Claims

What is claimed is:

1. A method for training an image generation model, comprising:

acquiring a first transformation model by training, wherein the first transformation model is configured to generate a first training image according to a first noise sample, the first training image being an image of a first style;

inputting an original image sample into a reconstruction model, wherein the reconstruction model is configured to map the original image sample to a latent variable corresponding to the original image sample, generate a reconstructed image corresponding to the original image sample by inputting the latent variable corresponding to the original image sample into the first transformation model, and adjust parameters of the reconstruction model based on the original image sample and the reconstructed image corresponding to the original image sample, thereby acquiring the reconstruction model by training based on the first transformation model;

acquiring a second transformation model by training, wherein the second transformation model is configured to generate a second training image according to a second noise sample, the second training image being an image of a second style;

generating a grafted transformation model by grafting the first transformation model with the second transformation model, comprising: generating the grafted transformation model by grafting n layers of weight network in a plurality of layers of weight network of the first transformation model with m layers of weight network in a plurality of layers of weight network of the second transformation model; wherein layers of the n layers of weight network and layers of the m layers of weight network are different, n is a positive integer, and m is a positive integer; or generating the grafted transformation model by performing a summing or averaging or difference operation on weight parameters of the plurality of layers of weight network of the first transformation model and corresponding weight parameters of the plurality of layers of weight network of the second transformation model; and

generating the image generation model by combining the reconstruction model and the grafted transformation model, wherein the image generation model is configured to generate a latent variable corresponding to an image to be transformed of the first style by inputting the image

to be transformed of the first style into the reconstruction model in the image generation model; and generate, based on the latent variable corresponding to the image to be transformed, a target image corresponding to the image to be transformed using the grafted transformation model in the image generation model, wherein the target image is an image of the second style.

2. The method according to claim 1, wherein

the first transformation model comprises a first mapping network and a first synthesis network; and

training the first transformation model comprises:

acquiring a first training sample set, wherein the first training sample set comprises a plurality of first noise samples;

acquiring latent variables respectively corresponding to the plurality of first noise samples by inputting the plurality of first noise samples into the first mapping network;

acquiring first training images respectively corresponding to the plurality of first noise samples by inputting the latent variables respectively corresponding to the plurality of first noise samples into the first synthesis network; and

adjusting a weight parameter of the first transformation model based on the first training images respectively corresponding to the plurality of first noise samples.

3. The method according to claim 2, wherein

the first transformation model comprises a first discrimination network; and

adjusting the weight parameter of the first transformation model based on the first training images respectively corresponding to the plurality of first noise samples comprises:

acquiring first discrimination losses respectively corresponding to the plurality of first noise samples by inputting the plurality of first training images respectively corresponding to the plurality of first noise samples into the first discrimination network; and

adjusting the weight parameter of the first transformation model based on the first discrimination losses respectively corresponding to the plurality of first noise samples.

4. The method according to claim 1, wherein training the reconstruction model based on the first transformation model comprises:

acquiring a second training sample set, wherein the second training sample set comprises a plurality of original image samples;

generating latent variables respectively corresponding to the plurality of original image samples by inputting the plurality of original image samples into the reconstruction model;

generating reconstructed images respectively corresponding to the plurality of original image samples by inputting the latent variables respectively corresponding to the plurality of original image samples into the first transformation model, wherein the plurality of original image samples and the reconstructed images respectively corresponding to the plurality of original image samples are images of the first style;

determining losses of the reconstruction model respectively corresponding to the plurality of original image samples based on the plurality of original image samples and the reconstructed images respectively corresponding to the plurality of original image samples; and

adjusting a weight parameter of the reconstruction model based on the losses of the reconstruction model respectively corresponding to the plurality of original image samples.

5. The method according to claim 4, wherein

the first transformation model comprises a first discrimination network; and

determining the losses of the reconstruction model respectively corresponding to the plurality of original image samples based on the plurality of original image samples and the reconstructed images respectively corresponding to the plurality of original image samples comprises:

determining a first sub-loss based on an output result acquired by inputting each of the reconstructed images respectively corresponding to the plurality of original image samples into the first discrimination network, wherein the first sub-loss indicates a first characterization of the reconstructed image;

determining a second sub-loss based on an output result acquired by inputting each of the plurality of original image samples and each of the reconstructed images respectively corresponding to the plurality of original image samples into a perceptual network, wherein

the second sub-loss indicates a first degree of conformity of the original image sample to the reconstructed image corresponding to the original image sample with respect to a target feature;

determining a third sub-loss based on an output result acquired by inputting each of the plurality of original image samples and each of the reconstructed images respectively corresponding to the plurality of original image samples into a regression function, wherein the third sub-loss indicates a second degree of conformity of the original image sample to the reconstructed image corresponding to the original image sample with respect to the target feature; and

determining the loss of the reconstruction model based on the first sub-loss, the second sub-loss, and the third sub-loss.

6. The method according to any one of claims 1 to 5, wherein during a training process, an initial weight parameter of the second transformation model is a weight parameter of the first transformation model.

7. The method according to any one of claims 1 to 5, wherein generating the image generation model based on the reconstruction model and the grafted transformation model comprises:

acquiring a combined transformation model by combining the reconstruction model and the grafted transformation model;

acquiring a fourth training sample set, wherein the fourth training sample set comprises at least one original image sample and an image of the second style corresponding to the at least one original image sample; and

generating the image generation model by fine-tuning the combined transformation model using the fourth training sample set.

8. A method for generating images, comprising:

generating a latent variable corresponding to an image to be transformed by inputting the image to be transformed of a first style into a reconstruction model in an image generation model; and

generating, based on the latent variable corresponding to the image to be transformed, a target image corresponding to the image to be transformed using a grafted transformation model in the image generation model, wherein the target image is an image of a second style;

wherein the grafted transformation model is a model generated by grafting a first transformation model with a second transformation model, the first transformation model is configured to generate an image of the first style according to a first noise sample, and the second transformation model is configured to generate an image of the second style according to a second noise sample;

wherein the reconstruction model is acquired by training based on the first transformation model, comprising: inputting an original image sample into a reconstruction model, wherein the reconstruction model is configured to map the original image sample to a latent variable corresponding to the original image sample, generating a reconstructed image corresponding to the original image sample by inputting the latent variable corresponding to the original image sample into the first transformation model, and adjusting parameters of the reconstruction model based on the original image sample and the reconstructed image corresponding to the original image sample;

wherein the grafted transformation model is the model generated by grafting the first transformation model with the second transformation model, comprising: generating the grafted transformation model by grafting n layers of weight network in a plurality of layers of weight network of the first transformation model with m layers of weight network in a plurality of layers of weight network of the second transformation model; wherein layers of the n layers of weight network and layers of the m layers of weight network are different, n is a positive integer, and m is a positive integer; or generating the grafted transformation model by performing a summing or averaging or difference operation on weight parameters of the plurality of layers of weight network of the first transformation model and corresponding weight parameters of the plurality of layers of weight network of the second transformation model;

wherein the image generation model is a model generated by combining the reconstruction model and the grafted transformation model, wherein the image generation model is configured to generate a latent variable corresponding to an image to be transformed of the first style by inputting the image to be transformed of the first style into the reconstruction model in the image generation model; and generate, based on the latent variable corresponding to the image to be transformed, a target image corresponding to the image to be transformed using the grafted transformation model in the image generation model, wherein the target image is an image of the second style.

9. An apparatus for training an image generation model, comprising:

a model training module, configured to acquire a first transformation model by training, wherein the first transformation model is configured to generate a first training image according to a first noise sample, the first training image being an image of a first style, wherein

the model training module is further configured to: input an original image sample into a reconstruction model, wherein the reconstruction model is configured to map the original image sample to a latent variable corresponding to the original image sample, generate a reconstructed image corresponding to the original image sample by inputting the latent variable corresponding to the original image sample into the first transformation model, and adjust parameters of the reconstruction model based on the original image sample and the reconstructed image corresponding to the original image sample, thereby acquiring the reconstruction model by training based on the first transformation model, and

the model training module is further configured to acquire a second transformation model by training, wherein the second transformation model is configured to generate a second training image according to a second noise sample, the second training image being an image of a second style; and

a model generation module, configured to generate a grafted transformation model by grafting the first transformation model with the second transformation model by: generating the grafted transformation model by grafting n layers of weight network in a plurality of layers of weight network of the first transformation model with m layers of weight network in a plurality of layers of weight network of the second transformation model; wherein layers of the n layers of

weight network and layers of the m layers of weight network are different, n is a positive integer, and m is a positive integer; or generating the grafted transformation model by performing a summing or averaging or difference operation on weight parameters of the plurality of layers of weight network of the first transformation model and corresponding weight parameters of the plurality of layers of weight network of the second transformation model, wherein

the model generation module is further configured to generate the image generation model by combining the reconstruction model and the grafted transformation model, wherein the image generation model is configured to generate a latent variable corresponding to an image to be transformed of the first style by inputting the image to be transformed of the first style into the reconstruction model in the image generation model; and generate, based on the latent variable corresponding to the image to be transformed, a target image corresponding to the image to be transformed using the grafted transformation model in the image generation model, wherein the target image is an image of the second style.

10. An apparatus for generating images, comprising:

a variable generation module, configured to generate a latent variable corresponding to an image to be transformed by inputting the image to be transformed of a first style into a reconstruction model in an image generation model; and

an image generation module, configured to generate, based on the latent variable corresponding to the image to be transformed, a target image corresponding to the image to be transformed using a grafted transformation model in the image generation model, wherein the target image is an image of a second style;

wherein the grafted transformation model is a model generated by grafting a first transformation model with a second transformation model, the first transformation model is configured to generate an image of the first style according to a first noise sample, and the second transformation model is configured to generate an image of the second style according to a second noise sample;

wherein the reconstruction model is acquired by training based on the first transformation model, by: inputting an original image sample into a reconstruction model, wherein the

reconstruction model is configured to map the original image sample to a latent variable corresponding to the original image sample, generating a reconstructed image corresponding to the original image sample by inputting the latent variable corresponding to the original image sample into the first transformation model, and adjusting parameters of the reconstruction model based on the original image sample and the reconstructed image corresponding to the original image sample;

wherein the grafted transformation model is the model generated by grafting the first transformation model with the second transformation model, by: generating the grafted transformation model by grafting n layers of weight network in a plurality of layers of weight network of the first transformation model with m layers of weight network in a plurality of layers of weight network of the second transformation model; wherein layers of the n layers of weight network and layers of the m layers of weight network are different, n is a positive integer, and m is a positive integer; or generating the grafted transformation model by performing a summing or averaging or difference operation on weight parameters of the plurality of layers of weight network of the first transformation model and corresponding weight parameters of the plurality of layers of weight network of the second transformation model;

wherein the image generation model is a model generated by combining the reconstruction model and the grafted transformation model, wherein the image generation model is configured to generate a latent variable corresponding to an image to be transformed of the first style by inputting the image to be transformed of the first style into the reconstruction model in the image generation model; and generate, based on the latent variable corresponding to the image to be transformed, a target image corresponding to the image to be transformed using the grafted transformation model in the image generation model, wherein the target image is an image of the second style.

11. A computer device, comprising: a processor and a memory, the memory storing one or more computer programs therein, wherein the one or more computer programs, when loaded and run by the processor of the computer device, cause the computer device to perform the method for training the image generation model as defined in any one of claims 1 to 7, or perform the method for generating the images as defined in claim 8.

12. A computer-readable storage medium, storing one or more computer programs therein, wherein the one or more computer programs, when loaded and run by a processor, cause the processor to perform the method for training the image generation model as defined in any one of claims 1 to 7, or perform the method for generating the images as defined in claim 8.

13. A computer program product, when loaded and executed by a processor, causes the processor to perform the method for training the image generation model as defined in any one of claims 1 to 7, or perform the method for generating the images as defined in claim 8.