

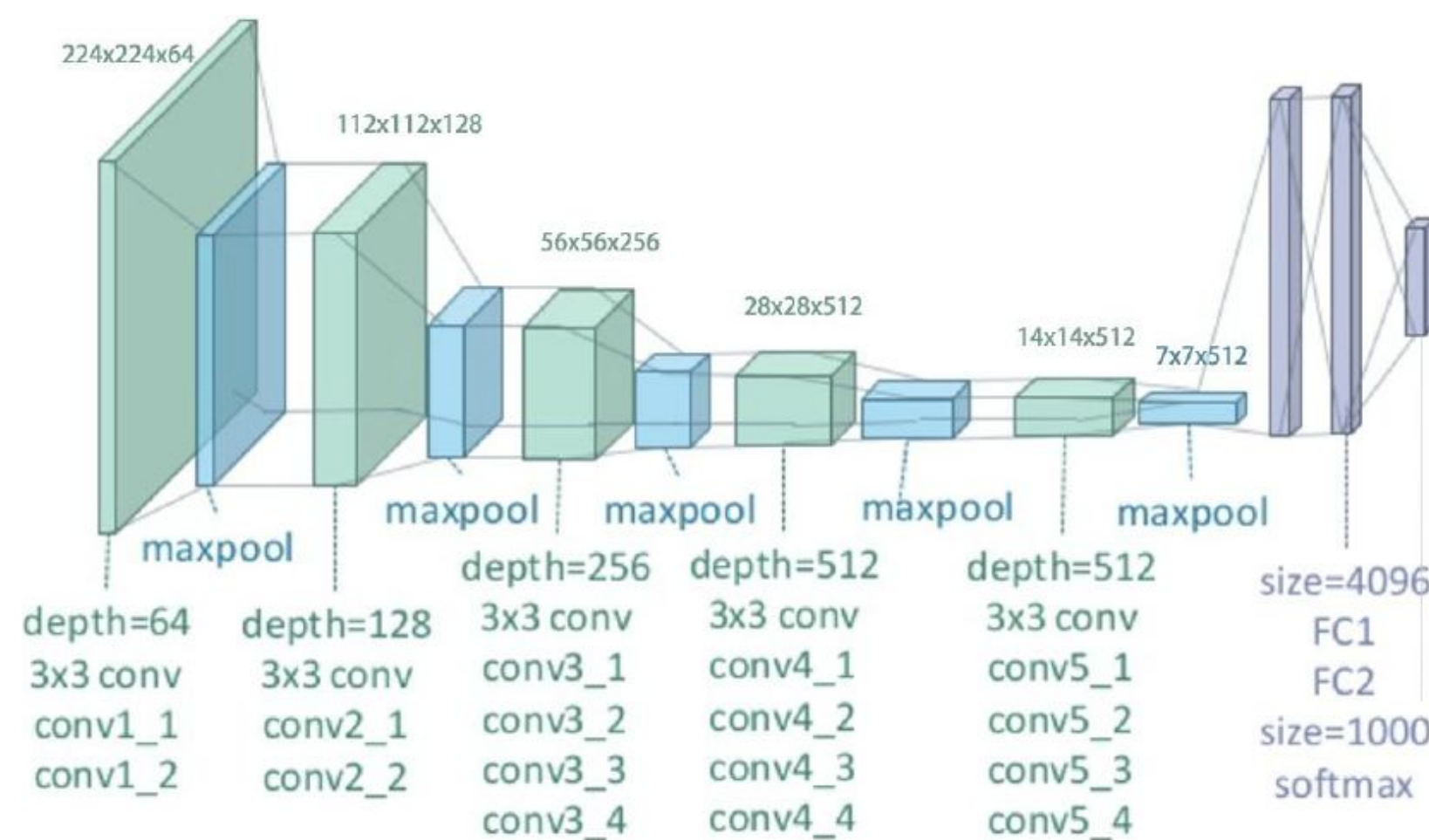
ABSTRACT & OBJECT

- Explored the neural style transfer (NST) model in image style transfer
- Visualized the intermediate layers
- Proposed a quantitative measure using content and style losses for model evaluation
- Experimented the effect of content similarity of the source images on generated image.



METHOD & MODEL

- Training a style transfer model requires two networks: a pre-trained feature extractor and a transfer network.
- Some filters of feature extractor learn to extract the content of an image, while others learn to focus on the texture. The feature extractor enables us to compare the content and style of two images:

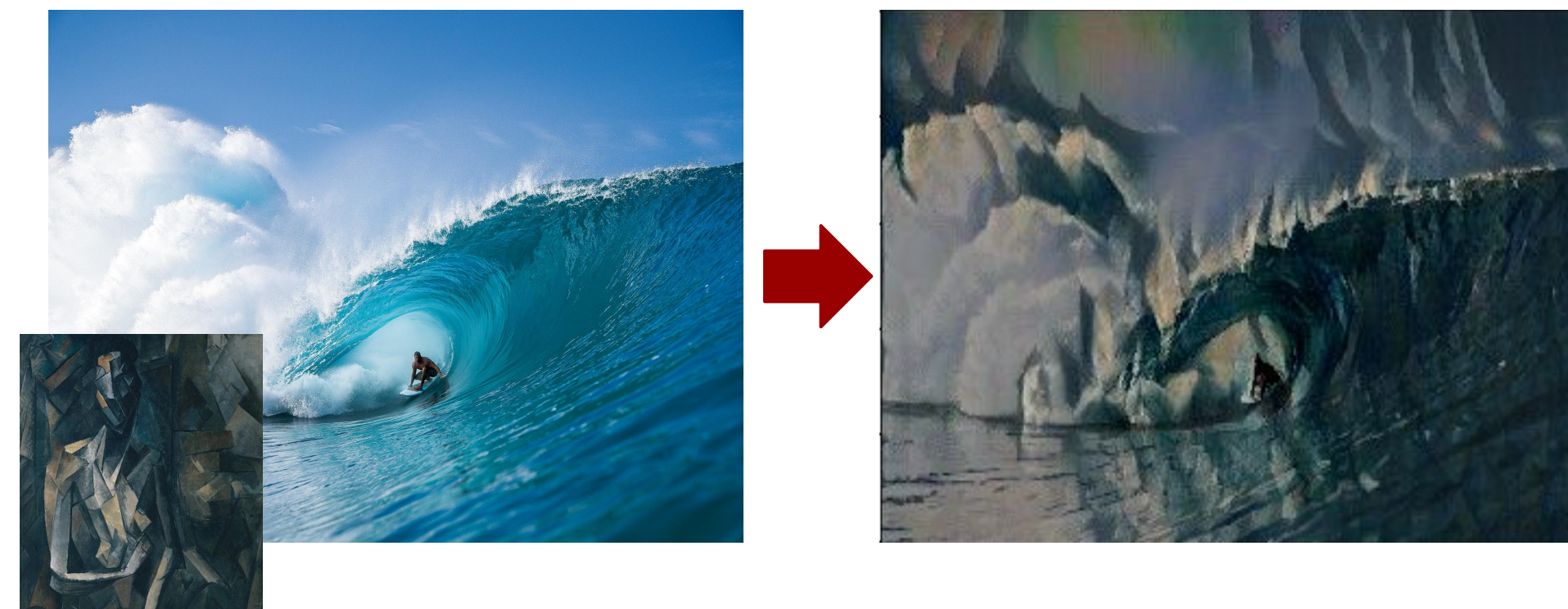


Structure of VGG19 model used in this study

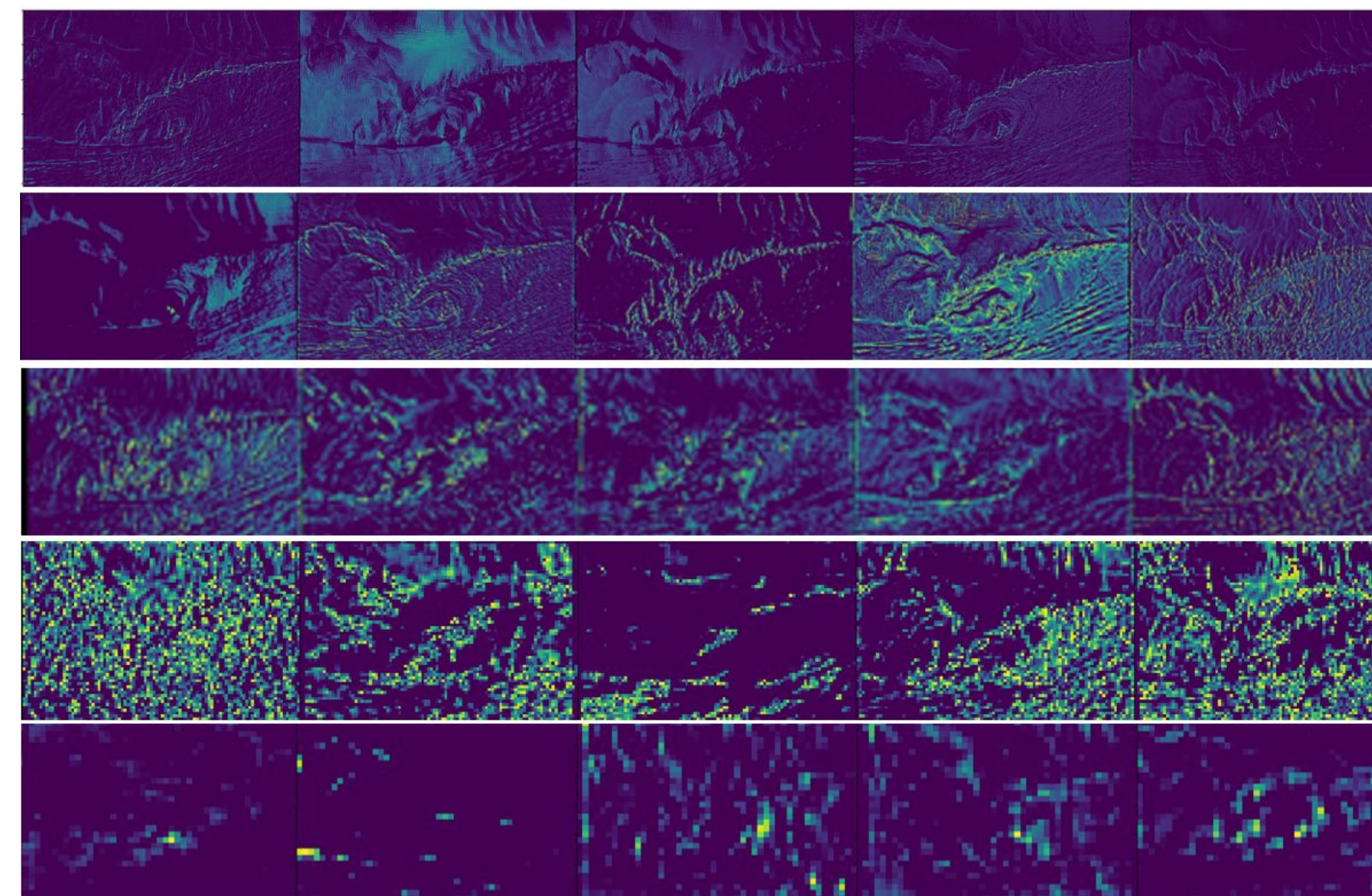
REFERENCE

- Yufeng Zheng, Clifford Yang, and Alex Merkulov "Breast cancer screening using convolutional neural network and follow-up digital mammography", Proc. SPIE 10669, Computational Imaging III, 1066905 (14 May 2018); <https://doi.org/10.1117/12.2304564>
- Gatys, Leon & Ecker, Alexander & Bethge, Matthias. (2016). Image Style Transfer Using Convolutional Neural Networks. 2414-2423. 10.1109/CVPR.2016.265.
- Y. Jing, Y. Yang, Z. Feng, J. Ye, Y. Yu, and M. Song, "Neural style transfer: A review," IEEE transactions on visualization and computer graphics, 2019.

METHOD & MODEL (cont'd)

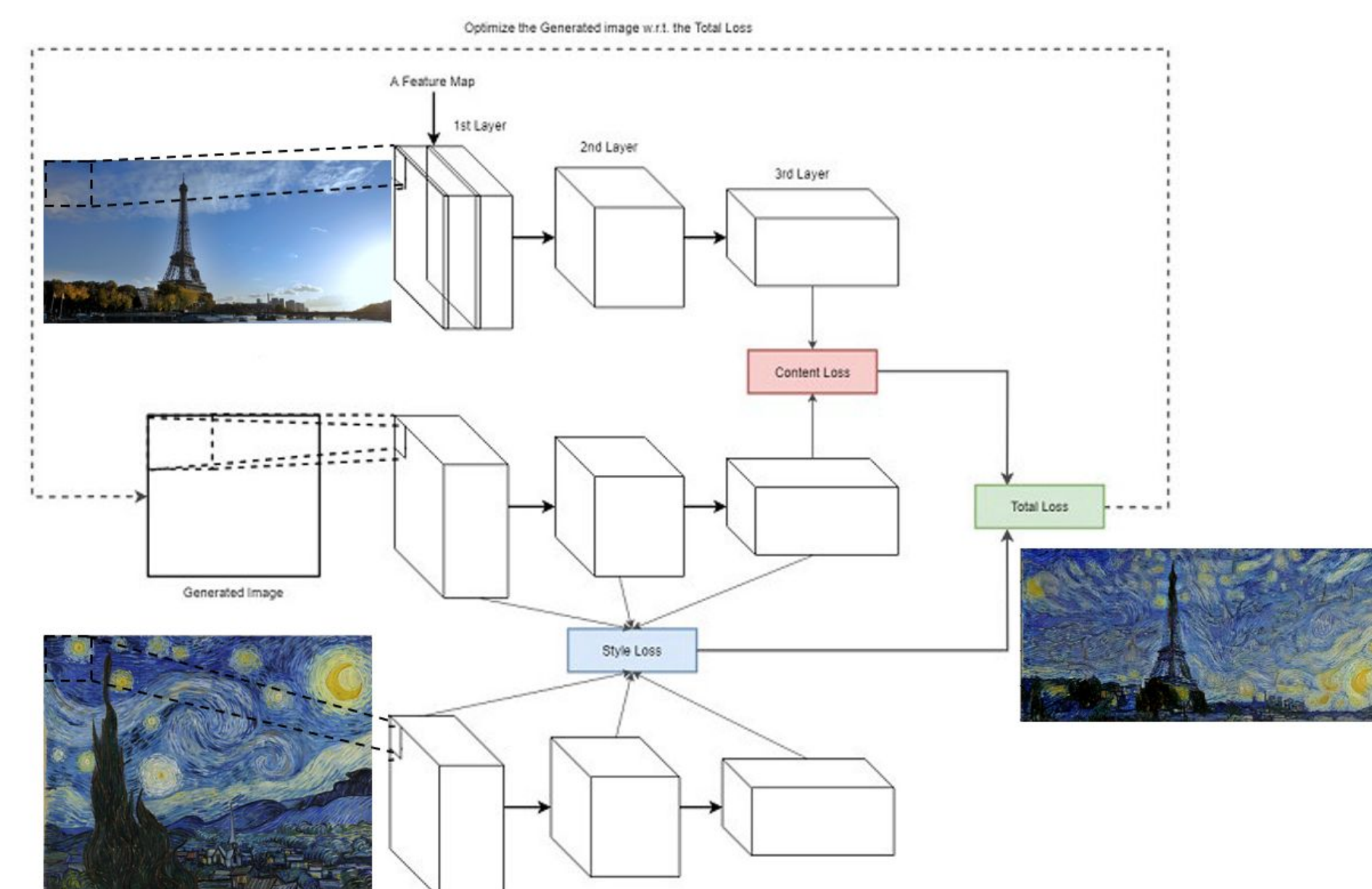


Example of style transfer: Picasso + Surfing



Intermediate layers of example Picasso + Surfing

- The transfer network helps us to create the stylized image:



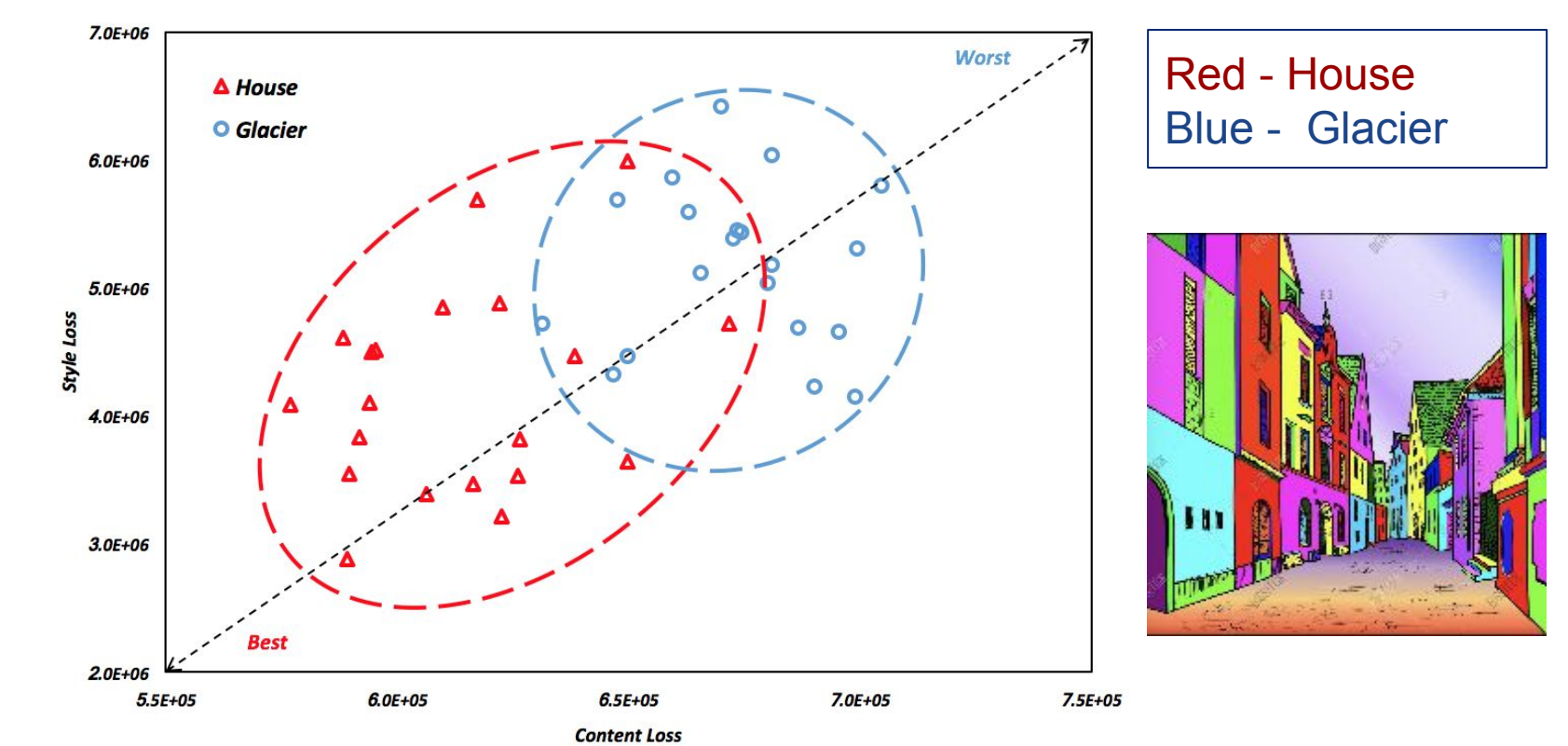
Transfer Network with Content Loss and Style Loss

- The quality of the stylized image is defined by a custom loss function that has terms for both content and style.

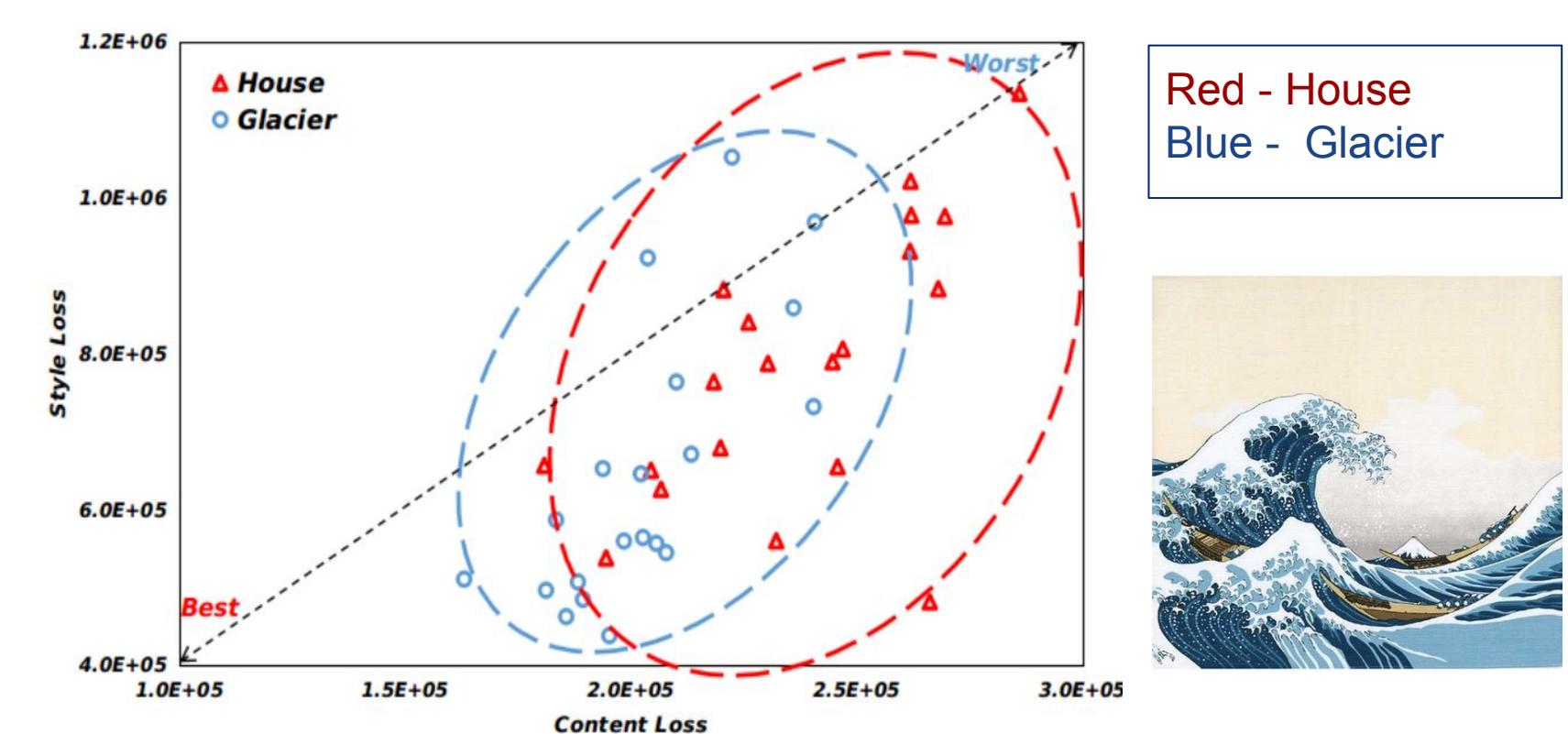
$$L_{total}(S, C, G) = \alpha L_{content}(C, G) + \beta L_{style}(S, G)$$

EVALUATION

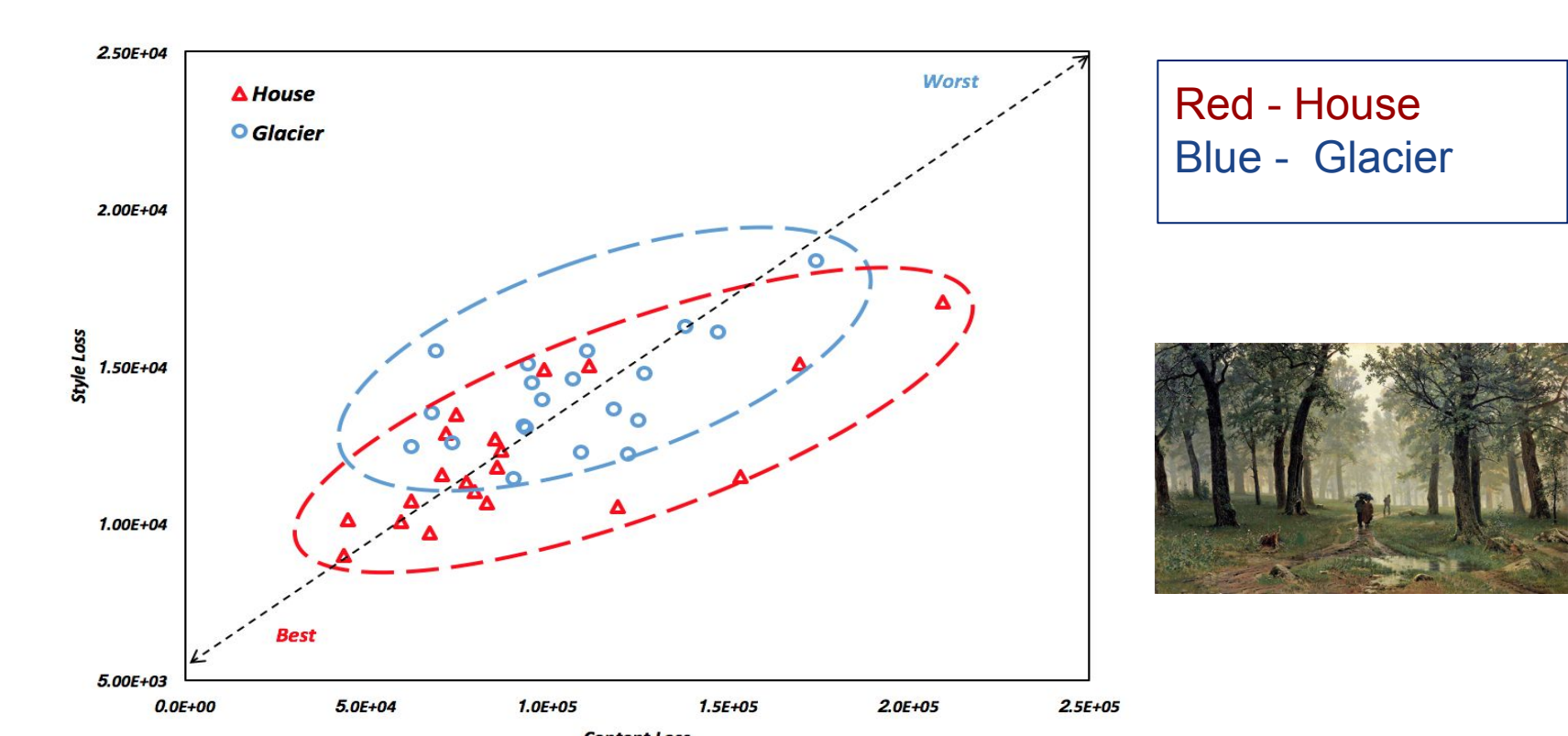
- Case 1: style image is similar to one of the categories



- Case 2: style image is distinct from either category



- Case 3: style image is distinct from either category



CONCLUSION

- The content of the style image has a certain degree of effect on the result.
- However, during the experiments, we also noticed that there are also many other factors that may influence the generated image, like the choices of the hyperparameters and the complexity of the content image.