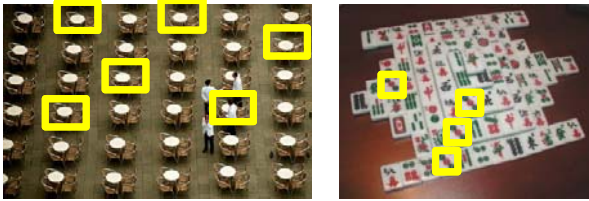


Distribution of Local Feature Descriptor and Parallel Estimation of Homography for Object Matching with Dozens of Repeated Patterns

Xu ZHAO 池永研究室修士課程修了

Research background

Object matching with repeated patterns



Problem

Sequential matching + Repeated patterns

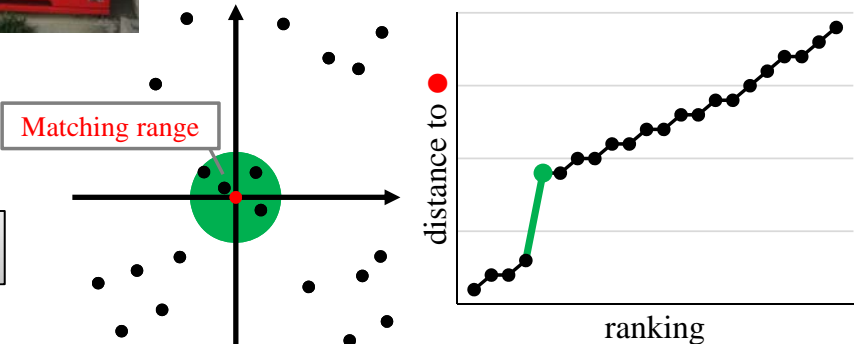
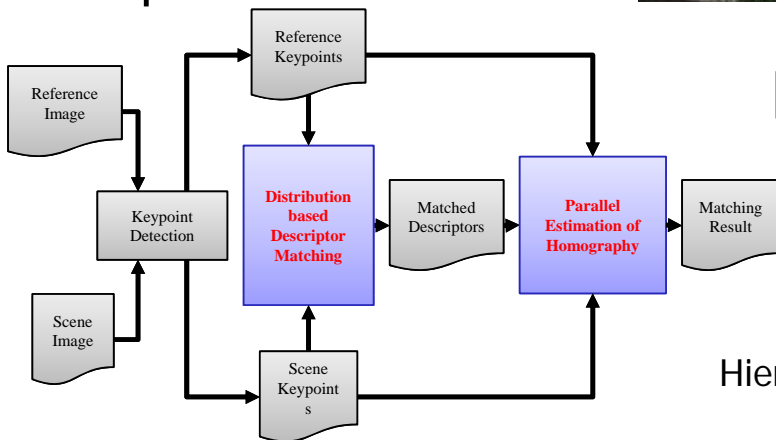
- ❑ Low matching rate
- ❑ Halt once failed

Target

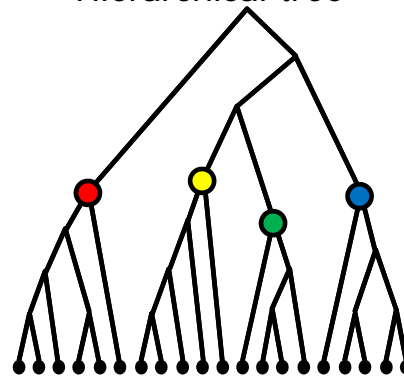
Parallel matching + Repeated patterns

- ❑ Distribution based descriptor matching
- ❑ Parallel estimation of Homography

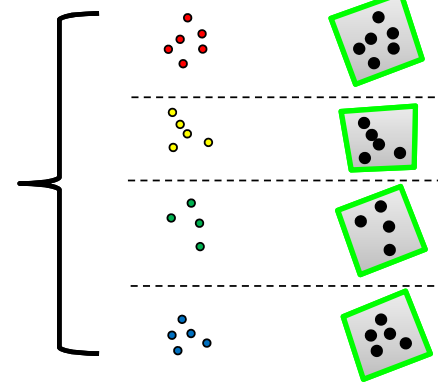
Proposed method







Hierarchical tree

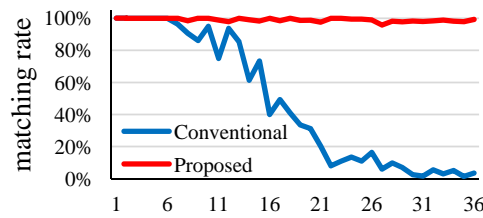


Parallel estimation

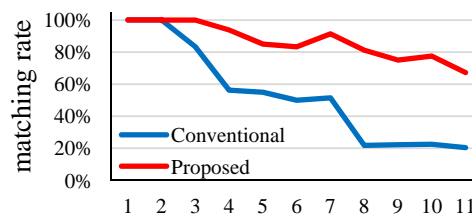


Experimental result

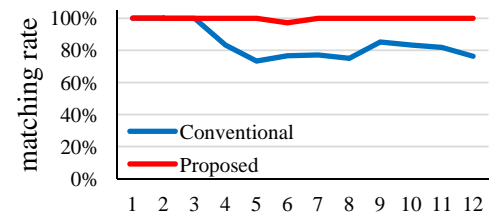
Resolution 4K x 3K		Texture	
		Simple	Complex
Category	2D surface	 Mahjong tiles	 Cash
	3D object	 Badminton	 Drink cans



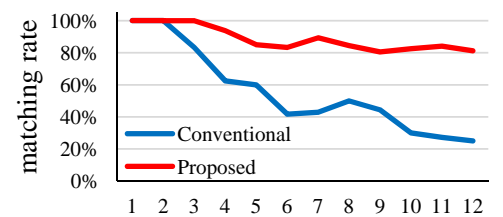
Mahjong tiles occurrences



Badminton occurrences



Cash occurrences



Drink cans occurrences

Conclusions

Proposal

- ❑ Distribution based local feature descriptor matching
- Matching range

- ❑ Parallel estimation of homography

- Pre-sampling with hierarchical tree
- Parallel iteration

Result

- ❑ Average matching rate: 99% for 2D and 87% for 3D.
- ❑ Average time consuming: Fluctuates within 8%.
- ❑ Compared with conventional method: 44% improvement.
- ❑ Matching rate: keep for 2D and fall a little for 3D.

