Neural Cameras

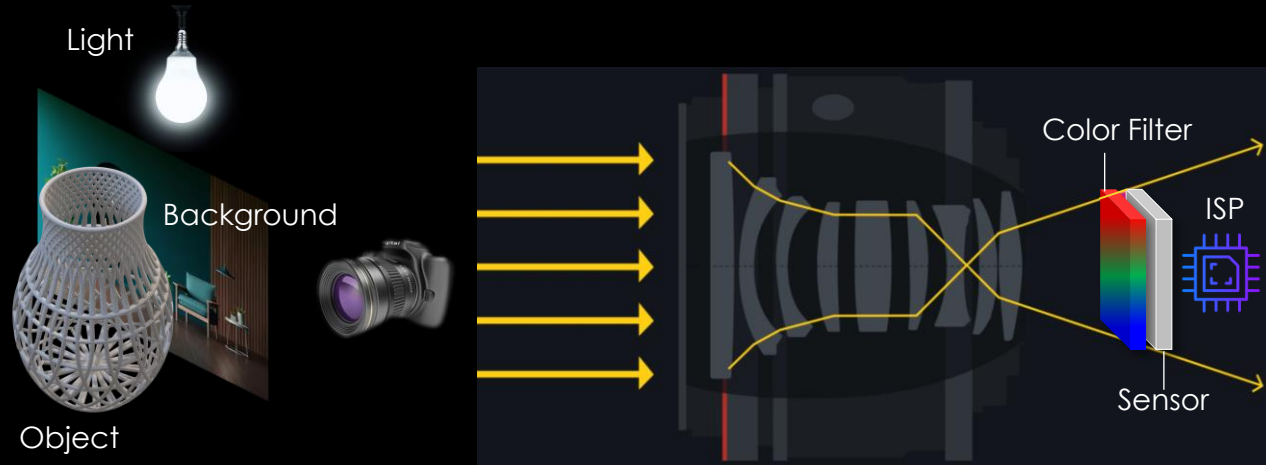Zhixiang Wang   Shin'ichi Satoh
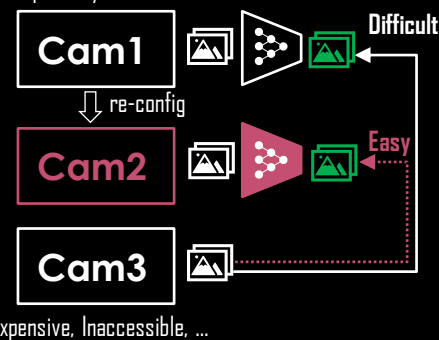
Light
Background
Object
Color Filter
ISP
Sensor

M1 - Camera Distillation

Cheap, Easily Accessible

Cam1 → re-config → Cam2   Cam3

Difficult
Easy

Expensive, Inaccessible, ...

M2 - Image Decomposition

Reconstruction

Cam1   Renderer

Generative Prior

Physical Parameters

Modify   Renderer   Re-Capture

Neural Sensor (M1)

¥29,170 → ¥145,850
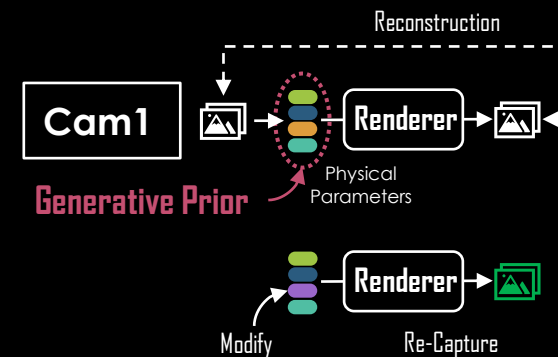
CVPR'22

Neural Viewpoint and Lens (M2)

20~30cm → >1m
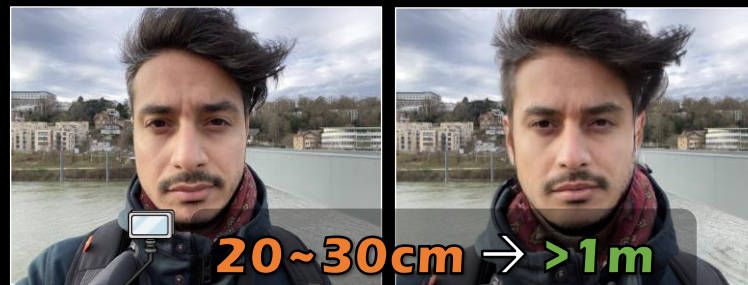
IJCV'24

Neural Green Screen (M2)

SIGGRAPH'24

What are minimum imaging components?

Lighting	Green Screen	Lens	Color Filter	Sensor	ISP	
Lighting	Green Screen	Lens	Color Filter	Sensor	ISP	NN

Camera or not camera?

Towards unknown

Human Vision
2
1 Normal
3 Specialized
4 Unknown