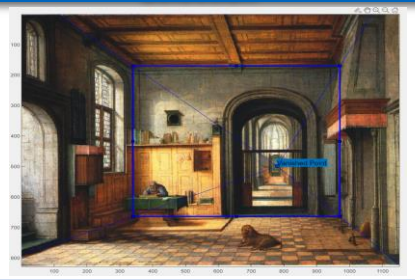
Lehrstuhl für Datenverarbeitung

Computer Vision Challenge SoSe22
Tour into the Picture

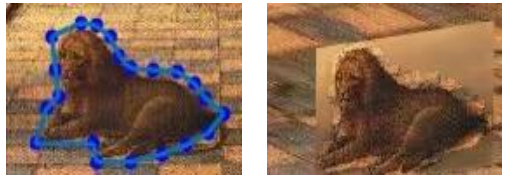
Group 16 : *Yinghan Huang, Jingkun Feng, Haoyu Wei, Jiawei Zou, Qihong Zha*

1 Vanishing Point & Background Selection

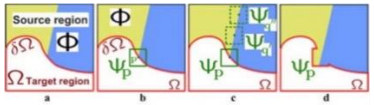


2 Foreground Selection

- Precise selection
- Multiple foreground objects
- Original image filled by interpolation

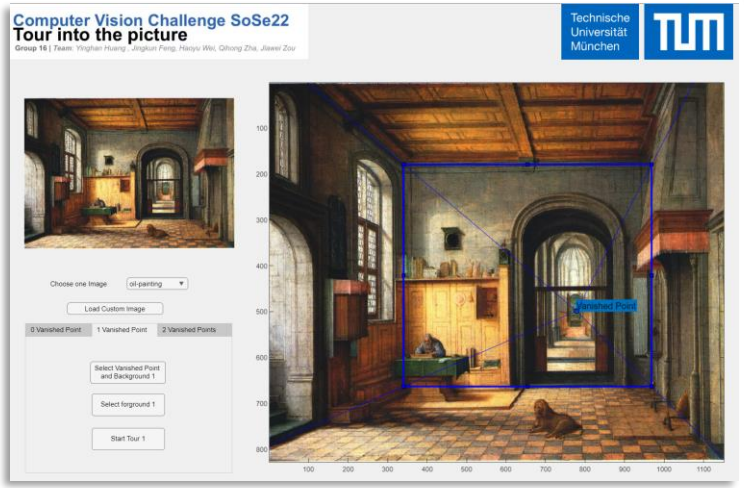


3 Interpolation



a) Structure propagation by exemplar-based texture synthesis [3]

User Interface

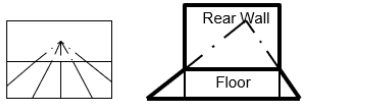


Results

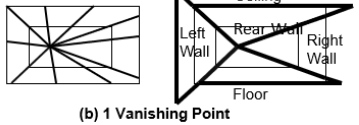
Scene 1: Oil painting

Scene 2: TUM MW Gebäude

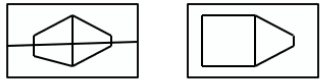
4 From 2D to 3D



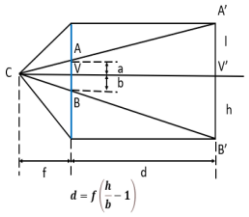
(a) 0 Vanishing Point



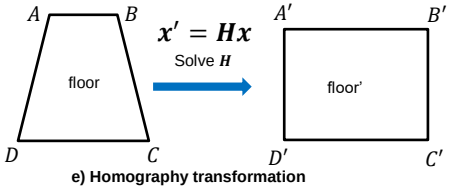
(b) 1 Vanishing Point



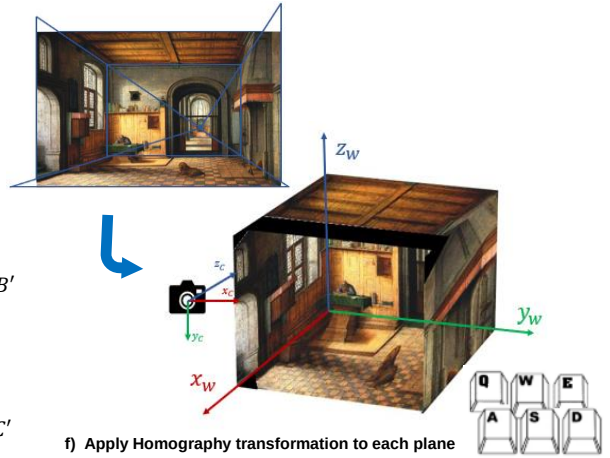
(c) 2 Vanishing Point



d) Estimate depth via triangular similarity



e) Homography transformation



f) Apply Homography transformation to each plane

Challenges

- Implementation of Interpolation
- Depth computation
- Homography matrix computation
- Dealing with MATLAB GUI

Problems

- Interpolation of extracted foreground objects is slow, highly related to image resolution
- Foreground objects can only be displayed as rectangles
- Only foreground objects on the floor are supported
- 3D reconstruction of scenes with 2 vanishing points
- On Linux, foreground selection in interface may fail

Allocation of Work

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Haoyu Wei
Jiawei Zou
Qihong Zha

117 Commits 14 Branches

References

[1] Y. Horry, K.-I. Anjyo, and K. Arai, “Tour into the picture: using a spidery mesh interface to make animation from a single image,” in Proceedings of the 24th annual conference on Computer graphics and interactive techniques, 1997, pp. 225–232.
[2] K. Andersen, The geometry of an art: the history of the mathematical theory of perspective from Alberti to Monge. Springer Science & Business Media, 2008. 5
[3]A. Criminisi, P. Perez and K. Toyama, "Object removal by exemplar-based inpainting," 2003 IEEE Computer Society Conference on Computer Vision and Pattern Recognition, 2003. Proceedings., 2003, pp. II-II, doi: 10.1109/CVPR.2003.1211538.