

Exploring the latent space of StyleGAN-type models

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Outline

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④ The disentanglement of latent spaces

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- InterfaceGAN
- The correlation between layers and attributes
- Projection

GAN overview

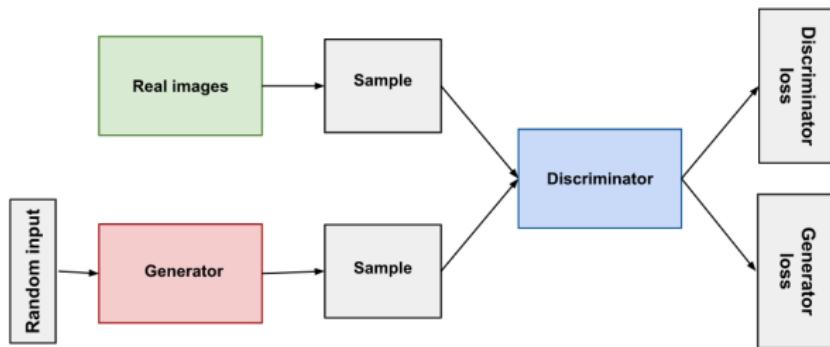


Figure: Generative adversarial network (GAN) model.

From StyleGAN to StyleGAN2

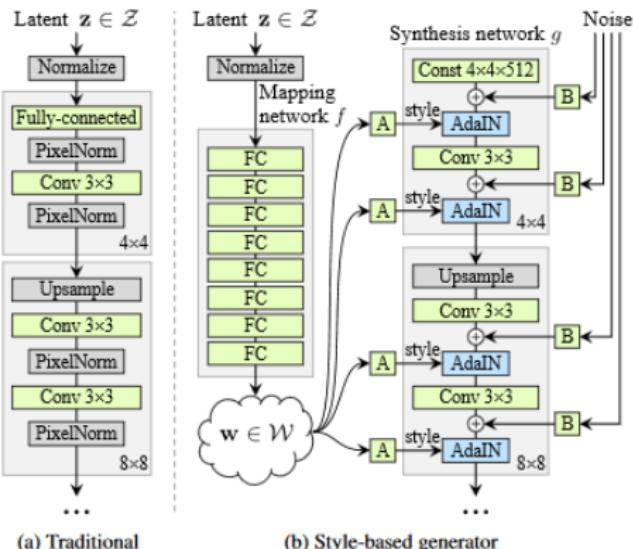


Figure: The traditional and style-based generator

From StyleGAN to StyleGAN2

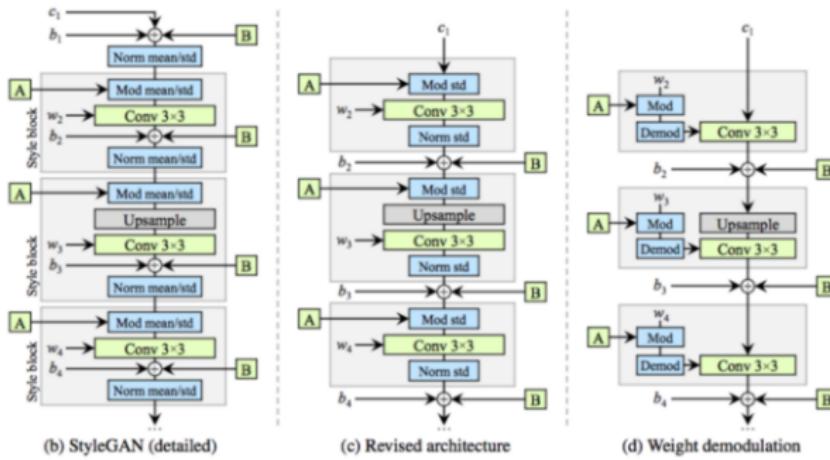


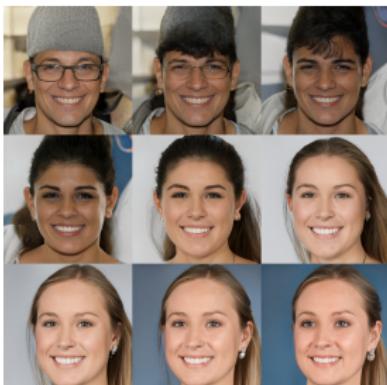
Figure: The architecture of StyleGAN2

The interpolation on \mathcal{Z} and \mathcal{W} spaces

The interpolation is defined as

$$t \cdot z_1 + (1 - t) \cdot z_2$$

for $z_1, z_2 \in \mathcal{Z}$ and $t \in [0, 1]$, analogous with vector $w \in \mathcal{W}$.



(a) The interpolation on
 \mathcal{Z} space



(b) The interpolation on
 \mathcal{W} space

Figure: Experiments on the linearity of the latent spaces

How the images look like when we change the direction of latent vectors?



(a) Gender direction



(b) Age direction



(c) Glasses direction



(d) Smile direction

Figure: The results when changing the direction of vector w

InterfaceGAN

Attribute	\mathcal{Z} space	Input	\mathcal{W} space
Glasses			
			
			
Gender			
Smile			

Table: The variation of some attributes is implemented on both \mathcal{Z} and \mathcal{W} space

InterfaceGAN



Figure: The age manipulation in \mathcal{W} and \mathcal{Z} spaces, first and second rows, respectively.

The correlation between layers and attributes

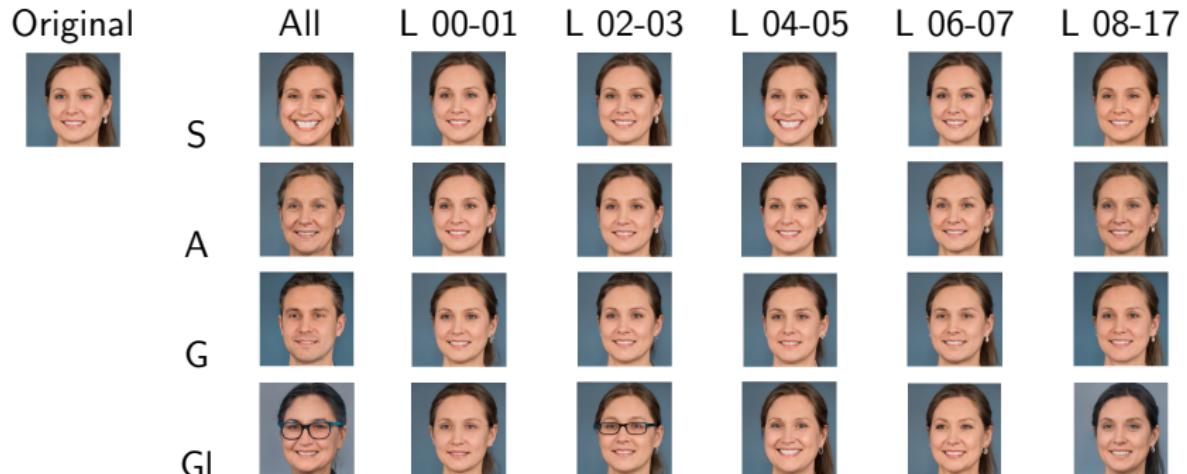


Table: The matrix whose the rows show the changes of attributes and the columns is about the layers are varied.

Projection



Figure: Target images of projection