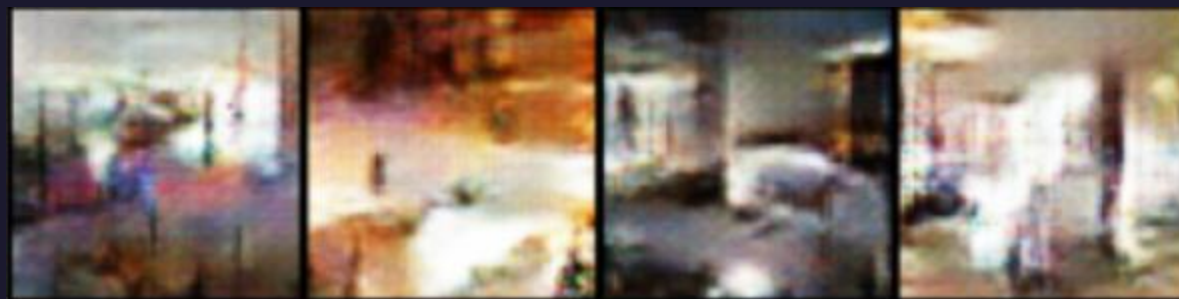
D: LeakyRelu



Relu-6



ELU



GAN. FID score



Thank you for attention!

