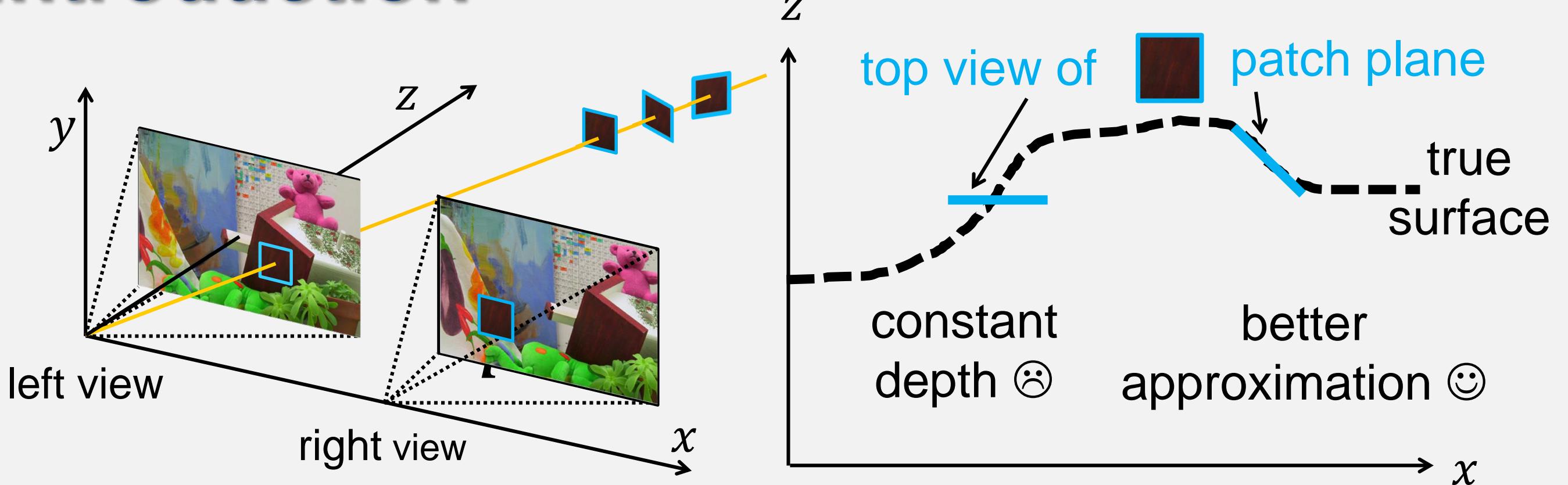


## Introduction

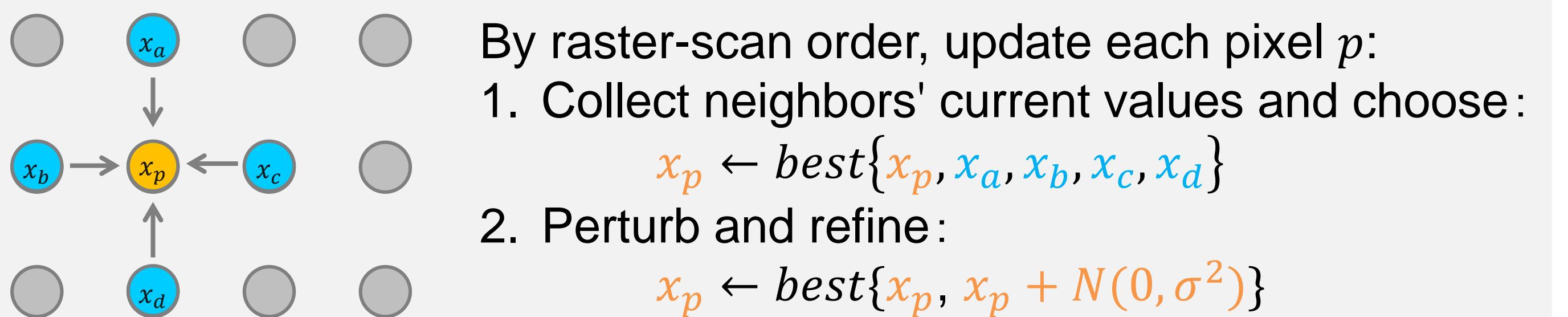


## Estimate per-pixel dense 3D planes

$$(a_p, b_p, c_p): z_p = a_p x + b_p y + c_p$$

## Related Work

### PatchMatch Stereo [Bleyer et al. BMVC'11]



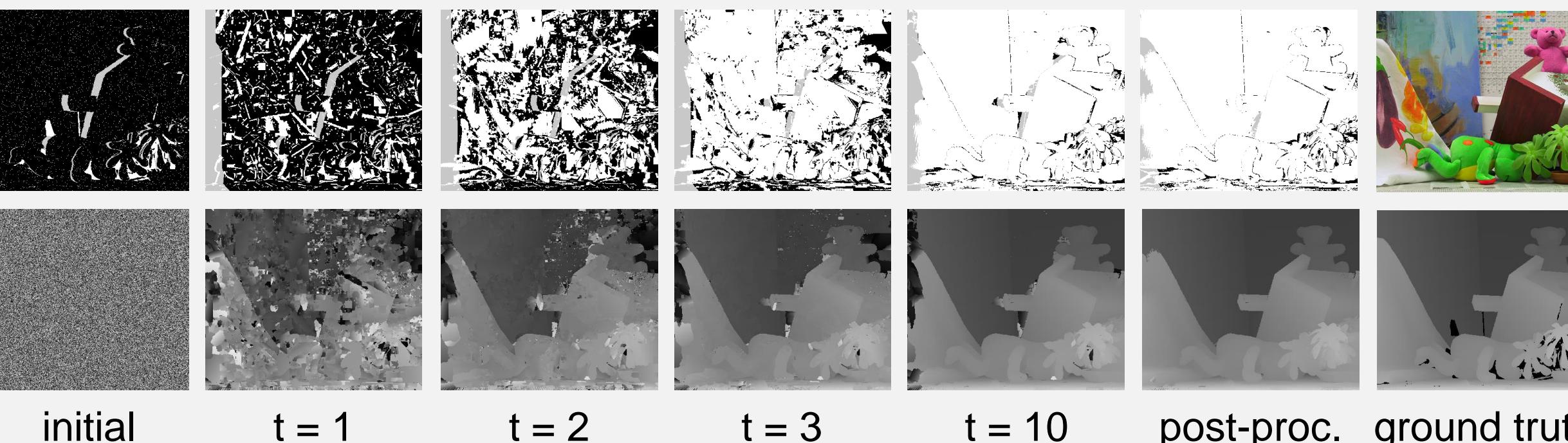
### PatchMatch BP [Besse et al. BMVC'12]

### Fusion Moves [Lempitsky et al. PAMI'10]

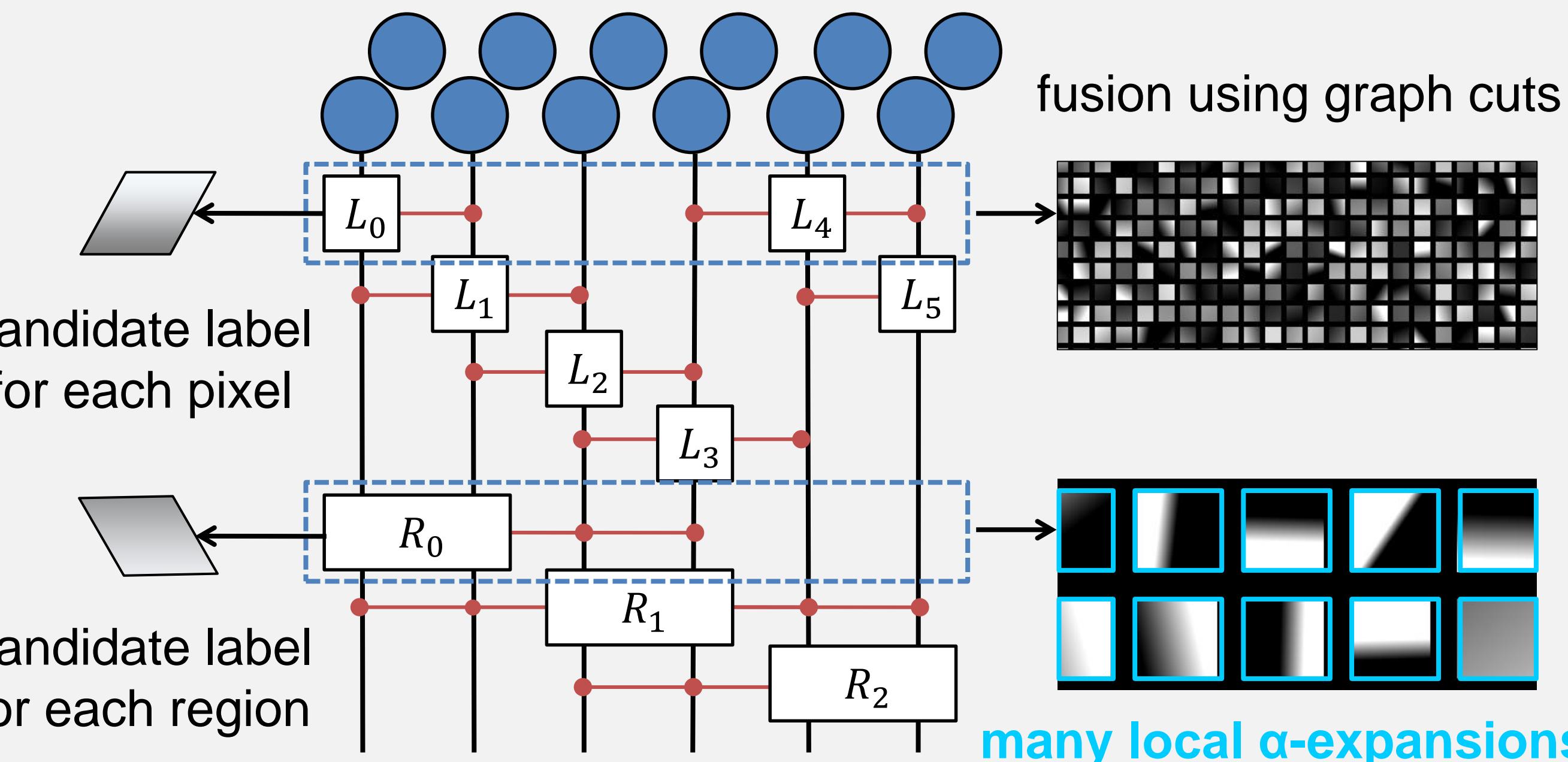
## Advantages

- A subproblem optimality (each min-cut is always submodular)
- Accounts for piecewise linearity of the scenes
- Efficient parallelization on GPUs

## Proposed Method

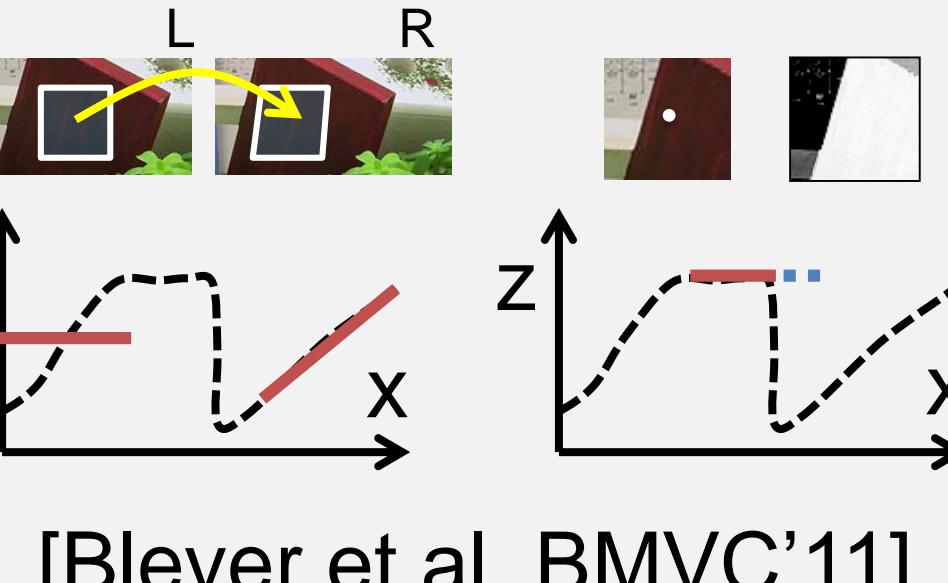


### Efficient randomized search using graph cuts

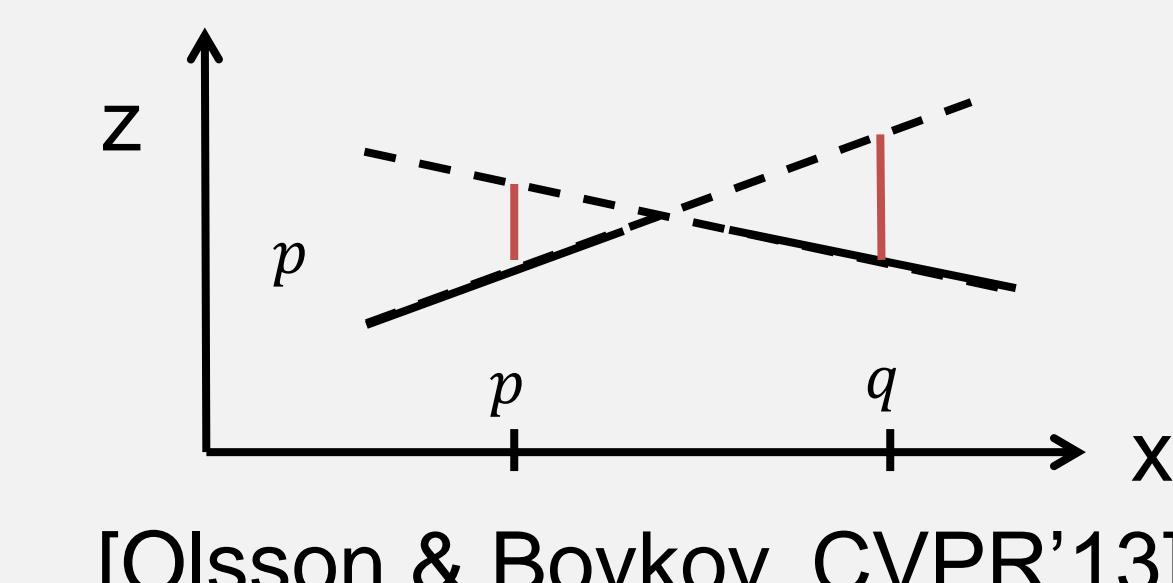


### Incorporate a spatial propagation technique into graph cut based MRF optimization

#### Data term



#### Smoothness term

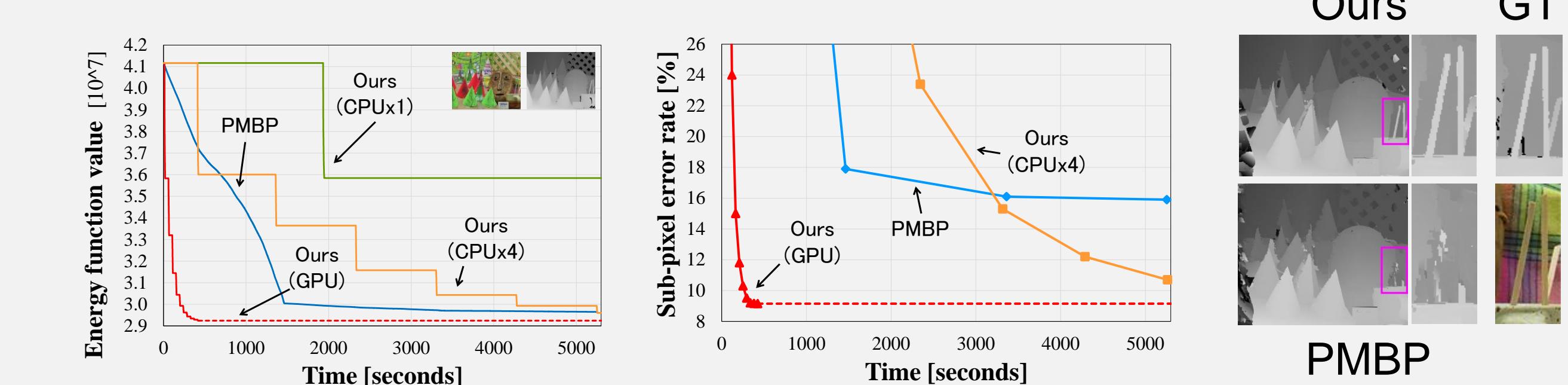


## Experiments

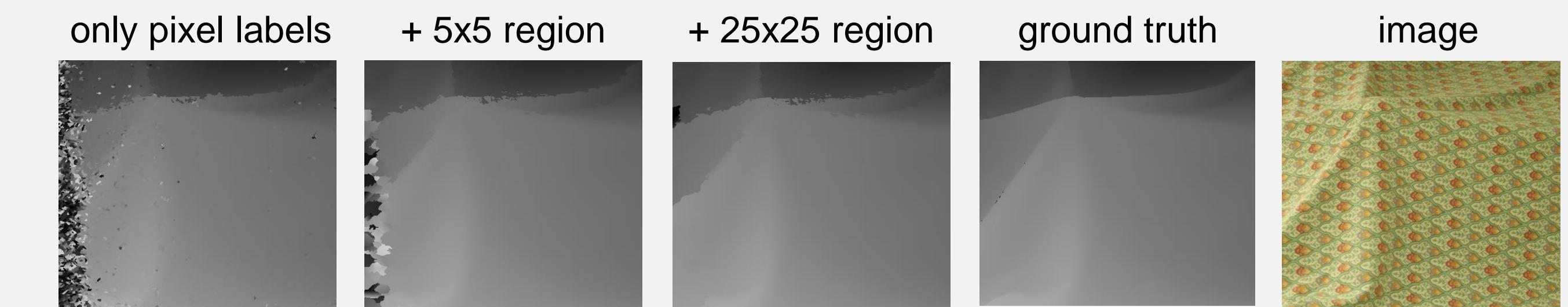
Algorithm	Avg. Rank	Tsukuba			Venus			Teddy			Cones			Average Percent Bad Pixels
		nonocc	all	disc	nonocc	all	disc	nonocc	all	disc	nonocc	all	disc	
1. OUR METHOD	3.5	5.04	2	5.56	2	14.0	9	0.66	2	0.88	2	5.82	4	6.63
2. PM-Huber	5.4	7.12	9	7.80	8	13.7	7	1.00	8	1.40	9	7.80	12	7.33
3. SubPixSearch	6.2	5.60	3	6.23	3	9.46	3	1.07	10	1.64	10	7.36	8	7.51
4. PMF	8.6	11.0	29	11.4	26	16.0	24	0.72	4	0.92	3	5.27	3	7.69
7. PMBP	13.2	11.9	40	12.3	36	17.8	43	0.85	6	1.10	4	6.45	6	8.77
9. PatchMatch	20.3	15.0	57	15.4	56	20.3	69	1.00	9	1.34	8	7.75	11	9.91
*. w/o post-proc.	4.3	5.15	2	5.82	2	14.0	9	0.73	4	1.02	3	6.65	6	7.29

(0.5 pixel error threshold)

1st rank on the Middlebury benchmark  
even without the post-processing



### Comparison with PMBP [Besse et al. BMVC'11]



Accounts for piecewise linearity of the scenes

