EE 368 Project Idea

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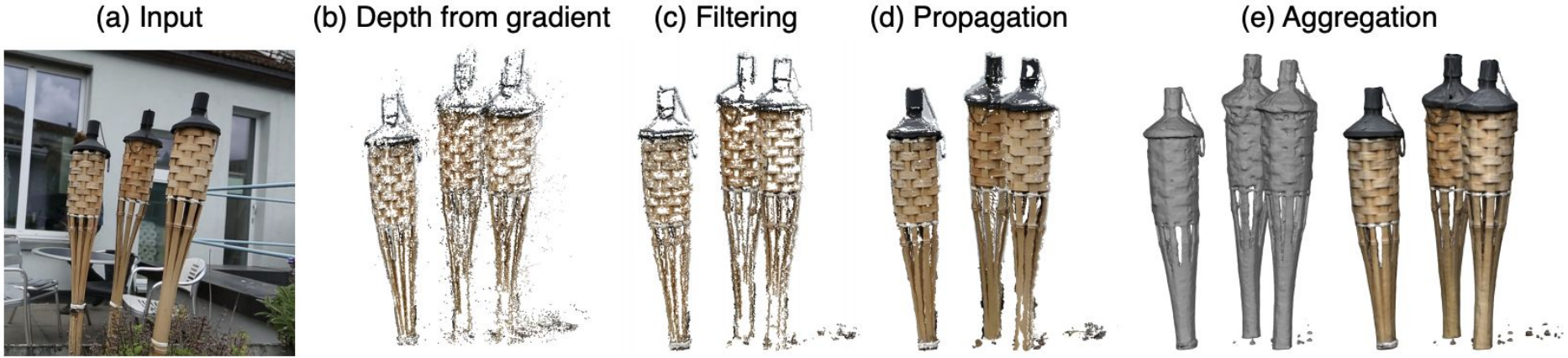
Outline

- Key words: Depth Perception, Lightfield, 3D Object Reconstruction
- Depth from Gradients in Dense Light Fields for Object Reconstruction
- Efficient 3D Object Segmentation from Densely Sampled Light Fields with Applications to 3D Reconstruction

Depth from Gradients in Dense Light Fields for Object Reconstruction

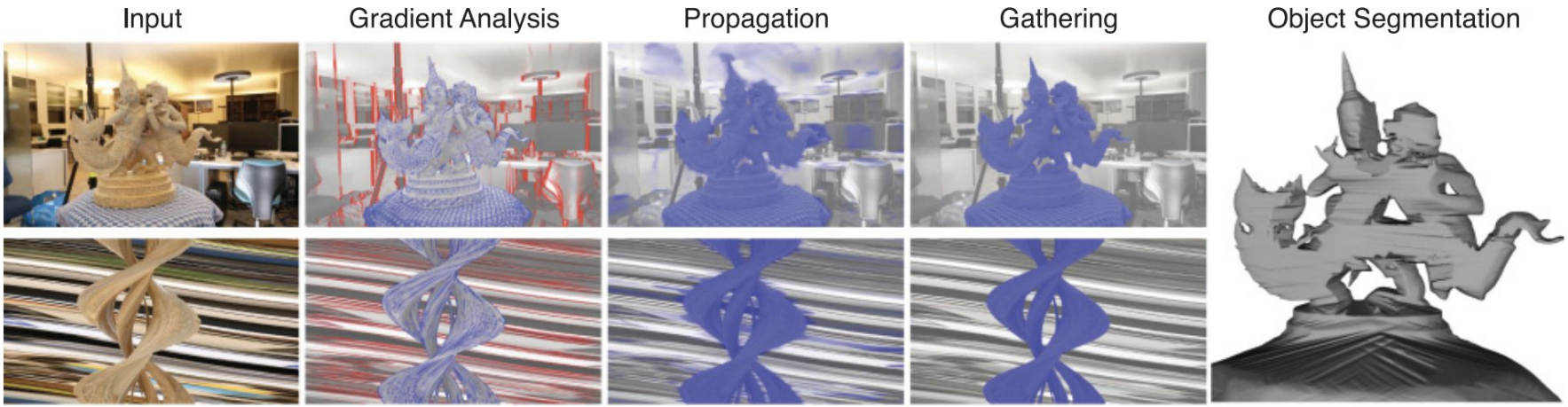
- ETH Zurich, Disney Research
- Goal: To reconstruct 3D objects from 2D images
- An efficient algorithm to reconstruct 3D objects using light fields



Efficient 3D Object Segmentation from Densely Sampled Light Fields with Applications to 3D Reconstruction

- ETH Zurich and Disney Research Zurich
- Goal: To segment foreground from background
- An efficient algorithm to segment a static foreground object from highly cluttered background in light fields

Efficient 3D Object Segmentation from Densely Sampled Light Fields with Applications to 3D Reconstruction



Q & A

“Digital Paint” drawings from photographs

CS232/EE368 Project Idea

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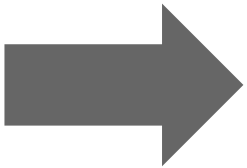
Concept

There are tons of stylized, artistic digital paint drawings that consist of outlines with color shading underneath.

Can we generate these from photos?



CC0 Max Pixel from https://www.maxpixel.net/Person-Look-Human-Face-Man-Portrait-Happy-Smile-700099

CC-BY magicalhobo from https://www.sketchport.com/drawing/4688423956774912/face-practice

Spectrum of photorealism

These drawings have various detail levels.

Some have pencil-sketch-like outlines, others have no outlining at all and rely on lighting and shading for edges.

Some have flat colors, others are mildly cell-shaded and some have colors that are detailed to the point of photorealism.

Can we come up with our own style by applying image processing techniques?

Approach

1. Extract edges, generate pencil-sketch like outlines

There’s a method called line-integral convolution that generates a pretty convincing pencil sketch by applying a directional textures to the image

Approach

2. Extract colors

Use CIE color space to extract only color information in the image, and apply edge-aware smoothing and quantization to get a cell-shaded effect.

Approach

3. Combine

Superimpose pencil sketch over colors to obtain final image

Other ideas

- Perform image segmentation, blur the foreground and background differently to get foreground separation
- After quantizing colors, exaggerate/rotate them in color space to get more stylized results

References

Mao, X & Nagasaka, Y & Imamiya, A. (2001). Automatic generation of pencil drawing from 2D images using line integral convolution.

Gao, Xingyu & Zhou, Jingye & Chen, Zhenyu & Chen, Yiqiang. (2010). Automatic Generation of Pencil Sketch for 2D Images.. 1018-1021. 10.1109/ICASSP.2010.5495319.