Image2StyleGAN++: How to Edit the Embedded Images?

Euna Lee, Kayla Ng, Luke Tao, Arthi Vijayakumar, Johnry Zhao

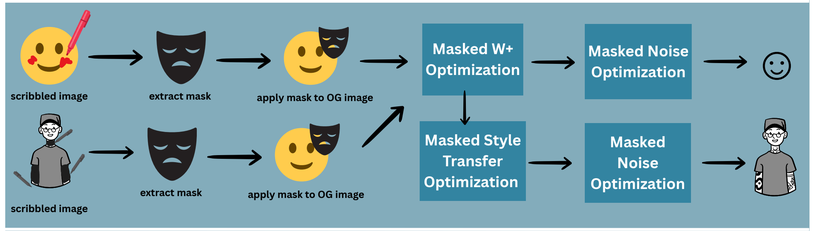
Cornell University

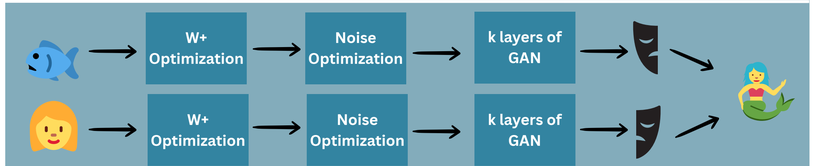
Introduction & Motivation

This paper focuses on improving upon the existing **Image2StyleGAN** framework—an image editing framework. The improved version, Image2StyleGAN++, introduces three main contributions:

1. Optimize noise separately from optimizing the latent space.
2. Use the global latent space (W^+) to make local edits with masks on images.
3. Combine W^+ embedding with activation tensors.

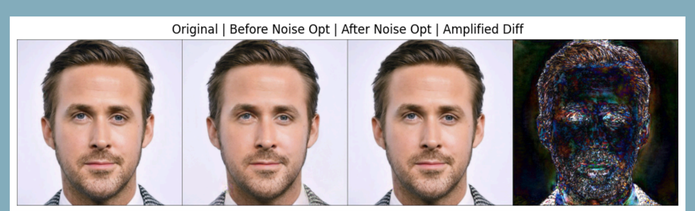
Methodology



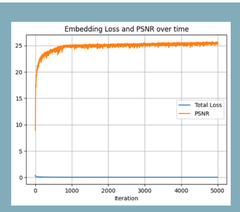


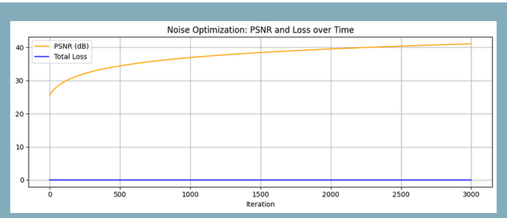
Results

Contribution 1:



PSNR SCORES: Pre Noise: ~ 30 DB Post Noise: ~ 42 DB





Contribution 2:

Local Edits Using Scribble:

Style Transfer:

Contribution 3:

Spatial Copying → W+ Blending

Conclusion

- Contribution 1 achieved similar PSNR scores
- Had to implement custom style loss function
- Quality of input images impacted the reconstruction of our output images
- Contribution 3: Adding W+ blending produced more organically combined images than just spatial copying

Future Works

Their ideas:

- in addition to static images, aim to extend framework to process and edit videos

Our ideas:

- map scribbles to semantic concepts (U-shaped scribble → smile)
- enable human feedback loops to improve output
- enable editing across different domains (e.g art styles, 3D vs 2D, etc)

References

Image2StyleGAN++: How to Edit the Embedded Images?, openaccess.thecvf.com/content_CVPR_2020/papers/Abdal_Image2StyleGAN_How_to_Edit_the_Embedded_Images_CVPR_2020_paper.pdf. Accessed 6 May 2025.

Our training mistakes ☹