OPTIMIZING LATENT SPACE DIRECTIONS FOR GAN-BASED LOCAL IMAGE EDITING

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Semantic Image Editing

Original

Eyebrows

Mouth

Hair
Generative Adversarial Networks (GANs)

StyleGAN2 Trained of FFHQ
Generative Adversarial Networks (GANs)

StyleGAN2 Trained of LSUN Cars
Generative Adversarial Networks (GANs)

BigGAN trained on ImageNet
Locally Effective Latent Space Directions (LELSD)
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Locally Effective Latent Space Directions (LELSD)

\[ \alpha \sim \mathcal{U}[-1.0, 1.0] \]

\[ u_{\text{hair}} \]

\[ \omega \]

\[ \omega + \alpha u_{\text{hair}} \]

Generator

Generator

X
Locally Effective Latent Space Directions (LELSD)
Locally Effective Latent Space Directions (LELSD)
Locally Effective Latent Space Directions (LELSD)
Locally Effective Latent Space Directions (LELSD)

Latent Space

\[ \Omega \]

\[ \alpha \sim U[-1.0, 1.0] \]

\[ \omega \]

\[ u_{\text{hair}} \]

\[ \omega + \alpha u_{\text{hair}} \]

\[ x \]

\[ x^{\text{edit}} \]

\[ S_{\text{hair}} \]

\[ LS(\mathbf{u}) = \frac{\sum_{i,j} s_{i,j}(x, x^{\text{edit}}) \odot |r - r^{\text{edit}}(\mathbf{u})|^2}{\sum_{i,j} |r - r^{\text{edit}}(\mathbf{u})|^2} \]
Locally Effective Latent Space Directions (LELSD)

\[ LS(u) = \frac{\sum_{i,j} s_c(x, x^{edit}) \circ |r - r^{edit}(u)|^2}{\sum_{i,j} |r - r^{edit}(u)|^2} \]
\[(4^2 - 8^2)\]
\[(16^2 - 32^2)\]
\[(64^2 - 128^2)\]
Sequential editing of real photos
Sequential editing of real photos
Sequential editing of real photos
Sequential editing of real photos
Sequential editing of real photos
Thank you for watching!