



A 4D Light-Field Dataset and CNN Architectures for Material Recognition

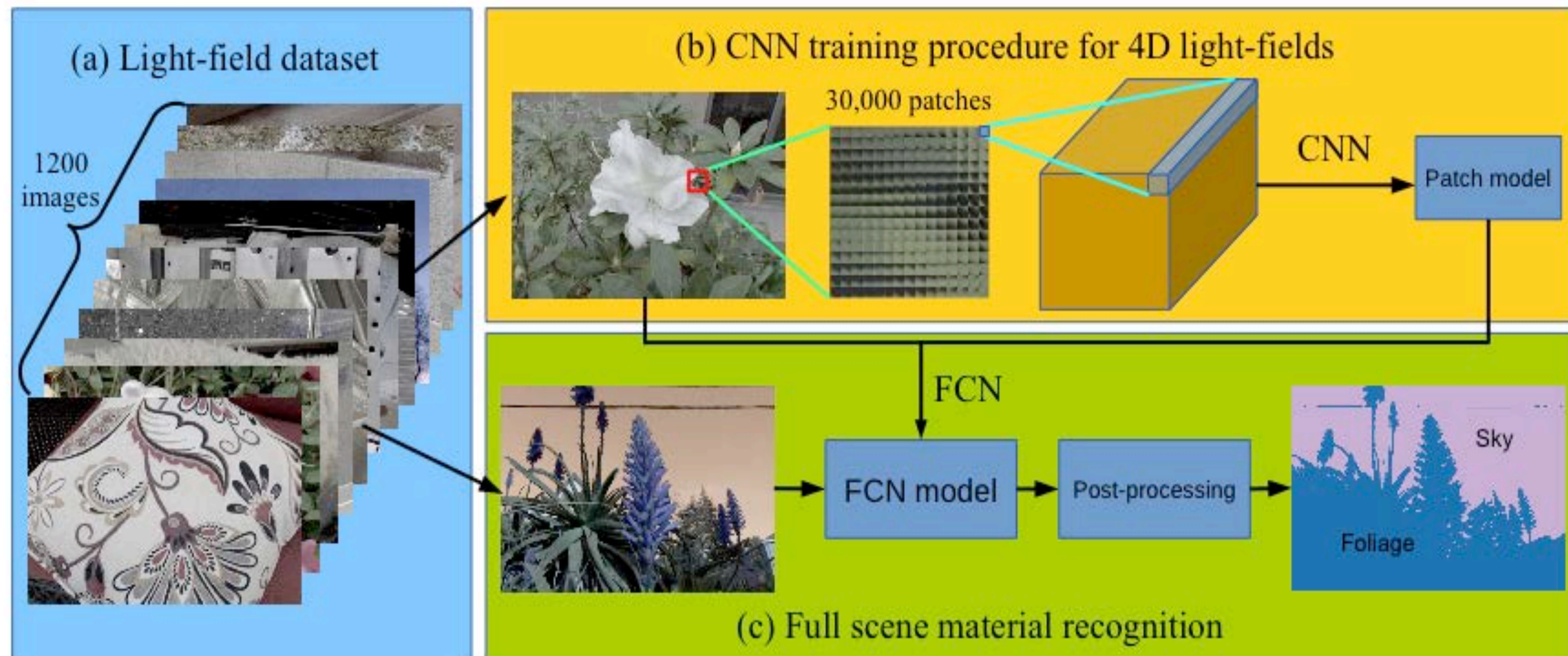


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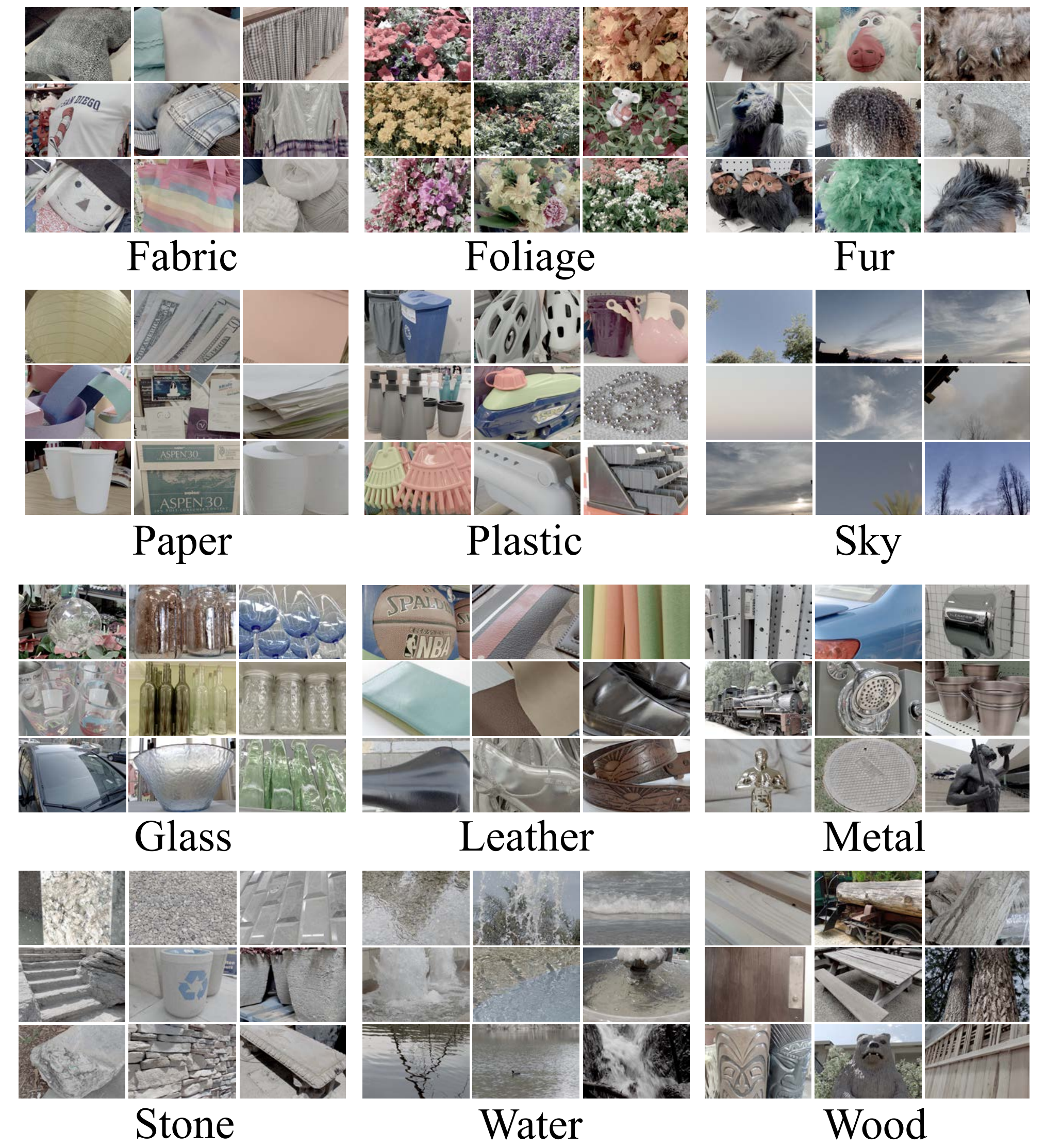
Motivation

- Light-field images should help recognize materials since reflectance can be estimated
- CNNs have recently been very successful in material recognition
- We combine these two and propose a new light-field dataset since no one is currently available

System Overview

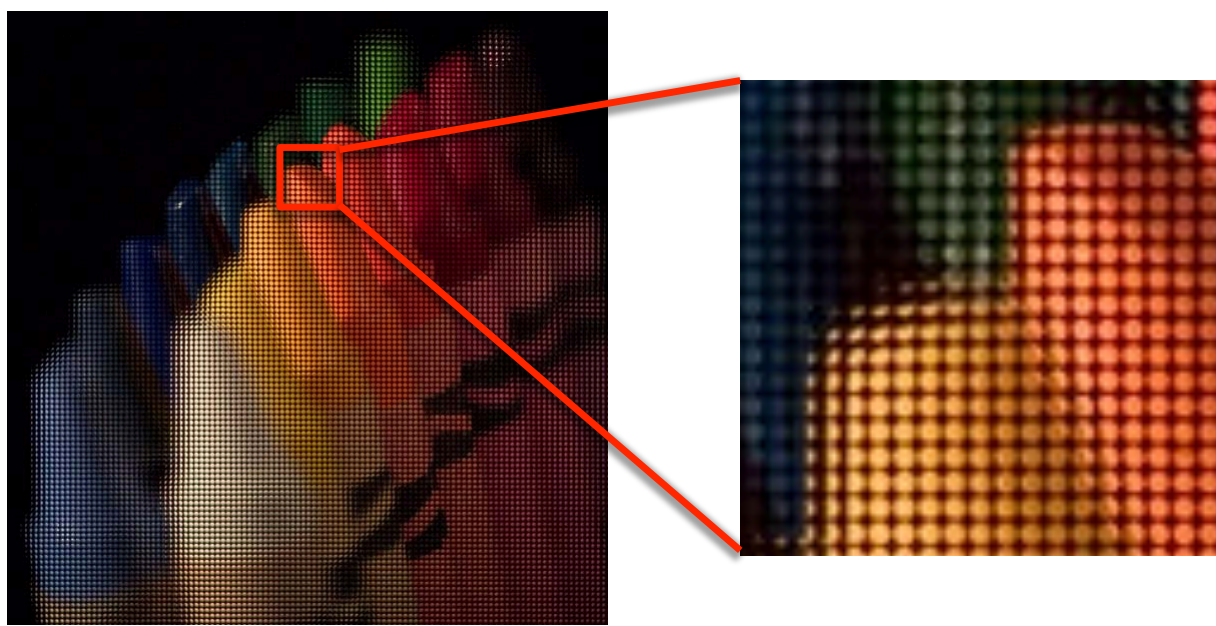


Example images in dataset

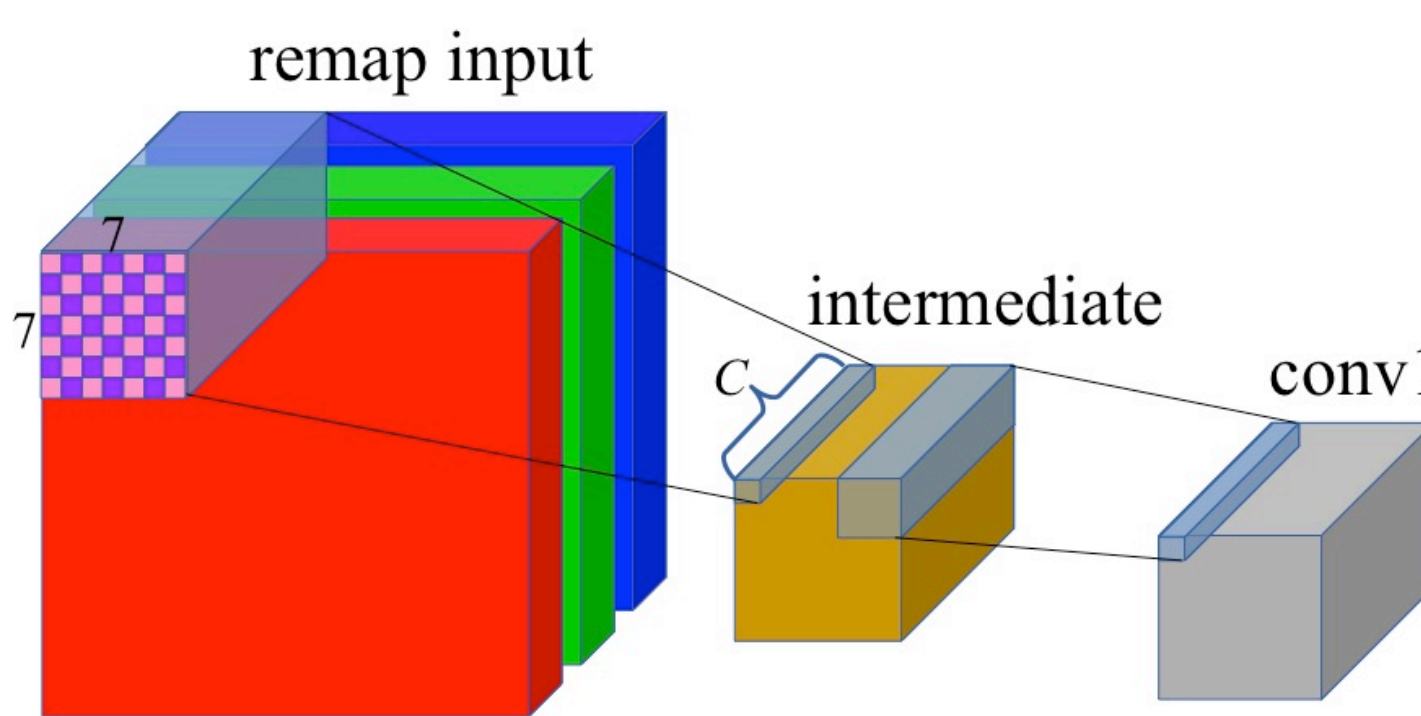


Network architectures

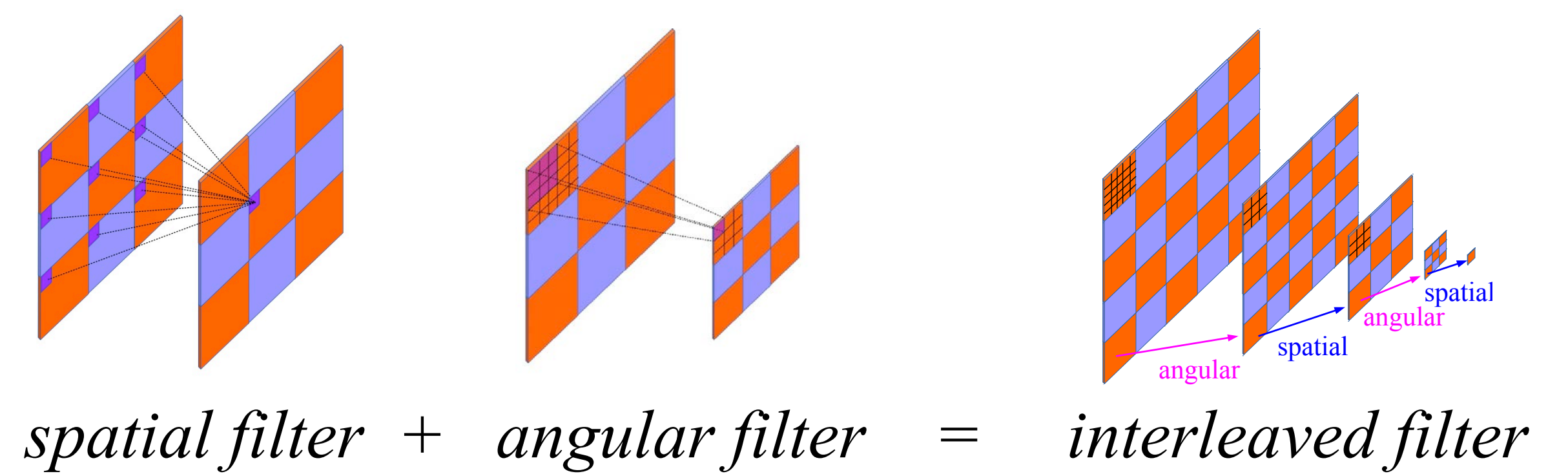
Input:
Light-field (microlens) image



Method 1:
Apply angular filter on (microlens) image



Method 2:
Decompose a 4D filter into a spatial and an angular filter

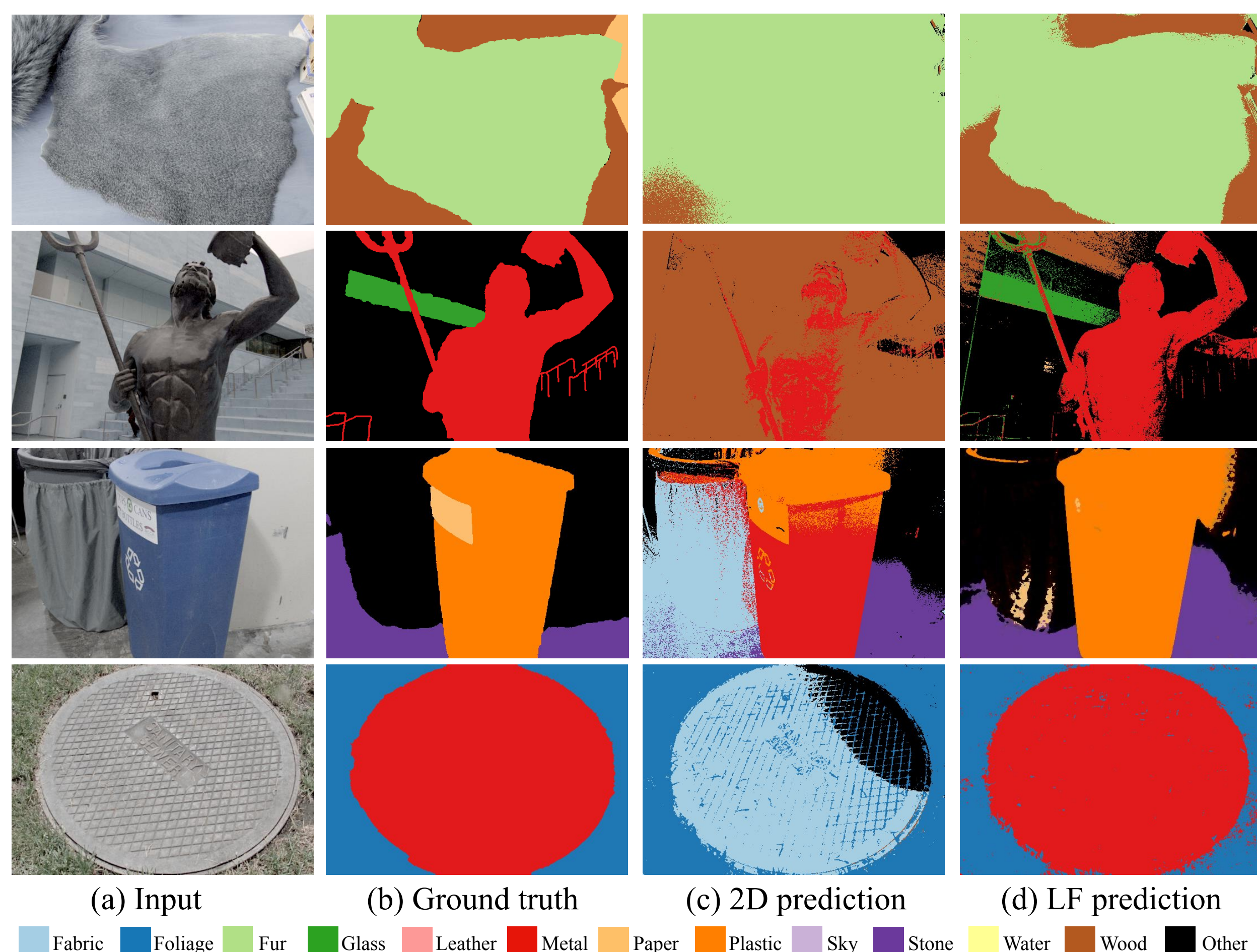


Results

Quantitative results:

Architecture	2D	2D avg	viewpool	stack	EPI	angular	4D
Accuracy (%)	70.2±1.0	70.5±0.9	70.0±1.0	72.8±1.1	72.3±1.0	77.0±1.1	77.0±1.1

Full scene segmentation results



Example advantages of using light-fields

