



3D Photography using Context-aware Layered Depth Inpainting

Abhishek Singh, Devansh Katheria,
Omkar Chougule, Kshitiz Jain
Project guide: Prof. Sachin Malave



Computer Engineering
COMPUTER STUDENT ASSOCIATION

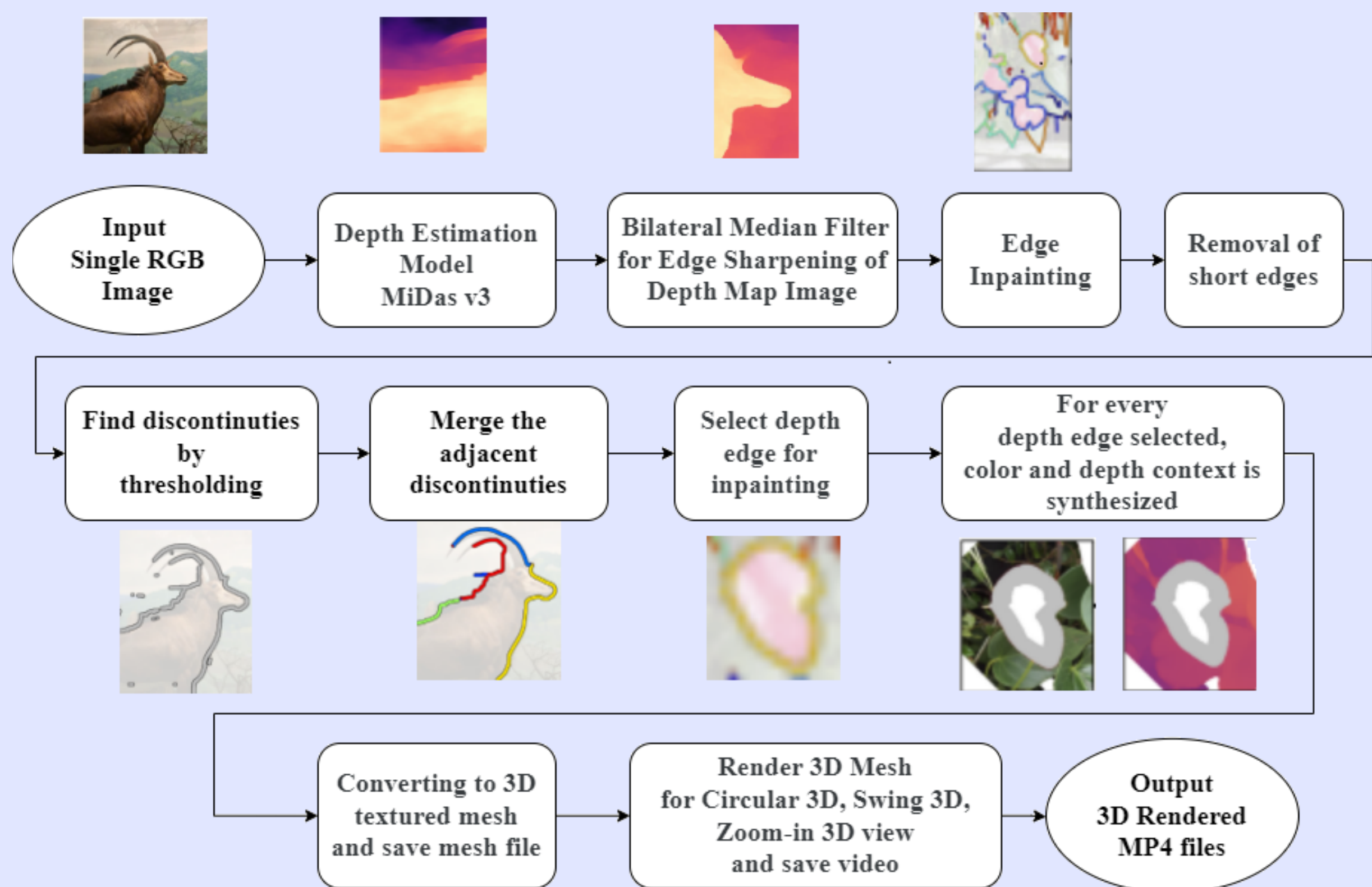
Abstract

Convert a single RGB-D input image into a 3D photo — a multi-layer representation for novel view synthesis that contains hallucinated color and depth structures in regions occluded in the original view.

Resolve the problem during rendering, if the image is having low contrast or the background is similar to the object.

The previous work, 3D photography, shows blur or improper inpainting during rendering in such cases.

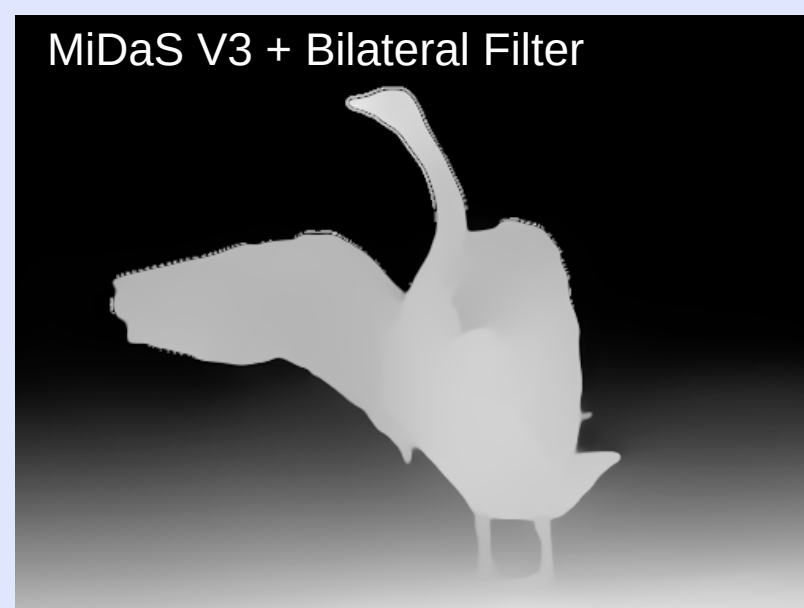
Proposed System



Results



MiDaS V2



MiDaS V3 + Bilateral Filter

- Identified the issue of improper blurred rendering if an image is having low contrast, or the background is similar to the object.
- Identified the root cause of the issue causing improper depth estimation and edge detection.
- It is resolved using depth estimation pre-trained model MiDaS v3.0 DPT Large and then edges sharpening techniques (bilateral morphological filters). Results show proper 3D rendering even if an image has very low contrast.

References

- Meng-Li Shih, Shih-Yang Su, Johannes Kopf, Jia-Bin Huang; Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)
- Varun Jampani, Huiwen Chang, Kyle Sargent, Abhishek Kar, Richard Tucker, Michael Krainin, Dominik Kaeser, William T. Freeman, David Salesin, Brian Curless, Ce Liu