

DAMAGED FACIAL IMAGE RECONSTRUCTION



Figure 1: Example of the damaged facial image.

Different modifications to the model improve the result in some specific way. The use of skip connections reduces the level of blurriness in the output, and replacing Dense layers with convolution layers increases the quality of the reconstruction of missing parts. Combining the individual changes into a single model achieves the highest quality results. The quality of the result is also enhanced by what damage was used in the training.

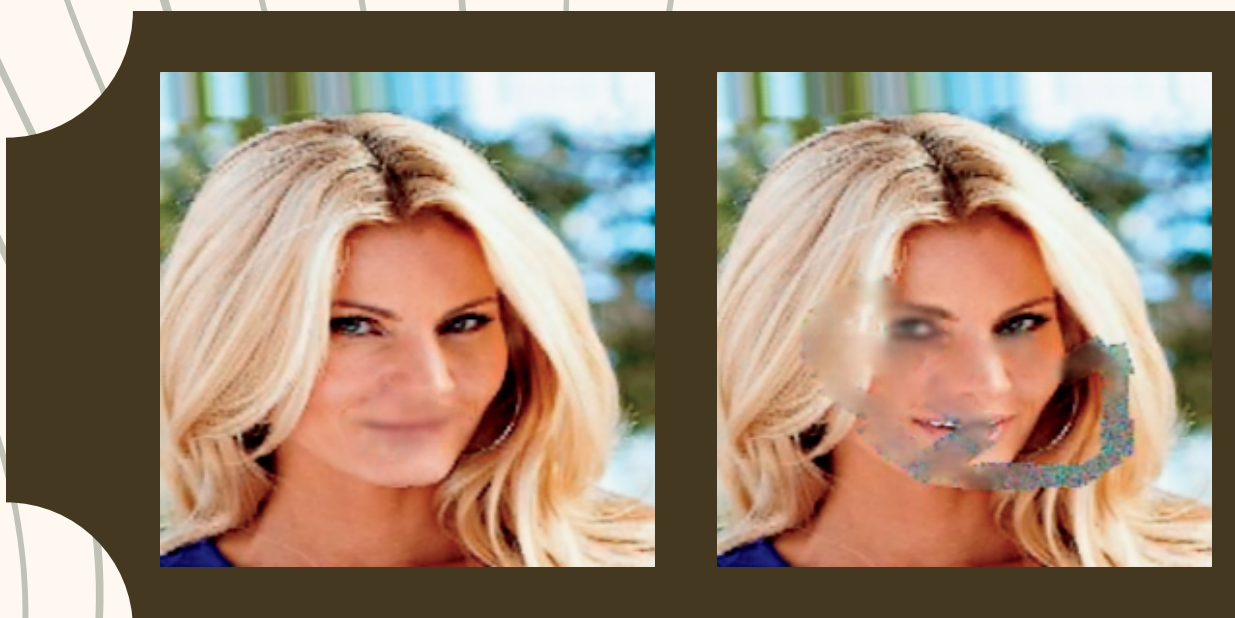


Figure 2: Reconstruction with skip connections.

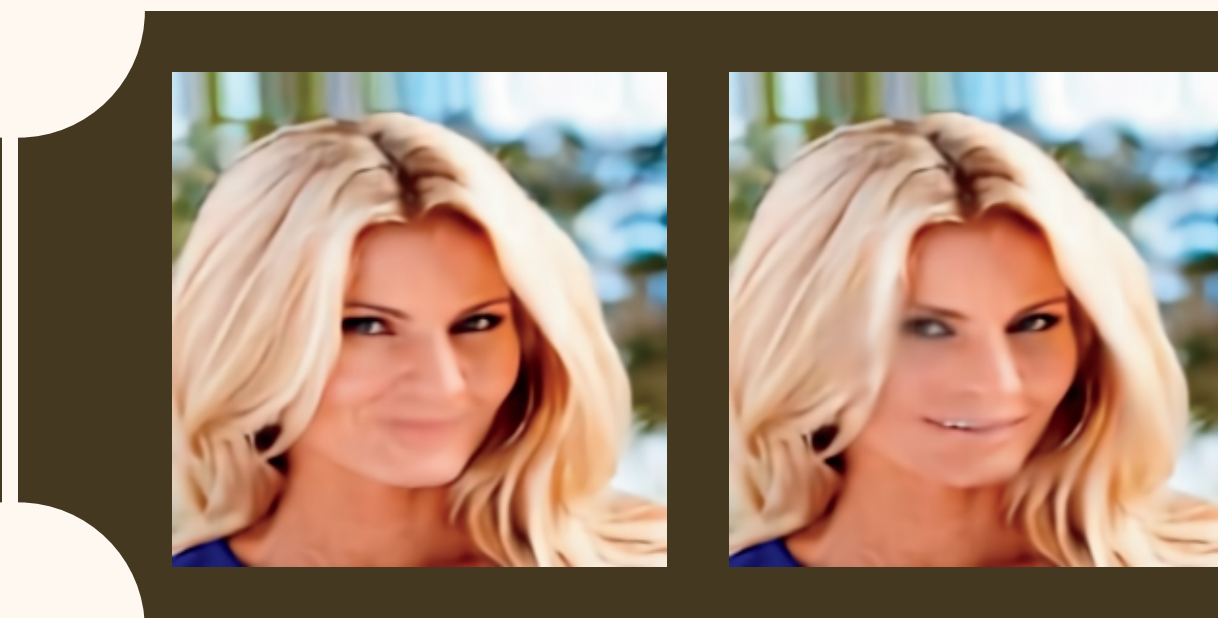


Figure 3: Reconstruction without Dense layers.

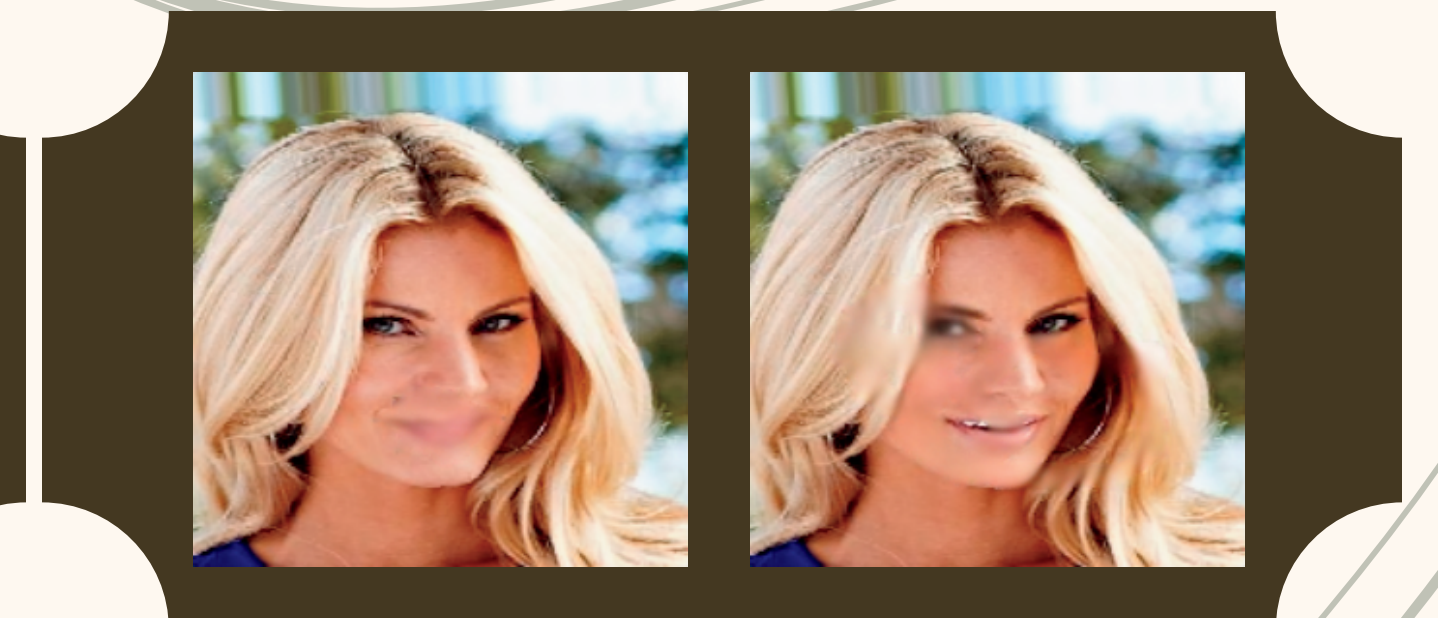


Figure 4: Combination of updates.

The final architecture of the Generator with the application of all the improvements increased the quality of the generated image. (Skip connections, strided convolutions, 2D convolutions instead of Dense layers)

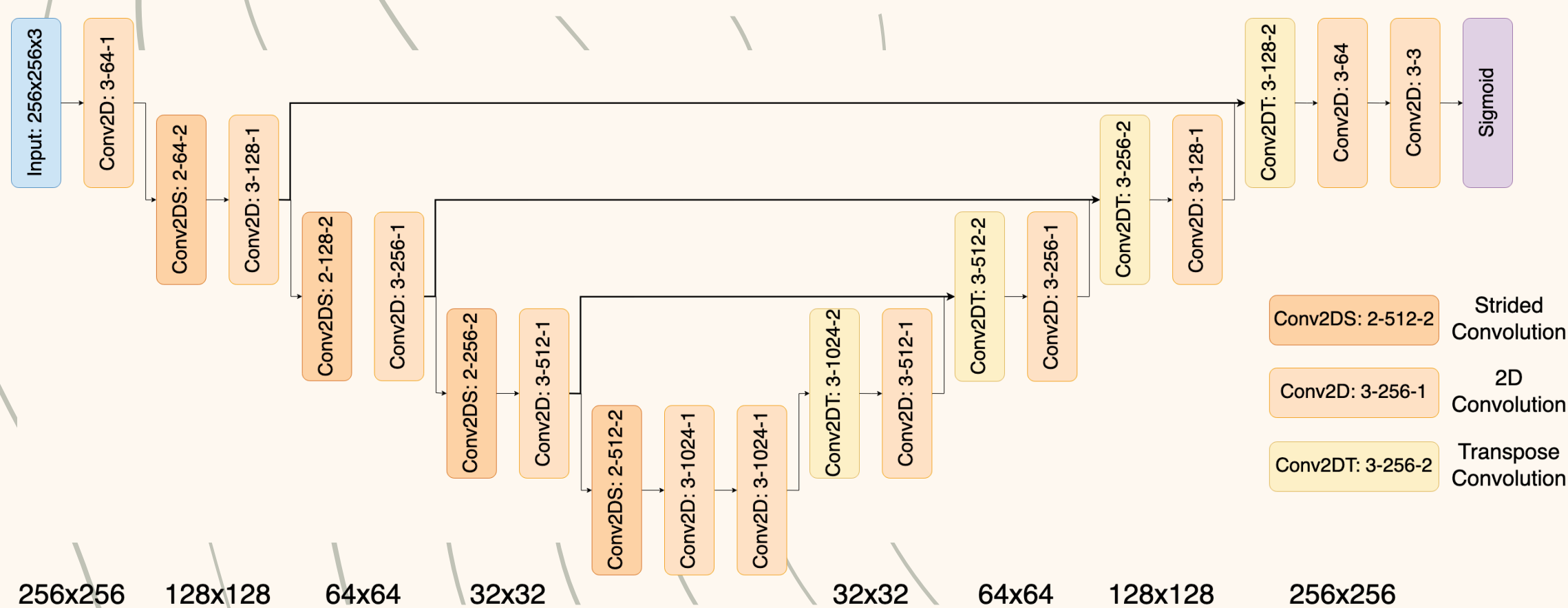


Figure 5: Generator architecture.

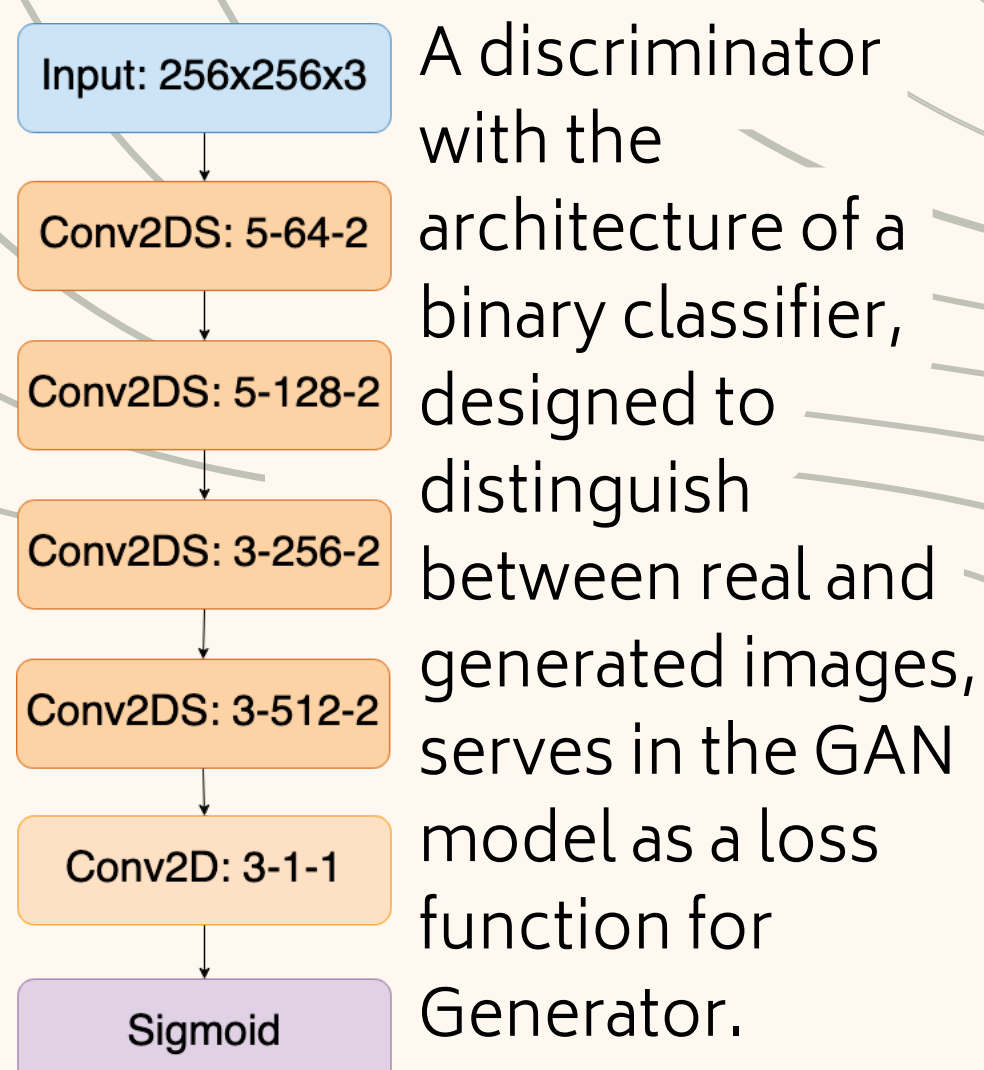


Figure 6: Discriminator architecture.

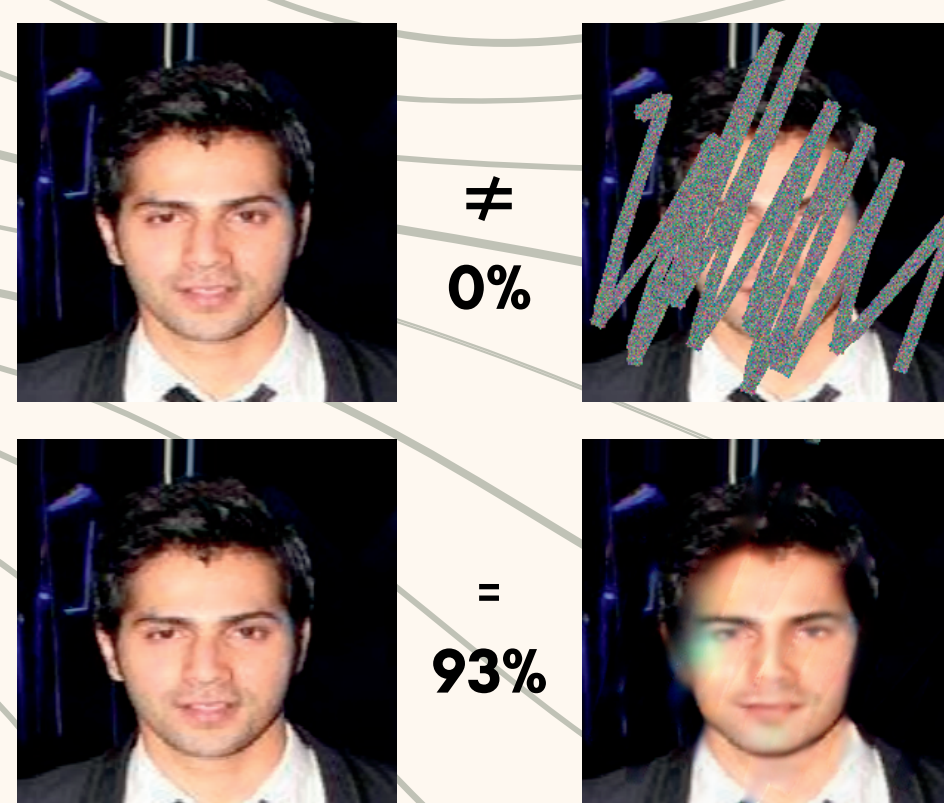


Figure 8: Face recognition comparison on damaged and reconstructed images.

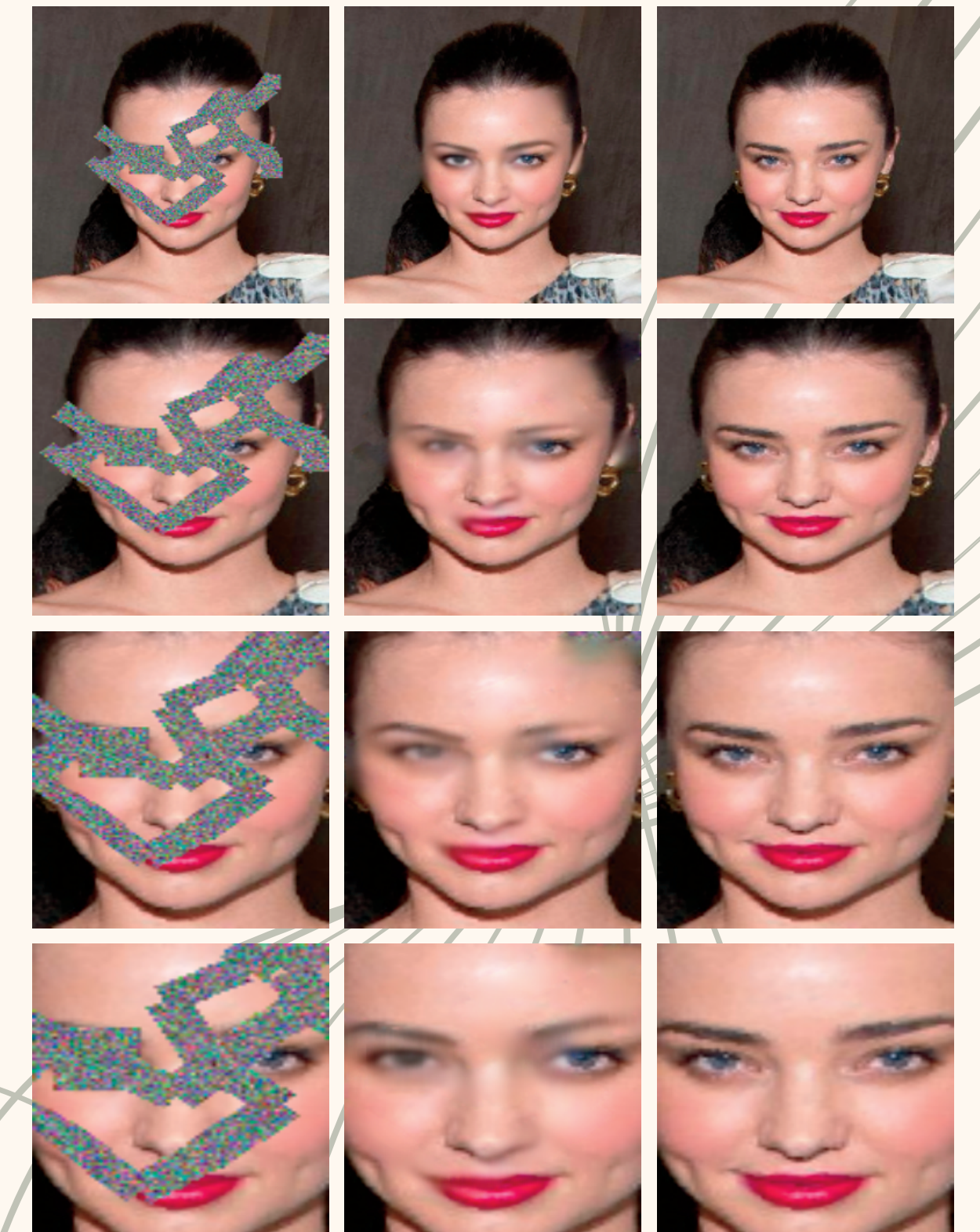


Figure 7: Results of four trainings with different zoom.

Table 1: Performance of different models

ITEM	PSNR	SSIM
Base model	24.931431	0.743891
Add skip connections	34.368622	0.976059
Replace Dense with Conv2D	31.564020	0.920793
Combination	37.851275	0.987335