DeOccNet: Learning to See Through Foreground Occlusions in Light Fields

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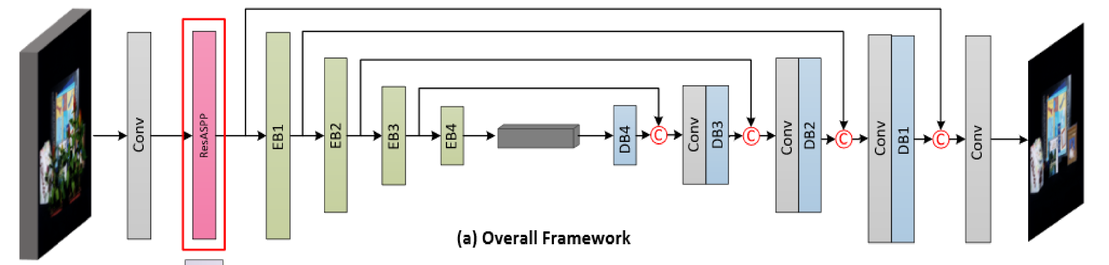
Contributions

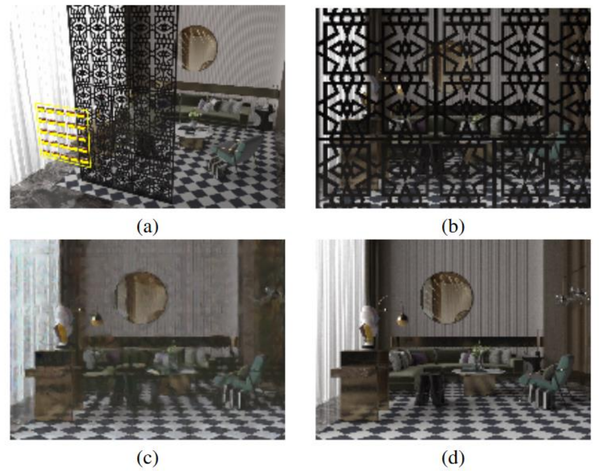
- We proposed *DeOccNet* for LF-DeOcc, which is the FIRST deep-learning method in literature;
- We proposed a *Mask Embedding* Approach for automatic training data generation;
- We developed a novel synthetic and real-world dataset for performance evaluation;
- Our *DeOccNet* outperforms SOTA methods on both public and our self-developed datasets.
- Our codes, datasets, slides, and videos for oral presentations, are ALL available online at: *https://wangyingqian.github.io/homepage*

Network Architechture



(b) Residual ASPP Module

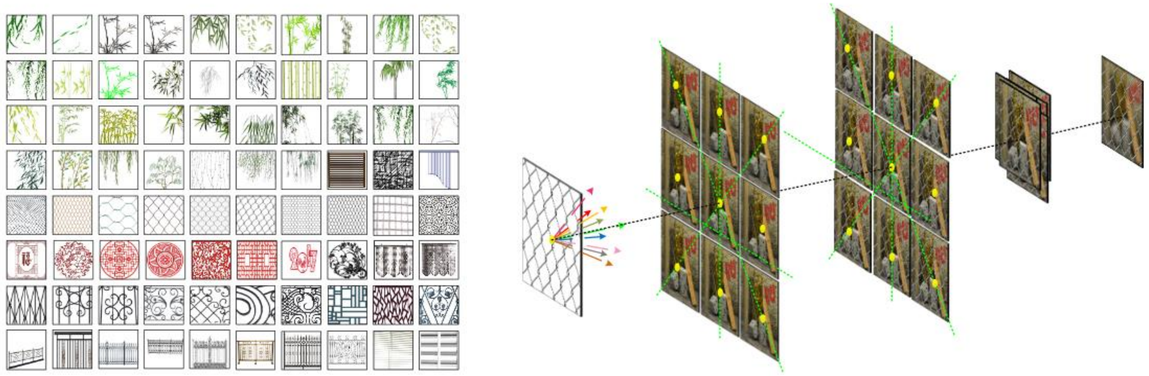
Thumbnail



(a) (b) (c) (d)

An illustration of LF-DeOcc using our rendered scenes Syn01. (a) Configuration of the scene. Yellow boxes with 5×5 blocks represent camera arrays. (b) Occluded center-view SAI. (c) Results of our *DeOccNet*. (d) Occlusion-free groundtruth.

Mask Embedding Approach



First, we collected 80 mask images (common foreground occlusions in daily life) from Internet and 60 LFs from public datasets. Then, we randomly embedded these mask images into sub-aperture images according to their angular coordinates and the allocated shallow depths. Afterwards, refocusing is performed to check the LF configuration. Using the *Mask Embedding* approach, more than 1500 LFs with removable foreground occlusions were generated to train our *DeOccNet*.

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Comparison to SOTA Methods on the CD Dataset

(a) Occluded (b) Refocus [18] (c) Median [17] (d) Pei *et al.* [11]

(e) Liu *et al.* [9] (f) *DeOccNet* (75 center views) (g) *DeOccNet* (h) Groundtruth

It can be observed that our *DeOccNet* outperforms other SOTA methods on the Stanford CD dataset. Note that in (f), our *DeOccNet* cannot work with 75 identical center-view SAIs as its inputs. That is because, our *DeOccNet* uses complementary information among different angular views for LF-DeOcc, which is different with single-image inpainting methods (e.g., Liu et al. [9]).