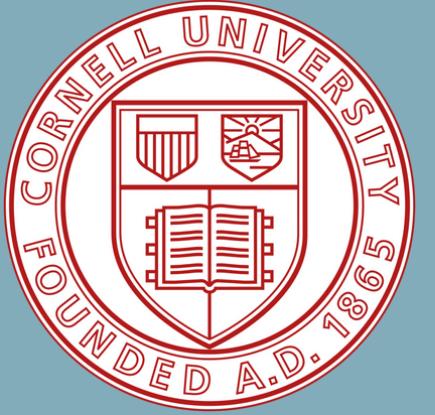
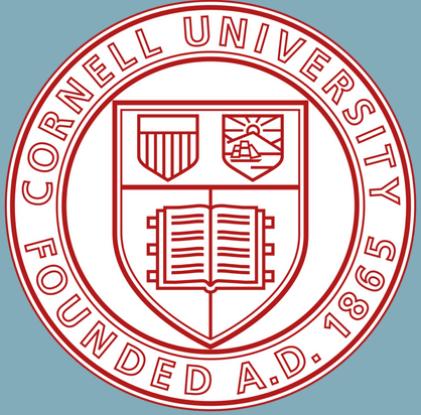


# Image2StyleGAN++: How to Edit the Embedded Images?



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

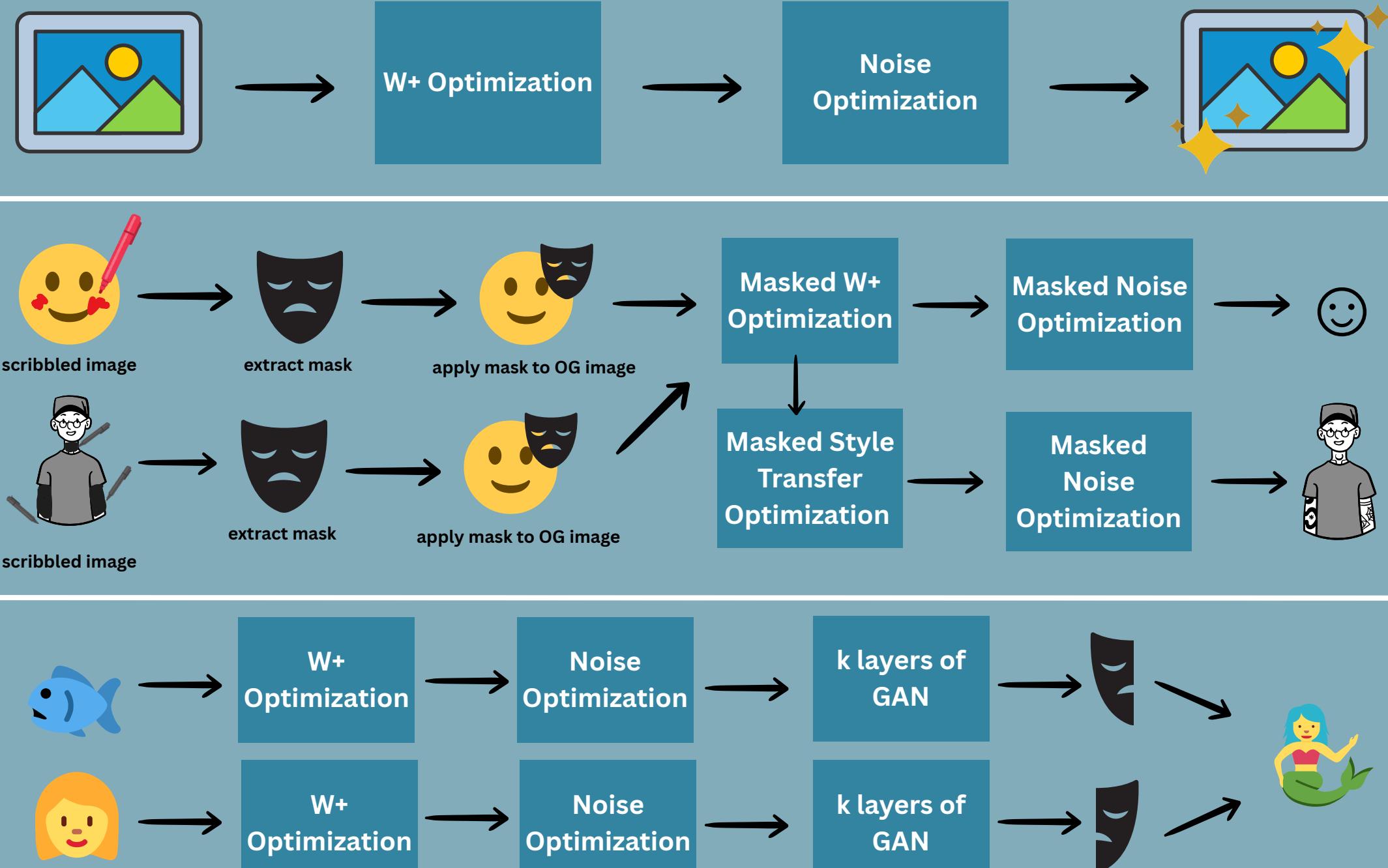
Cornell University

## 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

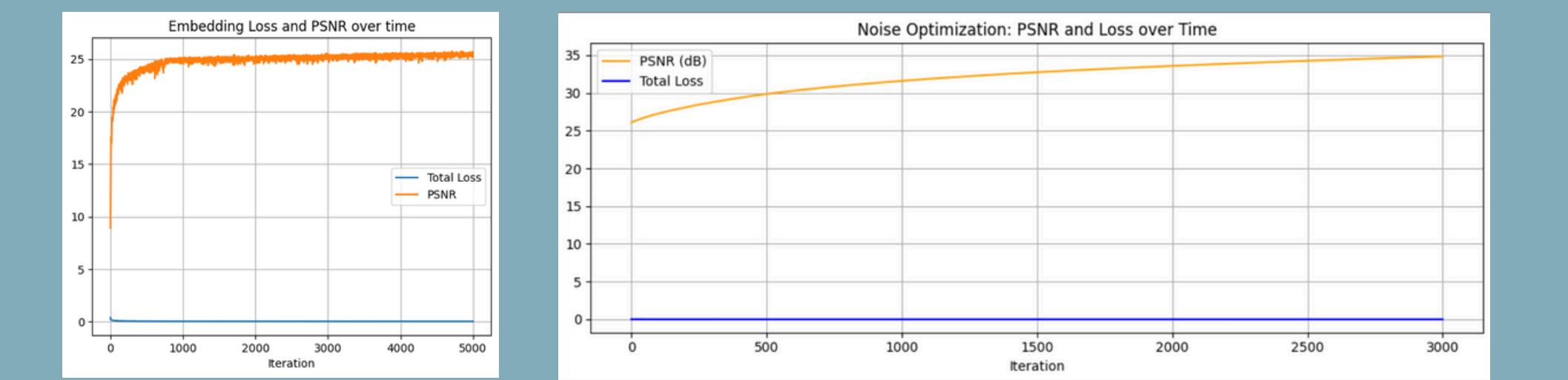


## Results

### Contribution 1:



PSNR SCORES: Pre Noise: ~ 26 DB Post Noise: ~ 35-37 DB

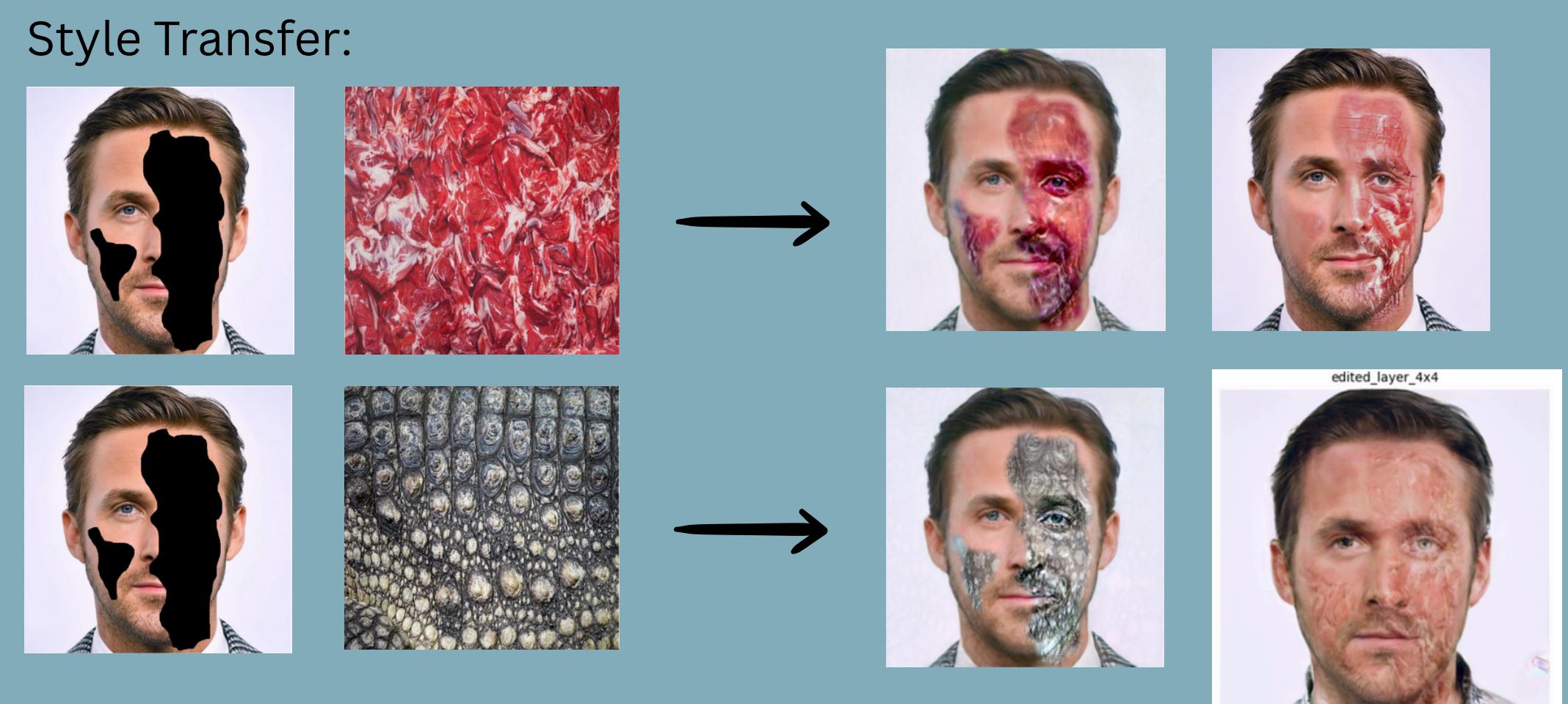


### Contribution 2:

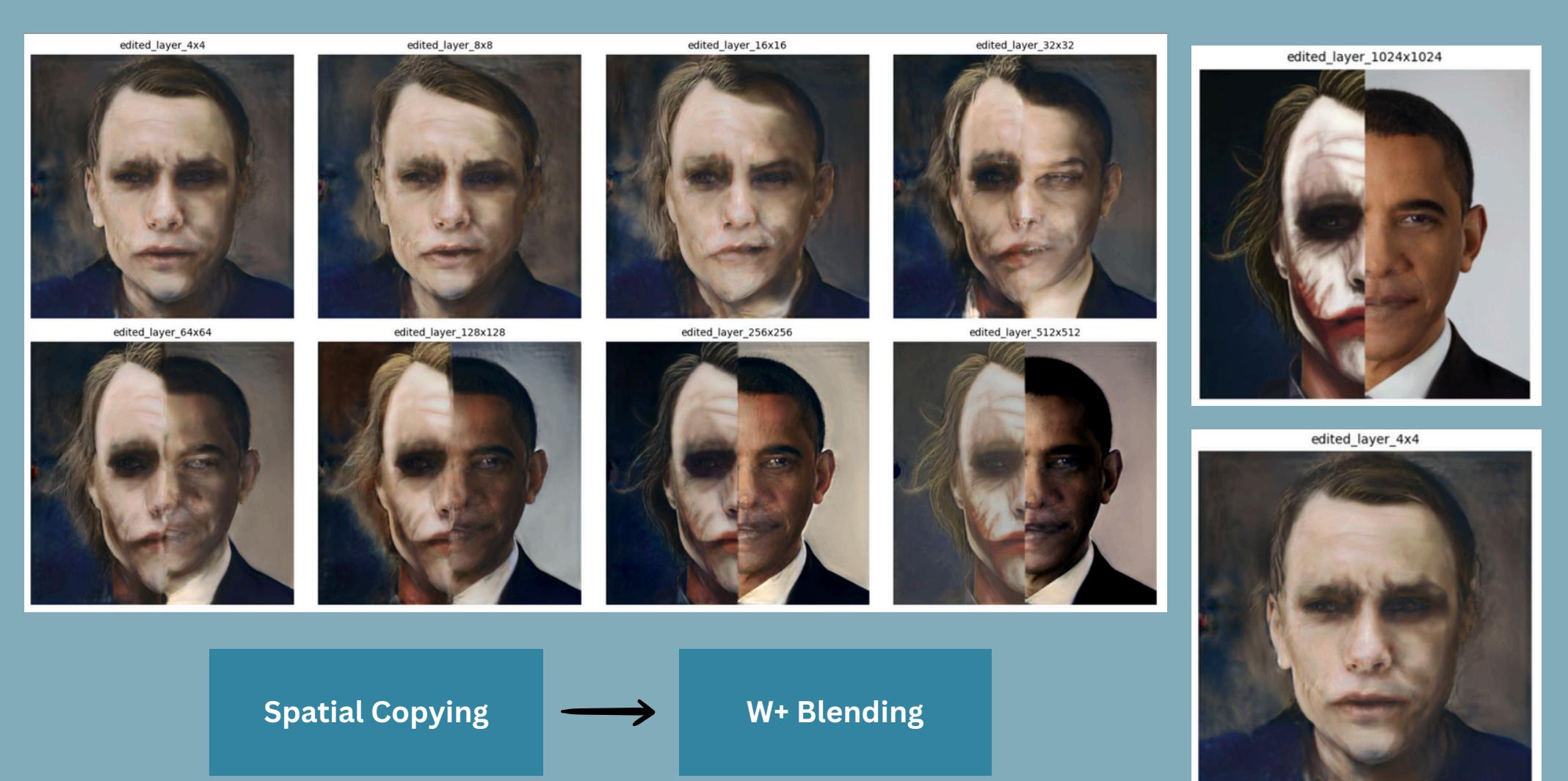
Local Edits Using Scribble:



Style Transfer:



### Contribution 3:



## 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

13.12. Neural Style Transfer – Dive into Deep Learning 0.15.0 documentation. (n.d.). D2L.ai. [https://d2l.ai/chapter\\_computer-vision/neural-style.html](https://d2l.ai/chapter_computer-vision/neural-style.html).  
Abdal, R., Qin, Y., & Wonka, P. (2020). Image2StyleGAN++: How to Edit the Embedded Images? CVPR, 8296-8305. [https://openaccess.thecvf.com/content\\_CVPR\\_2020/papers/Abdal\\_Image2StyleGAN\\_How\\_to\\_Edit\\_the\\_EMBEDDED\\_Images\\_CVPR\\_2020\\_paper.pdf](https://openaccess.thecvf.com/content_CVPR_2020/papers/Abdal_Image2StyleGAN_How_to_Edit_the_EMBEDDED_Images_CVPR_2020_paper.pdf)  
Abdal, R., Qin, Y., & Wonka, P. (2020). Image2StyleGAN++: How to Edit the Embedded Images? -Supplementary Material-. CVPR. [https://openaccess.thecvf.com/content\\_CVPR\\_2020/supplemental/Abdal\\_Image2StyleGAN\\_How\\_to\\_Edit\\_the\\_EMBEDDED\\_Images\\_CVPR\\_2020\\_supplemental.pdf](https://openaccess.thecvf.com/content_CVPR_2020/supplemental/Abdal_Image2StyleGAN_How_to_Edit_the_EMBEDDED_Images_CVPR_2020_supplemental.pdf)  
Bhat, Z. (2021). Image2StyleGAN [Pretrained Model]. <https://github.com/zaidbhat1234/Image2StyleGAN>.  
Mohd, A. (2021, February 8). Neural style transfer using PyTorch. DEV Community. <https://dev.to/aquibpy/neural-style-transfer-using-pytorch-3d5l>.

## Our training mistakes

