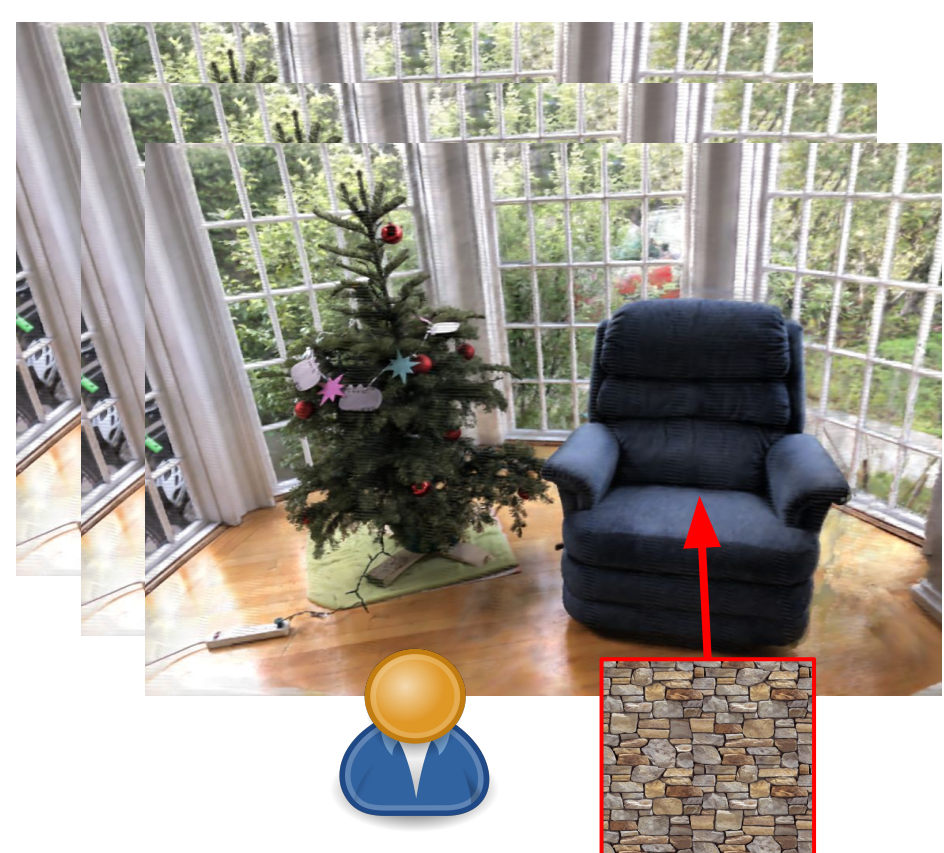


Motivation

We present a method to transfer style from any image(s) to object(s) in a 3D scene, providing enhanced control in scene stylization.

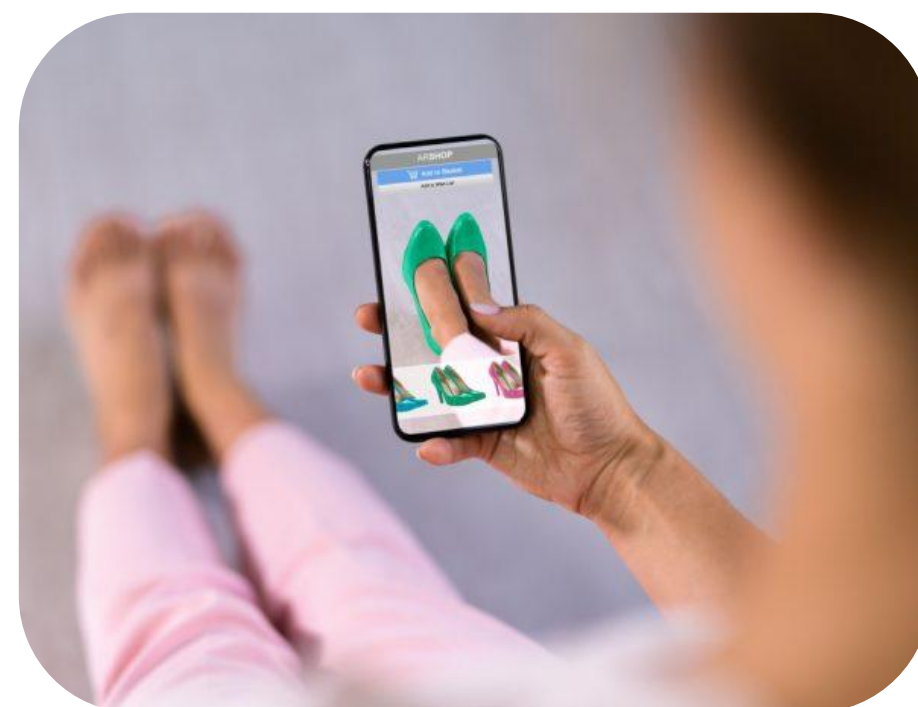
Original views with style inputs



Edited stylized views



AI-based interior decoration



Virtual Try-On

Contributions

Given **calibrated scene images** and **user-defined objects**, our method generates a visually realistic and geometrically consistent image from any viewpoint within the scene, where **only** the user-specified objects conform to reference style images.

- We present a method which allows for semantic and instance level style transfer on objects in 3D scene.
- Introduce **masked Nearest Neighbor Feature Matching (mNNFM)** loss to produce high-fidelity consistent 3D renderings for semantic/instance style transfer
- Our method is **agnostic** to radiance field representation.
- Plenoxel based implementation is quick to train (~15 mins on a single NVIDIA GeForce RTX 3090)

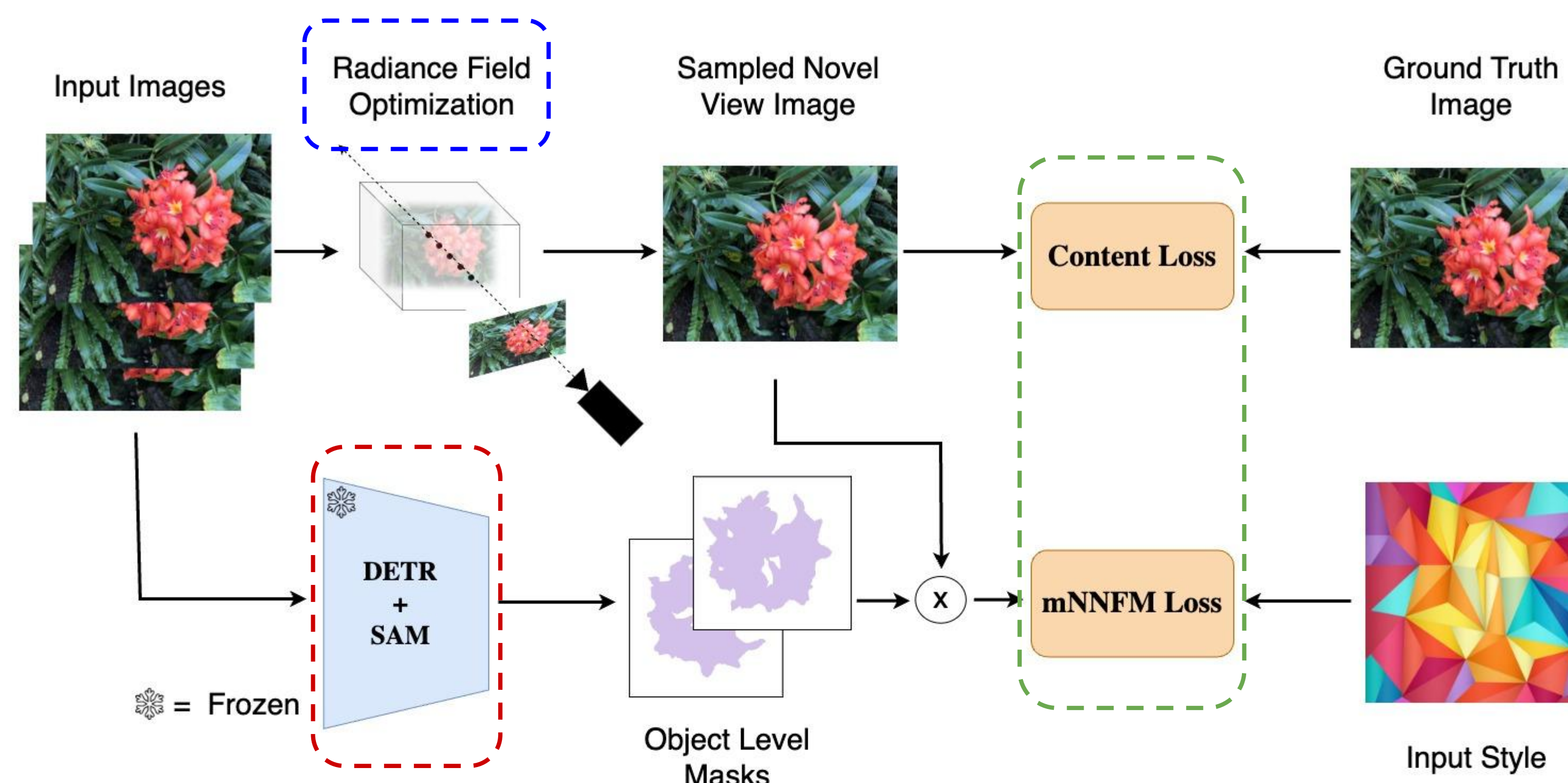


Webpage



Paper

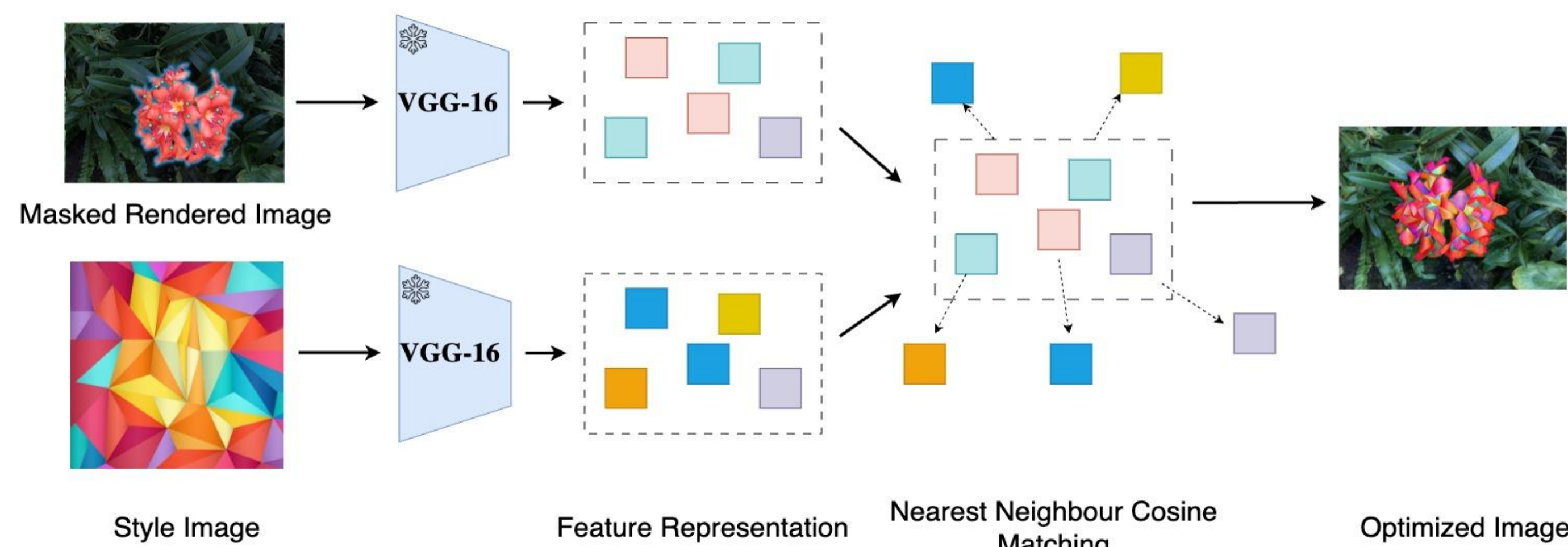
Approach



Our framework consists of three phases:

1. **Generation of radiance fields using calibrated scene images.**
2. **Detection and Segmentation of objects using DETR and SAM.**
3. **Stylization of radiance fields using content and mNNFM Loss.**

Masked Nearest Neighbour Feature Matching



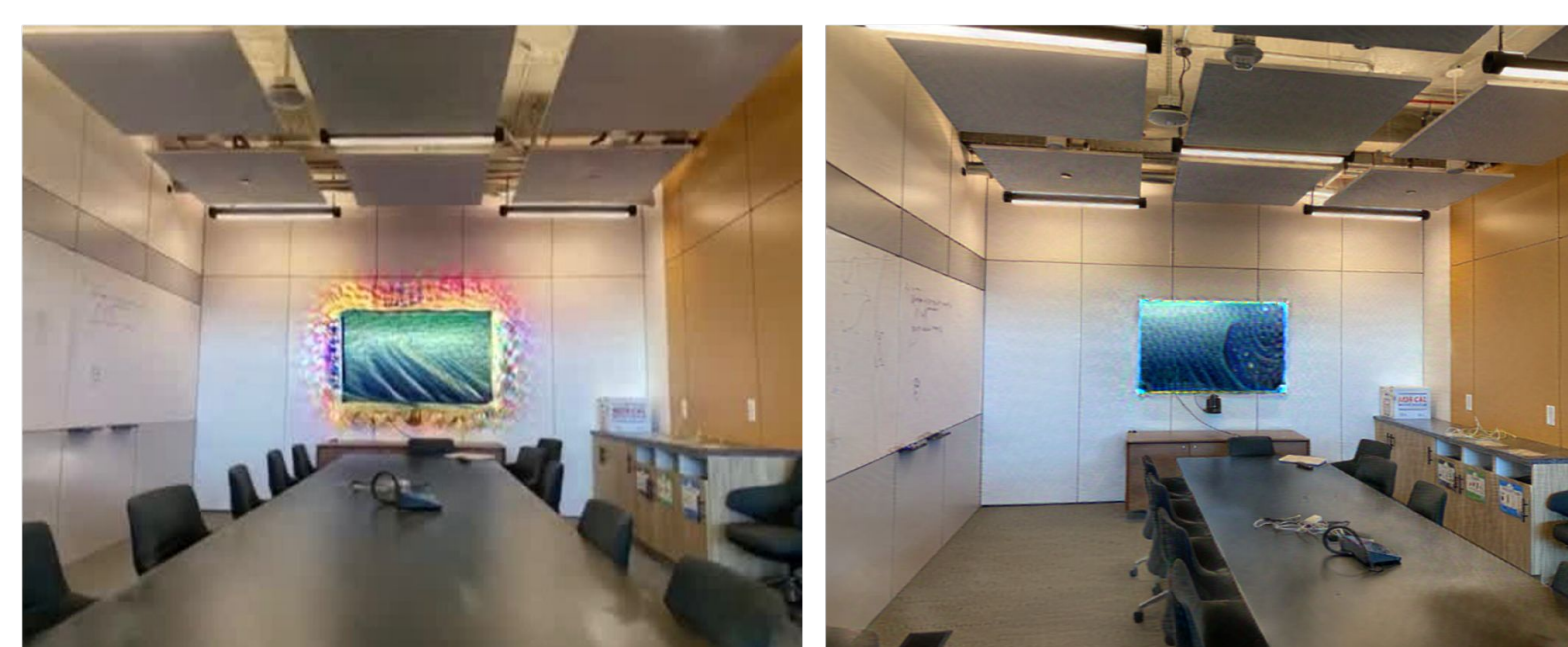
We exclusively apply the NNFM loss to the pixels that correspond to each object separately

Ablation Study

GRAM matrix loss vs mNNFM loss

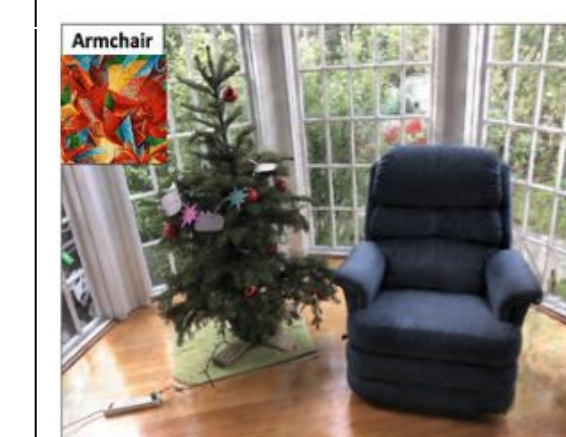


Feature pixel Mask vs Image pixel Mask

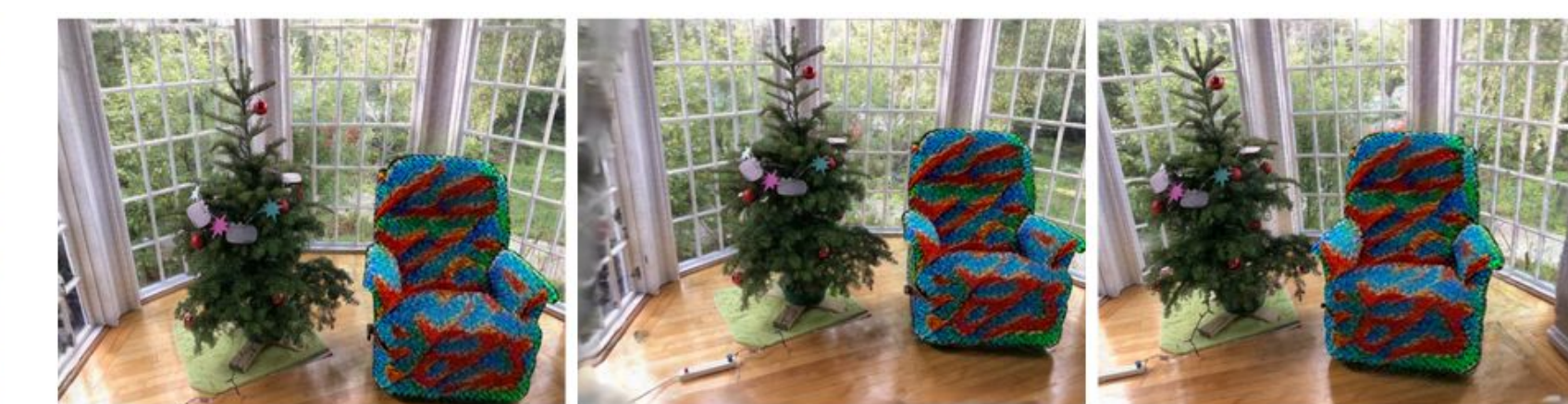


Results

Original Views



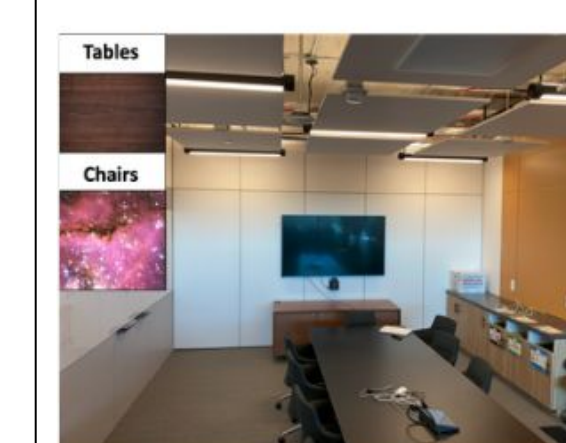
Stylized Views



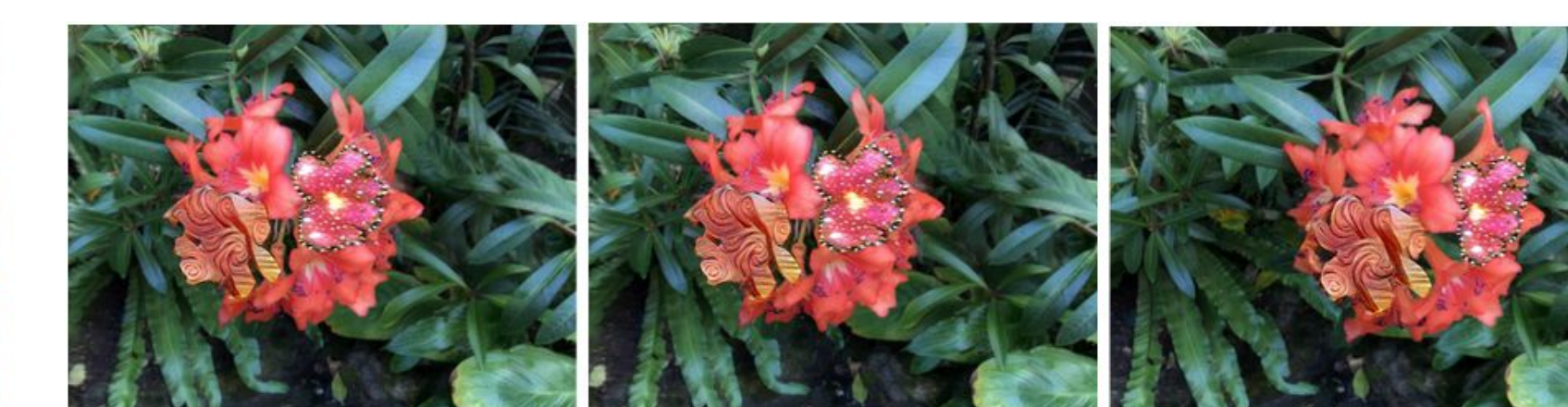
Single object (chair) instance is stylized.



Multiple instances of the same object (flower) have been stylized



Multiple instances of multiple object(s) (Chairs and Table) are stylized



Multiple instances of the same object (flower) are stylized

Limitations

- Evaluation using qualitative (user studies) and quantitative metrics
- Comparison with existing methods
- Re-training of the radiance field for every style transfer.
- Assessments with a broader range of scenes, including 360-degree environments and scenes with an increased number of object