

Room Layout Estimation in AR

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1 Introduction

This project uses the Magic Leap 2 platform to develop a **room** layout estimation system. By combining images and depth captured by the device, alongside ST-RoomNet and OneFormer, the system extracts room boundaries and renders them in 3D with customizable features.

2 Background

Motivation:

- Interior Decoration/Design: Should I put furniture here?
- Better AR Device: Locate myself with room layout lines!
- Real Estate: Buy satisfying room!

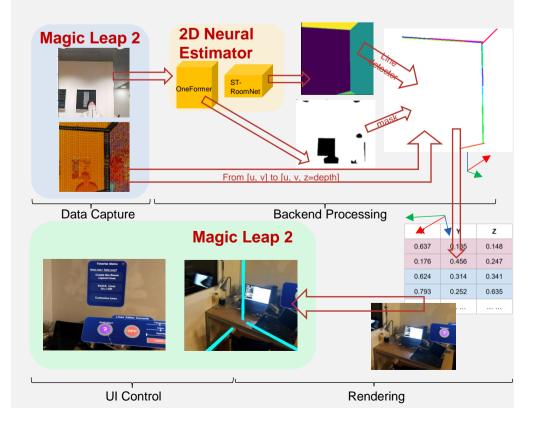


→ 3D Rendering

Would it be possible if I put a microwave here??

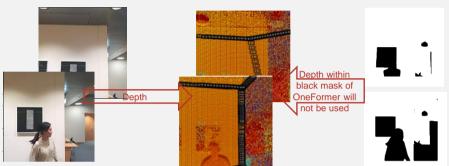
3 Method Overview

- Data Capture: Magic Leap 2 → images with depth captured
- Backend Processing: Images + Neural estimators in 2D → boundaries in 2D + depth captured → boundaries in 3D
- **Rendering:** Boundaries in 3D → coordinates transformation→ Magic Leap 2
- **UI Control:** Console → customize visualization.

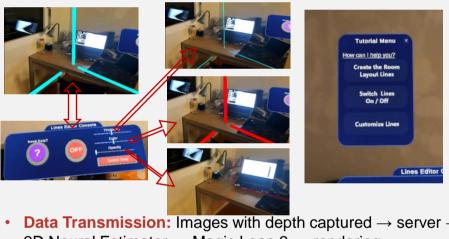


4 Results and Discussion

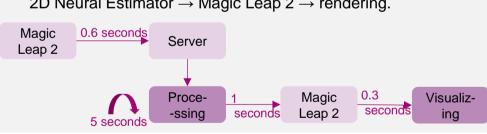
 Backend Output: Only depth information filtered by OneFormer will be considered



Final UI Output: Allow customization and ask for neip.



Data Transmission: Images with depth captured → server → 2D Neural Estimator \rightarrow Magic Leap 2 \rightarrow rendering.



5 Conclusions

- Room layout estimation system developed:
 - Visualize furniture placement and optimize room flow
 - Enhance spatial awareness with AR
- Future:
 - Reduce latency
 - Enhance real-time

References

- 1. H. Ibrahem, A. Salem, and H.-S. Kang, "ST-RoomNet: Learning Room Layout Estimation From Single Image Through Unsupervised Spatial Transformations," in *Proc. IEEE/CVF Conf. on Computer Vision and Pattern Recognition (CVPR) Workshops*, Jun. 2023, pp. 3375-3383.
- 2. Jain, J., Li, J., Chiu, M., Hassani, A., Orlov, N., & Shi, H. (2023). OneFormer: Universal Image Segmentation.

