

IMFVX HW2-1

Q1. Please provide a brief introduction about your experiments, including details such as setting of hyperparameter, data augmentation techniques used, network structure, etc.

To further understand this model, I do the following experiment.

Change the dimension of latent space

I have wondering the influence of dimension of latent space. Thus, I design an experiment to change the dimension of embedding space from $zn=50$, $zn=100$, $zn=150$, $zn=500$

- $zn=50$



- $zn=100$



- $zn=150$



- $zn=500$

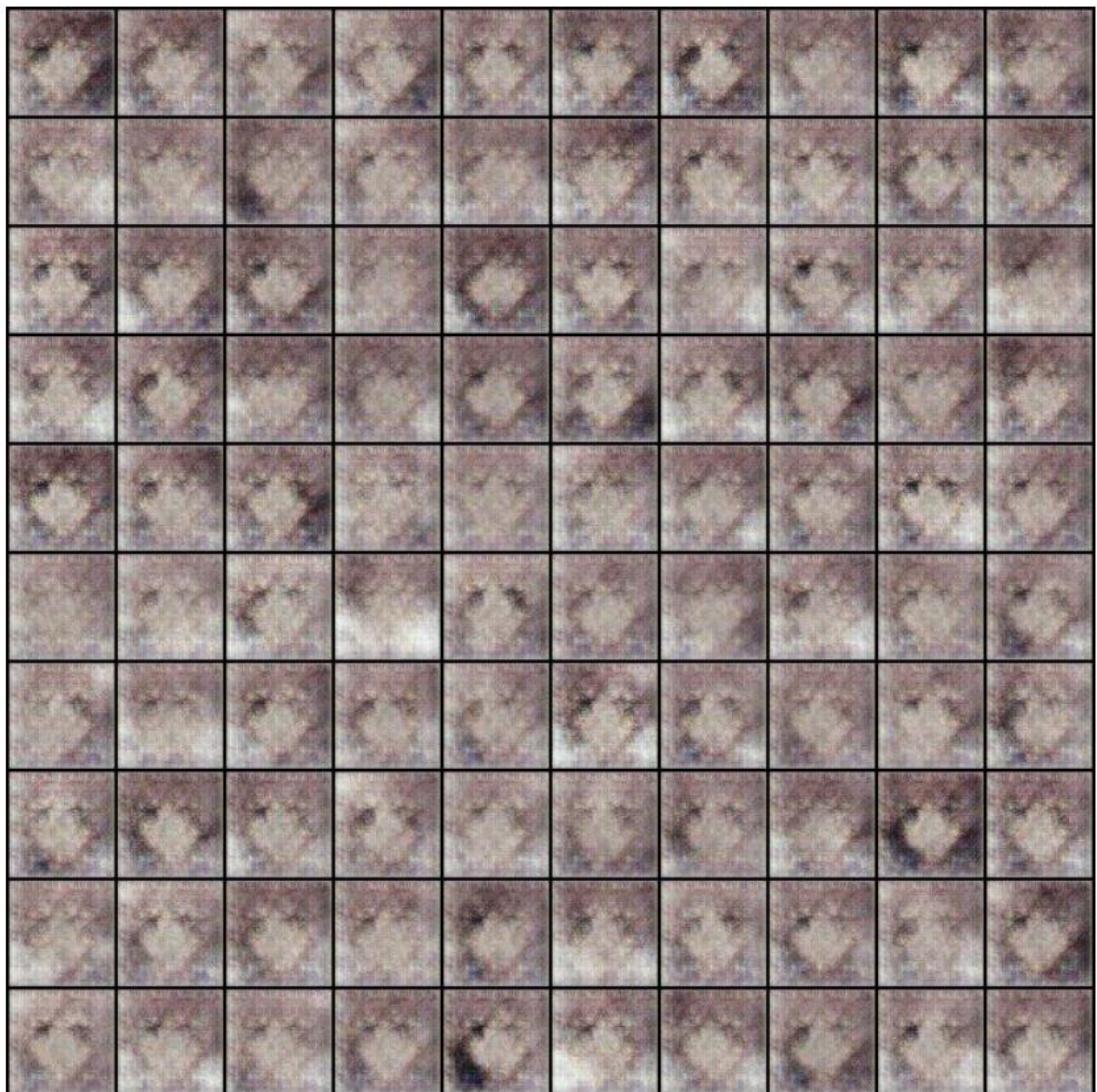


Dicussion

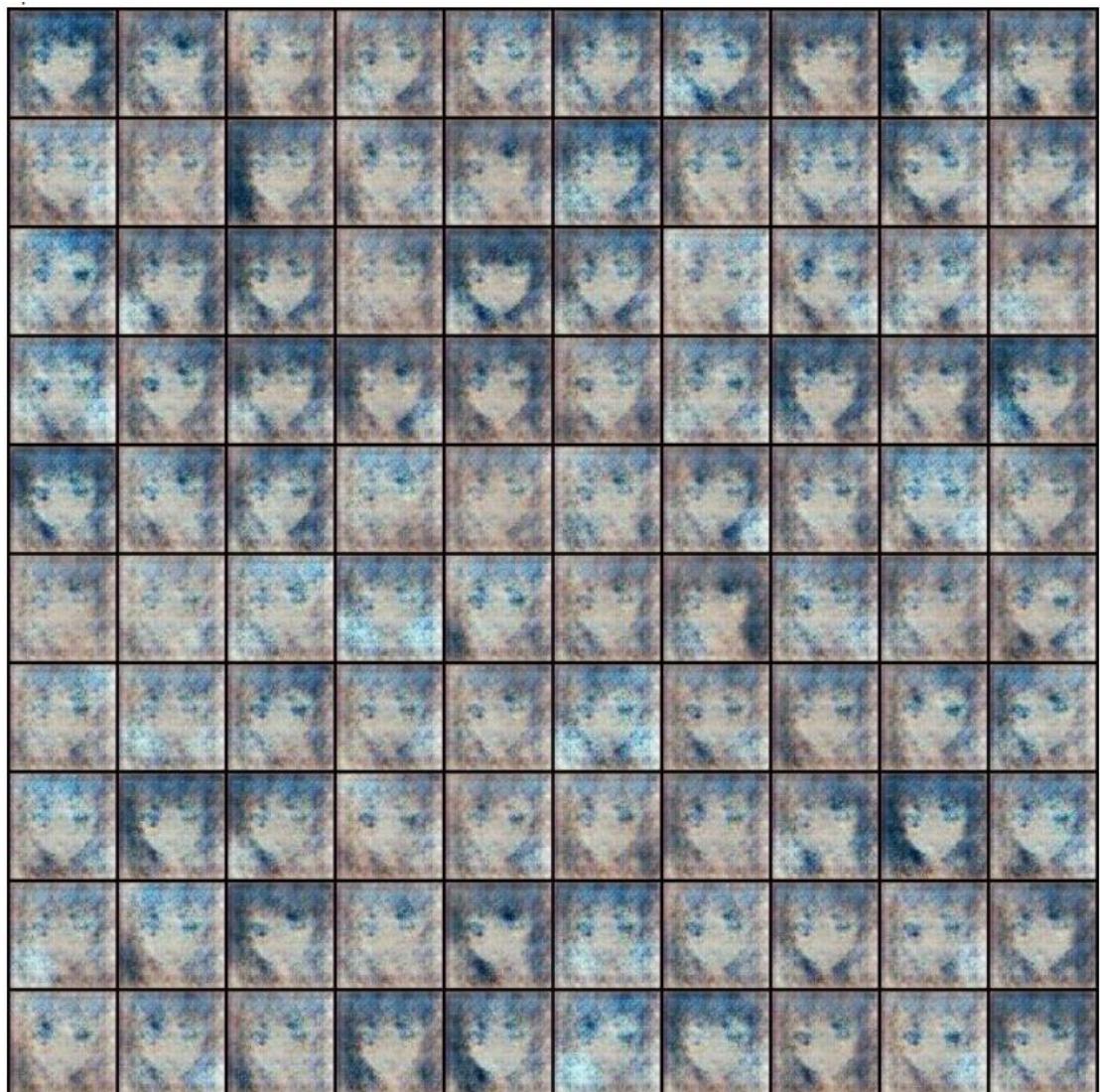
As the dimensionality increases, the generated images exhibit finer details and greater perfection. However, If the dimensionality of the latent space is too high, it may result in the generation of images with segmented. I think that is because if the dimension of latent space is too small, we can not retain the fine details. However, if the latent space is too large, we retain too much information (including noise) and it would be hard for model to utilize this feature appropiatly.

Q2. Place the generated image series from various epochs during the training process here and provide a discussion of your observations.

- Epoch 1



- Epoch 2



- Epoch 3



- Epoch 4



- Epoch 5



- Epoch 6



- Epoch 7



- Epoch 8



- Epoch 9



- Epoch 10



- Epoch 11



- Epoch 12



- Epoch 13



- Epoch 14



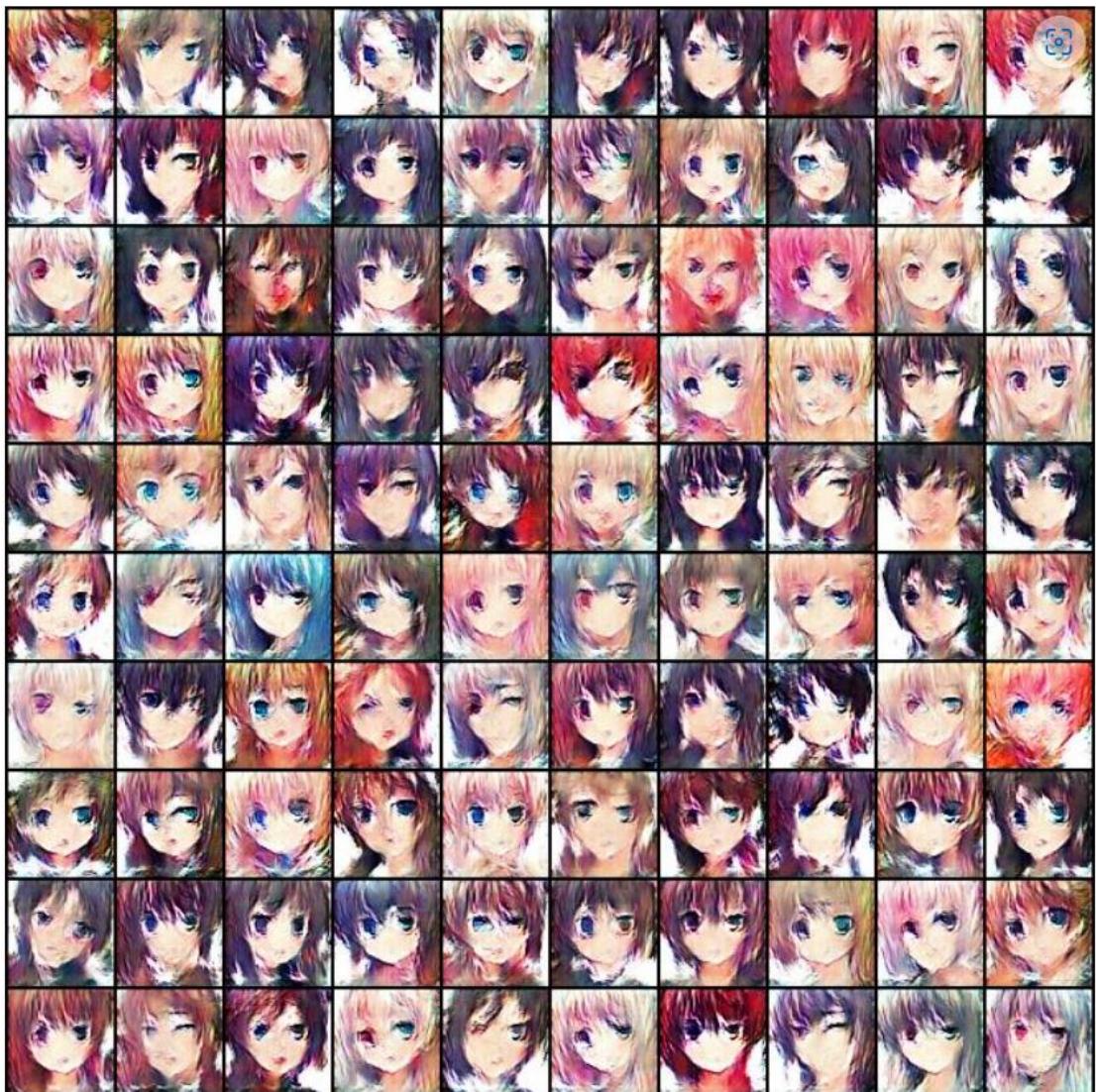
- Epoch 15



- Epoch 16



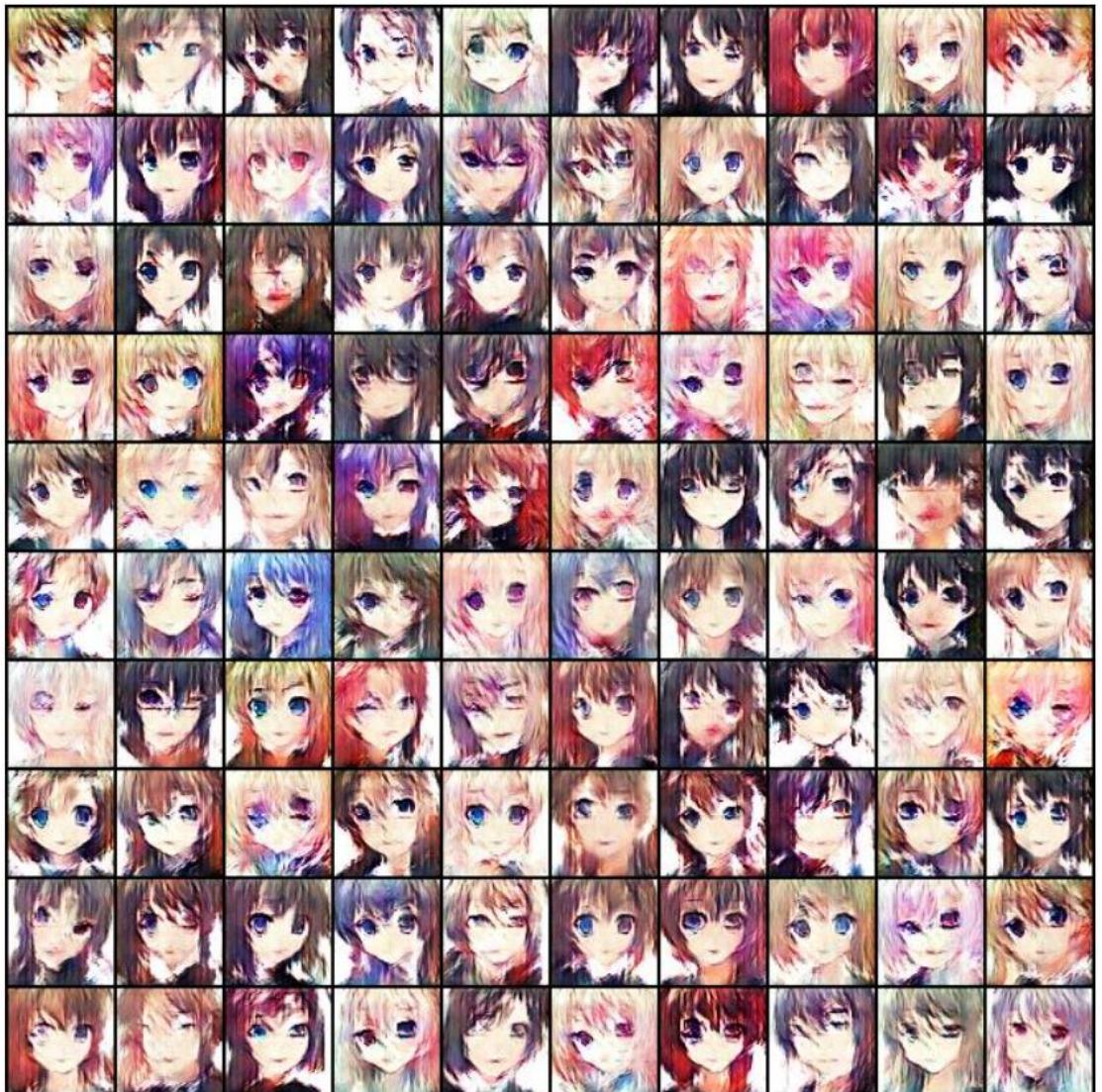
- Epoch 17



- Epoch 18



- Epoch 19



- Epoch 20



Observation

In the beginning, the images showed significant improvement in clarity (from 1 to 4), but as the process continued, there wasn't much noticeable progress. It can be inferred that the optimization might have plateaued or become stuck in a local minimum.

Q3. Discuss about A.1-4. Please explain how the z vector influence your images here

The following are the result of A.1-4:



The images appear to undergo a linear transformation, resulting in a distinctively different picture. I believe that the latent space, where the z vector resides, effectively maps similar features from the images to nearby regions in the latent space. Thus, we can observe a gradual transformation from Image 1 to Image 2.