

1. Demo

Run the **demo.py**.

The demo contains two parts: 1) **Sampling**, 2) **FID_Calculation** shown as screenshots below.

```
##### Part1: SAMPLING #####
# Demo GNN
loading GNN model .....
GNN load pretrained_parameters successfully
GNN discriminator size 161143 parameters
GNN generator size 1151972 parameters
generating GNN sample .....
GNN samples saved in folder demo_save

# Demo VAE
loading VAE model .....
VAE load pretrained_parameters successfully
VAE recond size 127084 parameters
generating VAE samples .....
VAE samples saved in folder demo_save

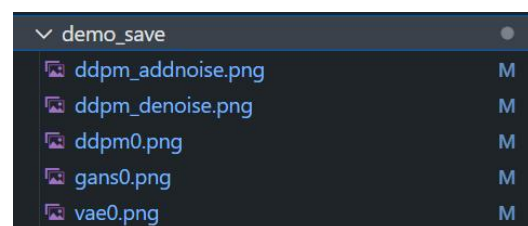
# Demo DQNN
loading DQNN model .....
DQNN load pretrained_parameters successfully
DQNN model size 2564663 parameters
generating DQNN samples .....
DQNN samples saved in folder demo_save

##### Part2: FID #####
# FID File
generating FID File for VAE File
generating FID File for GNN File
FID score = 0.842108643005
VAE_val_fid_score = 18.166006412027

# GAN File
generating logs for GAN File
GAN score = 21.51686000170482
GAN_val_fid_score = 18.16407176770482

# GMM File
generating logs for GMM File
GMM score = 12.517000116979
GMM_val_fid_score = 18.16407176770482
GMM load pretrained_parameters successfully
GMM_val_fid_score = 18.16407176770482
```

Samples are saved in the **folder demo_save**. **FID scores** are displayed in the terminal.

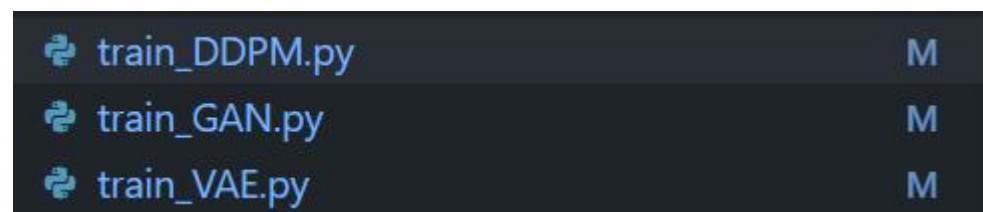


2. Training

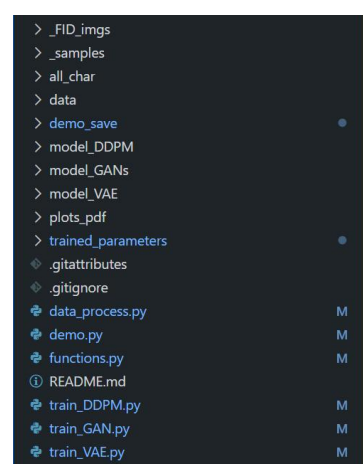
For each model training named as **train_MODEL.py**,

run the code to reproduce our training processes.

Var **model_name** is required in those codes to load our trained model saved in **folder trained_parameters**. You may change the **model_name** to train a new model, but please make sure the name is not duplicated in the folder **trained_parameters**.



3. Structure Explain



_FID_img: This folder is generated when calculating FID scores. The images used in this process are saved here.

_samples: Training samples are saved here as grid images, named according to the model and epoch.

_all_char: This contains the handwritten images we selected from the handwritten dataset (as mentioned in our report). These images were preprocessed using our functions and converted into numpy files stored in the data folder.

data: The data used for training (handwriting, CIFAR-10) is stored here.

demo_save: Demo pictures are saved in this folder.

model_DDPM, model_GANs, model_VAE: These folders contain the implementations of each respective model.

plot_pdf: Training loss plots are saved here as PDF files.

trained_parameters: Model parameters saved as .pth files are stored here.

data_process: Implementations for data processing, such as customizing our handwritten dataset and encapsulating data-related functions.

functions: Reusable encapsulated functions, including: `# load_model,`

`# saving training samples, # generating images for FID calculation, # calculating FID, and others.`