

Hand-drawn Bokeh Generation

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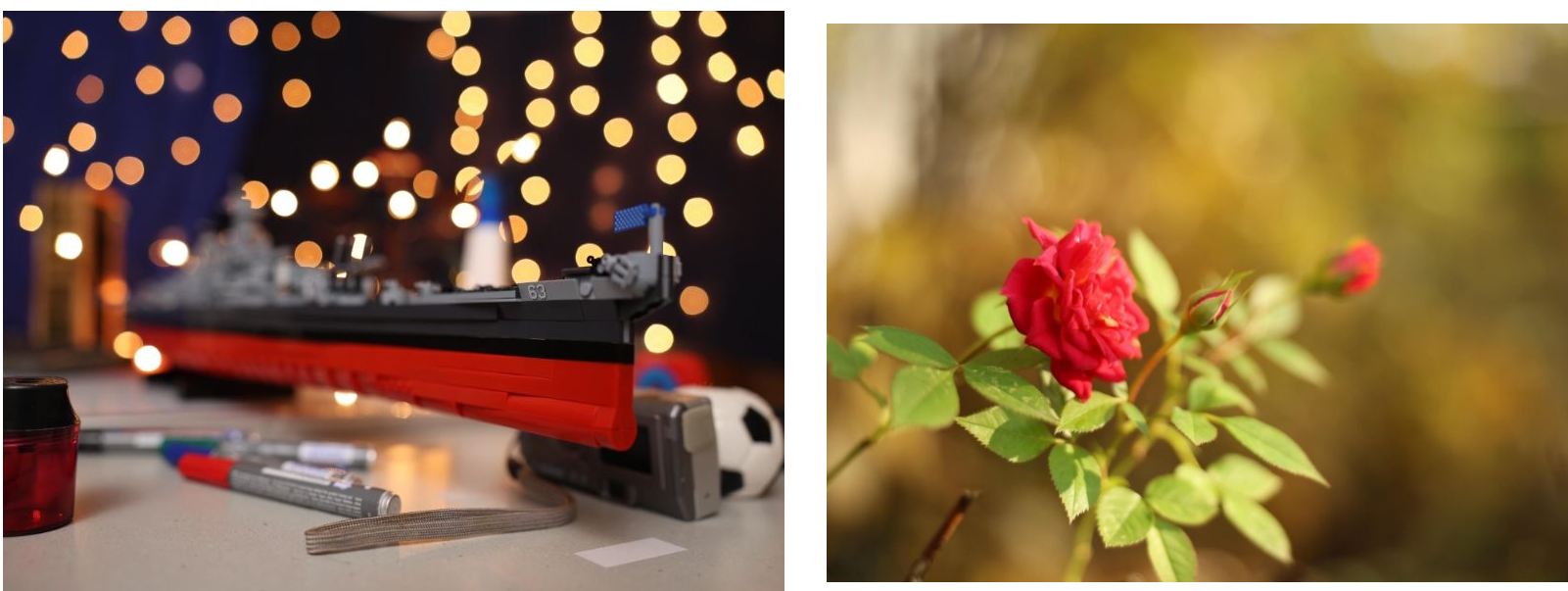
Motivation

Bokeh is the aesthetic quality of the blur in the out-of-focus parts of an image. Different shapes of apertures renders diffuse and specular highlights in image backgrounds.

The goal of this project is to provide a comprehensive artistic control layer over computational bokeh effects.

The system aims to move beyond generic algorithmically-determined blur by allowing the user to:

- 1. Define the focal mask/depth of field
- 2. Customize the shape of the bokeh kernel to create blur effects



Images from [3].

Related Work

Prior works like BokehMe [2] and Bokehlicious [3] have focused on postprocessed bokeh generation.

BokehMe [2] focuses on bokeh generation with a prior disparity map and adjustable kernels. This approach is limited by the fact that the kernels were not user adjustable and a prior disparity map is required.

Bokehlicious [3] focuses on generic bokeh generation, where the user does not have control over the bokeh shape or size.

References

[1] Ignatov, A. D., Patel, J., & Timofte, R. (2020). Rendering Natural Camera Bokeh Effect with Deep Learning. In 2020 IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (CVPRW), 418–427.

[2] Peng, J., Cao, Z., Luo, X., Lu, H., Xian, K., & Zhang, J., BokehMe: When Neural Rendering Meets Classical Rendering, Computer Vision and Pattern Recognition (CVPR), 2022.

[3] Seizinger, T., Vasluianu, F.-A., Conde, M. V., Wu, Z., & Timofte, R., Bokehlicious: Photorealistic Bokeh Rendering with Controllable Apertures, arXiv (Computer Vision and Pattern Recognition section), 2025.

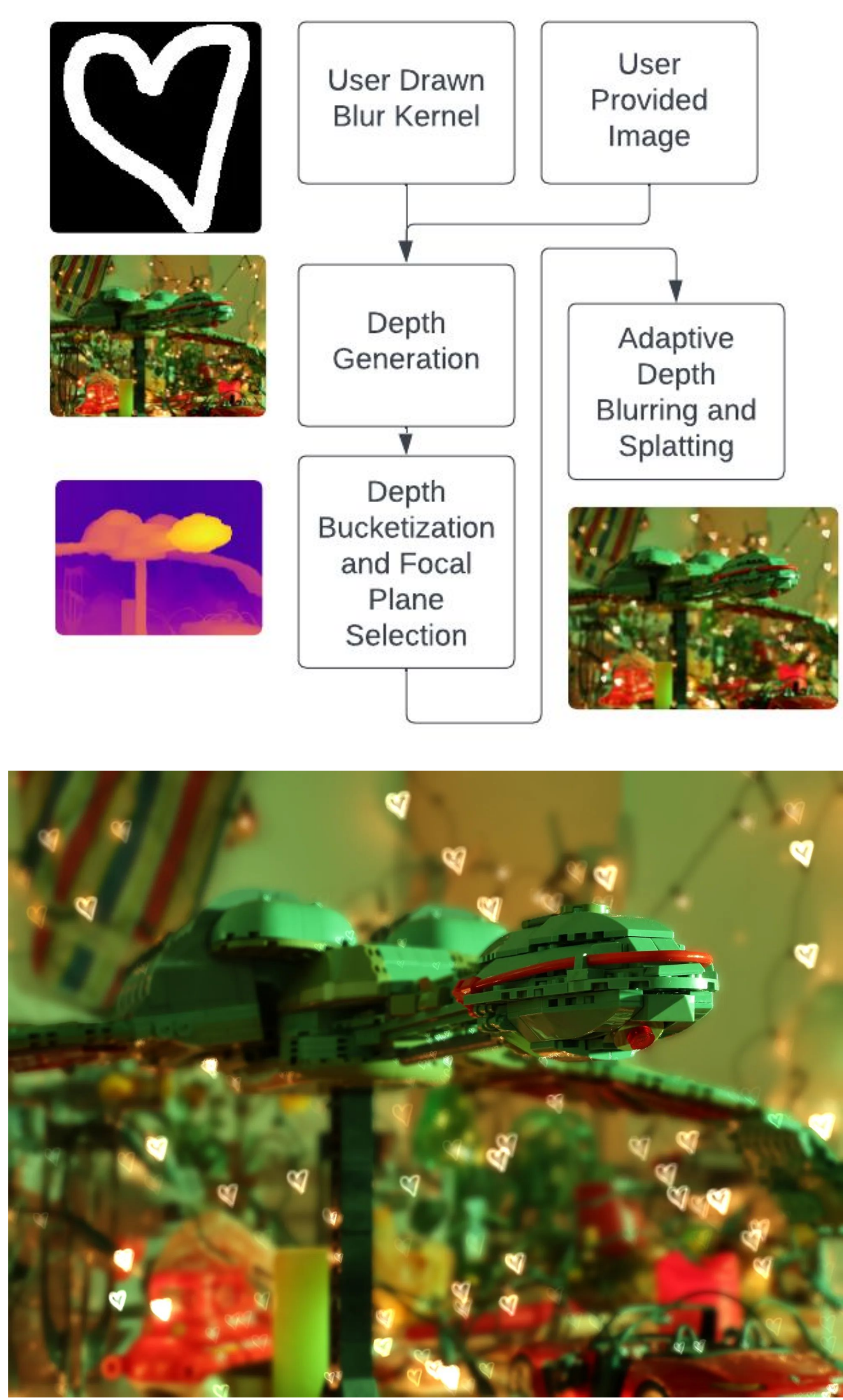
[4] Yang, L., Kang, B., Huang, Z., Zhao, Z., Xu, X., Feng, J., & Zhao, H. (2024). Depth Anything V2. Neural Information Processing Systems (NeurIPS).

New Technique

Users provide an initial all-in-focus image (typically captured on a smartphone) and a custom blur kernel for generation.

DepthAnythingV2 [4] is used to generate a dense depth map across the scene. Using this depth and a user-selected focal plane, the depths are bucketized and blurred based on the distance and ordering from the focal plane.

To create artistic bokeh effects, the high activation pixels are also “splatted” onto the image with the blur kernel.



Experimental Results

Method	PSNR
BokehMe [2]	23.85
Bokehlicious [3]	25.02
Ours	24.42

Table 1. Results on the EBB! [1] validation set

