

Supplementary Material: Generalizable Neural Radiance Fields for Flare Removal

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1 Training Dataset Generation

We use the Flare7K dataset by [10] to create a dataset of flare-corrupted images. A wide variety of flare patterns are imposed randomly on the IBRNet dataset consisting of 44 scenes to train GN-FR end-to-end using our proposed masking loss mentioned in Eq.4 of the main paper. K-Means clustering technique is used to obtain ground truth flare occupancy masks as in Fig. 1. These masks are used during the training process of the Flare-occupancy Mask Generation (FMG) Network, which is inspired by PSPNet [9].

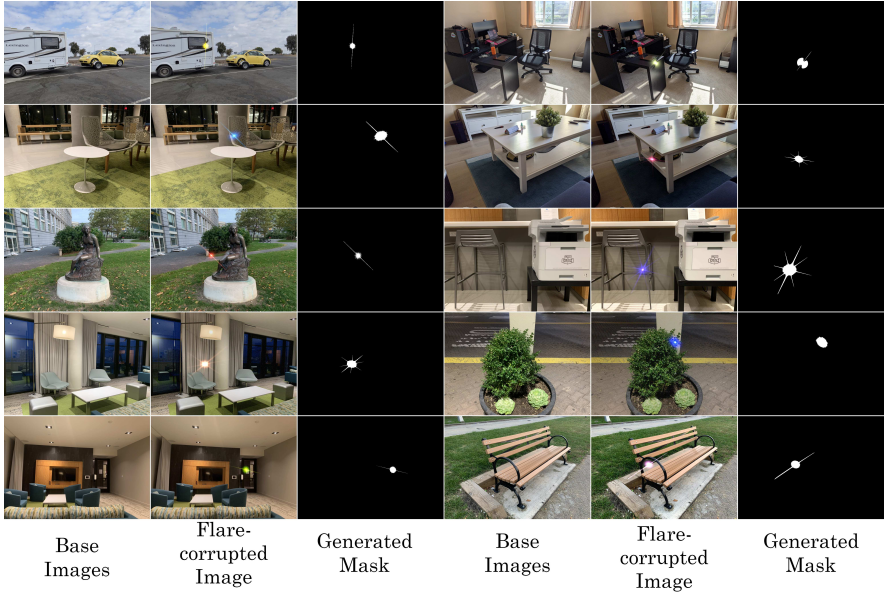


Figure 1: Base images, generated samples of flare-corrupted images, and the corresponding flare-occupancy mask. Base images consists of complex real-world scenes from the IBRNet dataset [10].

2 Our Captured Real Dataset

Our novel contributions towards the dataset include,

- Real Flare-3D Dataset
- Real Flare Pattern Dataset
- Mask Annotations

2.1 Our Real Flare-3D Dataset

Our model, GN-FR is initially trained on the synthetic dataset shown in Fig. 1. Our Real flare-3D dataset is captured to validate our model’s efficacy on real-world 3D flare scenes. A total of 782 images were captured across 17 flare-corrupted scenes. A few sample images of our flare 3D dataset are shown in Fig. 2.

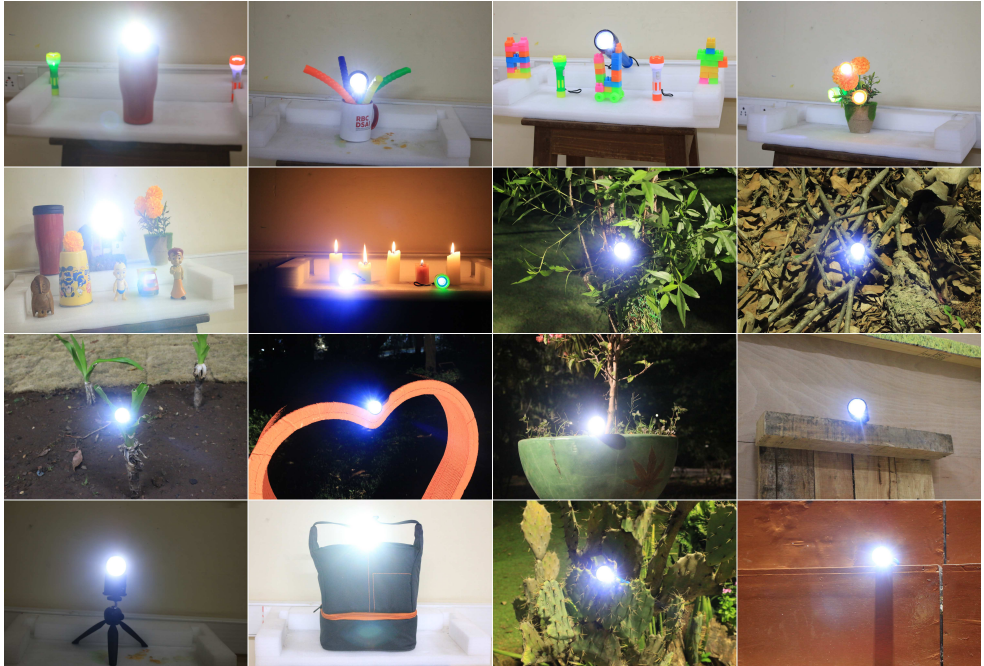


Figure 2: Samples of our captured real-world flare-3D dataset consisting of 782 images across 17 scenes corrupted by flare artifacts.

2.2 Our Real Flare Pattern Dataset

Our FMG network trained over the synthetic dataset using the flare patterns by [14] performs poorly when evaluated on the real-world dataset. To bridge the gap, we captured 80 different real flare patterns in a dark room setting, a few samples are shown in Fig. 3. We replaced the Flare7k++ flare patterns with these patterns to improve our FMG network’s performance.



Figure 3: Samples of 80 different flare patterns captured in a dark room setting to enhance our FMG network’s performance by reducing the gap between the training and test datasets

2.3 Our Mask Annotations

Since mask generation done using K-Means clustering on the synthetic dataset performs poorly on the real-world dataset, we manually annotated the flare masks for the real-world dataset. Samples of manually annotated masks shown in Fig. 4 are used during the training process of our FMG module to generate flare-occupancy masks. The results of the FMG network are almost on par with the manually annotated masks as reported in Fig. 3 of the main paper.

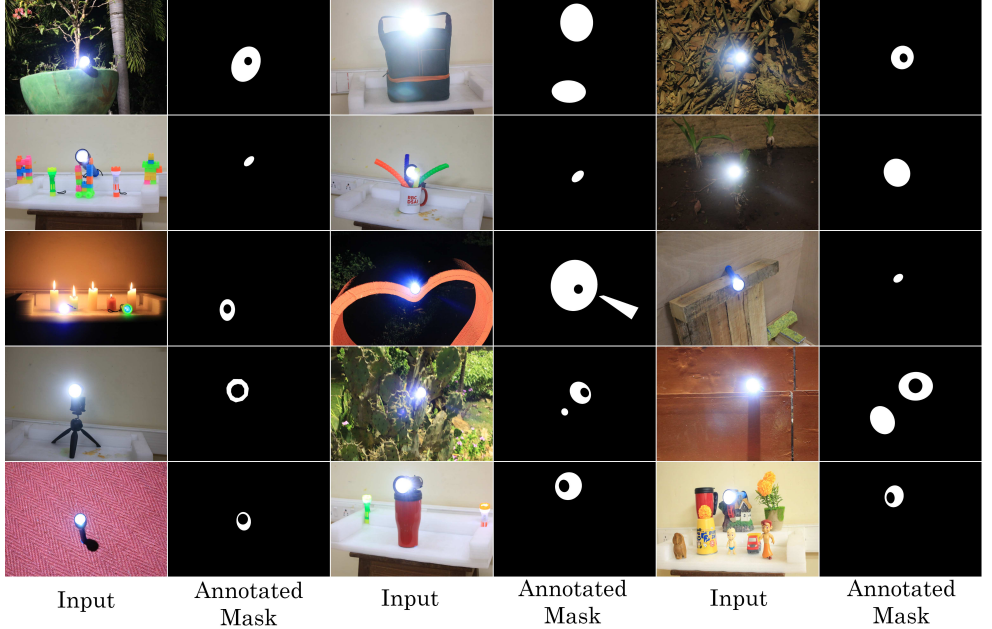


Figure 4: Our real-world flare-3D dataset with the corresponding flare-occupancy masks annotated manually using MATLAB segmentation tool. These annotated masks are used during the training process of our FMG module to generate flare-occupancy masks

3 Results

This section contains the qualitative results of GN-FR on both the synthetic and real-world datasets. We encourage the reader to engage in a closer examination of the results to appreciate the flare removal capability of GN-FR across various scenes.

3.1 Our Synthetic Data

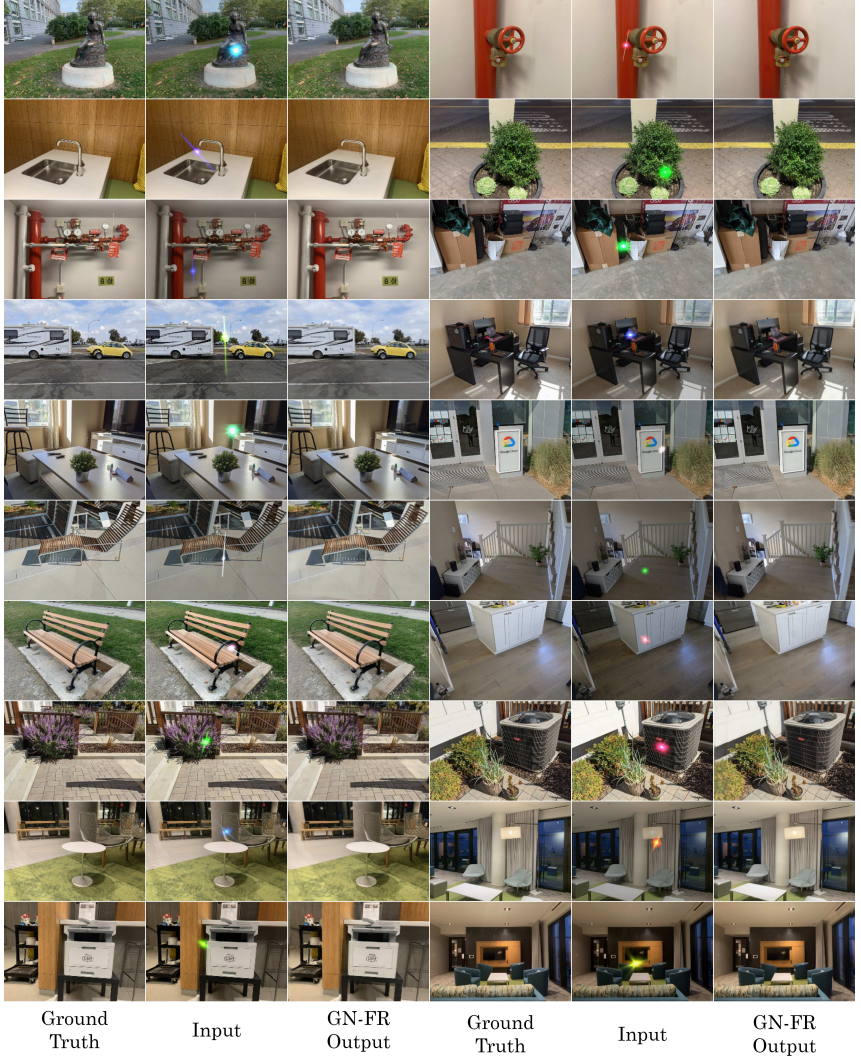


Figure 5: **Qualitative results on Synthetic dataset:** Comparing our method’s outputs on a few training samples with the ground truth images, GN-FR is proven to consistently remove the flare artifacts across scenes. Test results are reported in Fig. 5 of the main paper and also in the supplementary video.

3.2 Our Real Captured Data

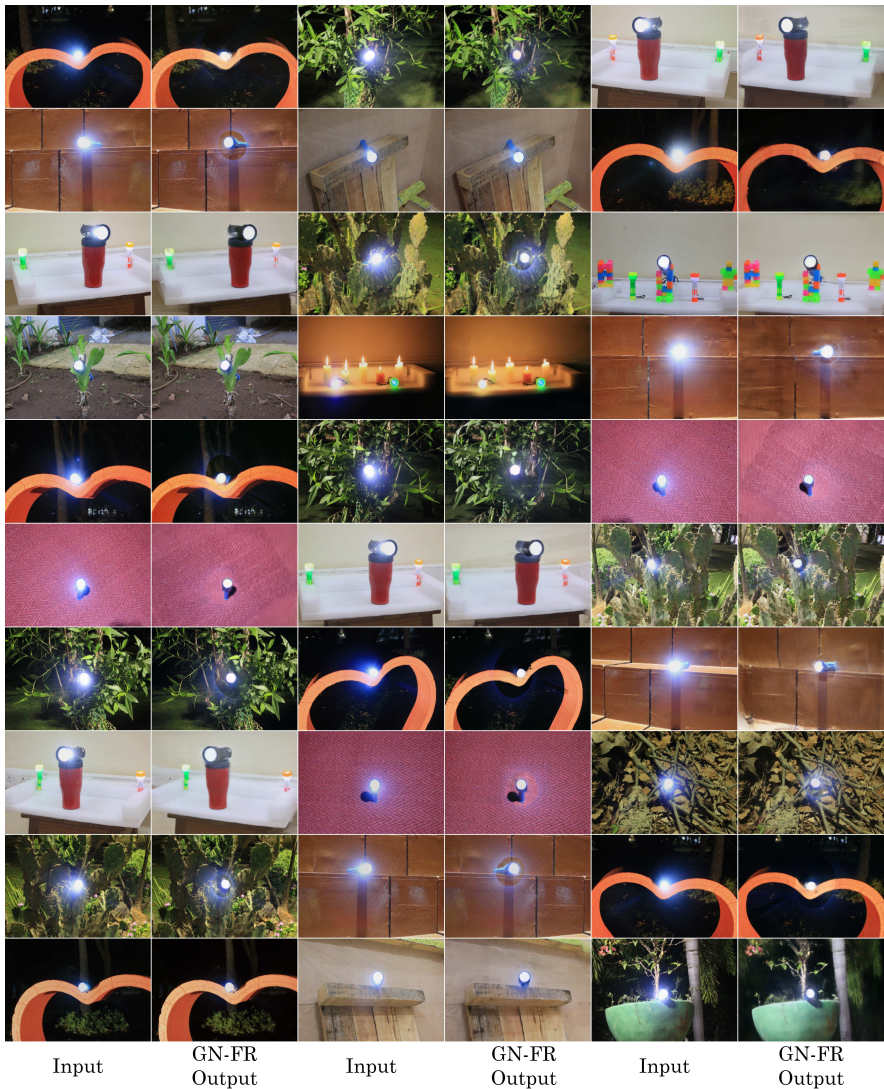


Figure 6: **Qualitative results on Real dataset:** GN-FR is able to remove the flare-artifacts on our real flare-3D dataset and also reproduce the lost scene information covered up due to flare effects.

References

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