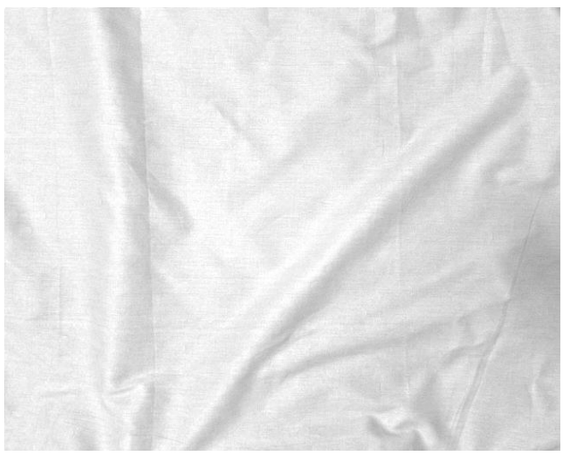
# PatchMatch-based Automatic Lattice Detection for Near-Regular Textures

Supplemental Material

## 1. Application: retexturing

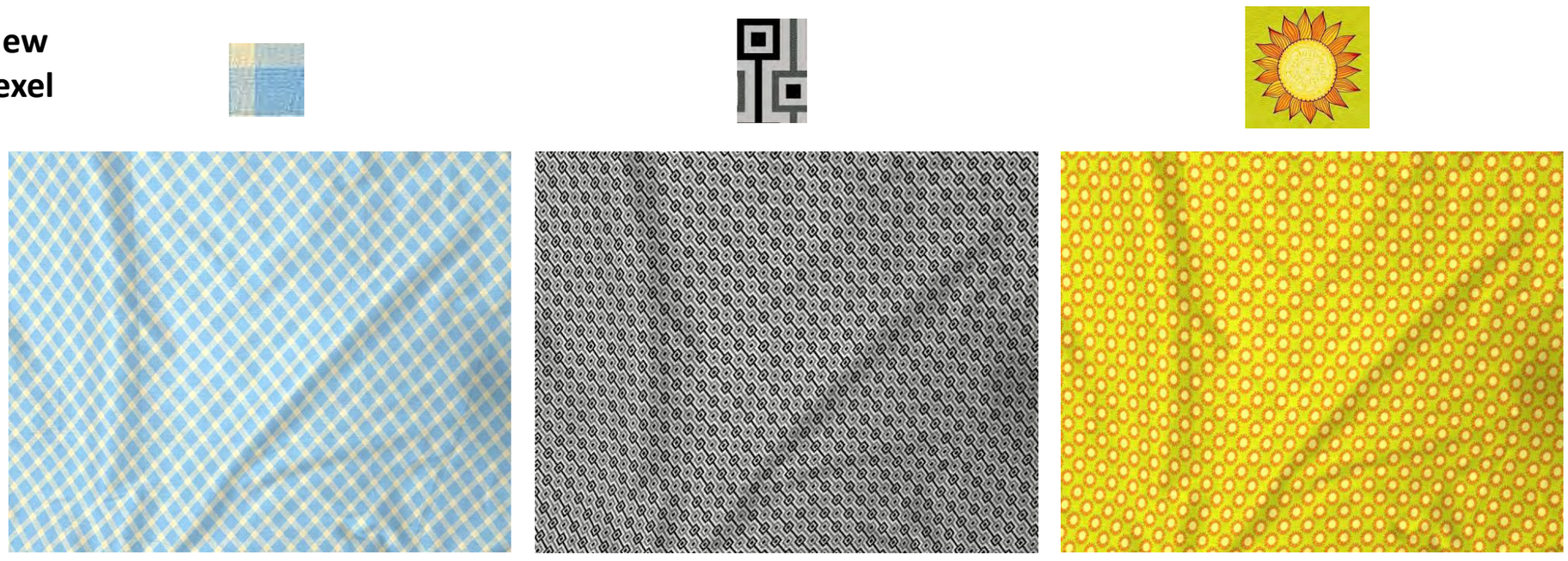
The proposed method is able to detect lattices reliably. It provides accurate geometric correspondences for the estimation of a warping field between the folded texture and its rectified counterpart, allowing us to edit the texel level of an image's reflectance layer. We used the intrinsic image decomposition method of Zhao *et al.* [1] to extract the shading map of an input image. This shading map is then multiplied with the edited reflectance layer to create the final rendering. We present retexturing results in Fig. 1 to supplement the main paper. We can see that our method captures the geometric deformations of the original images well and the renderings look realistic.

**Input image**



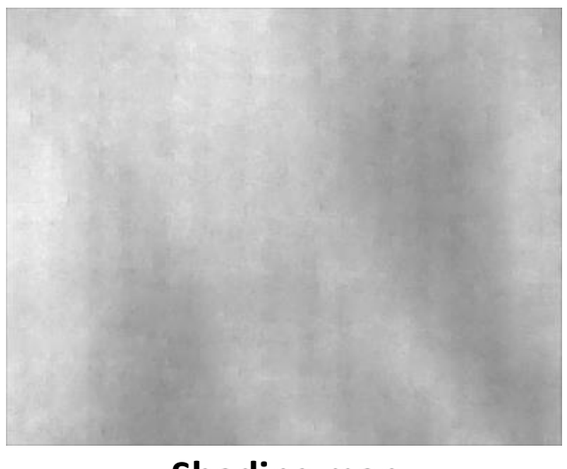
**Shading map**

**New texel**



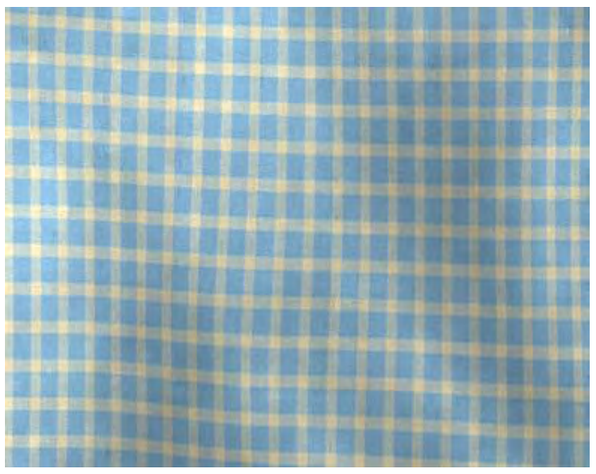
(a)

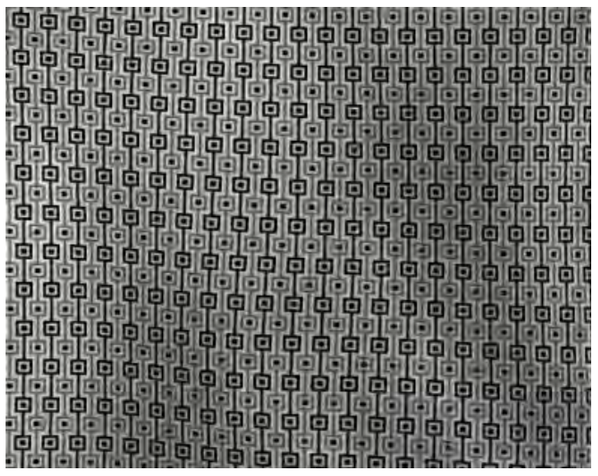
Input image

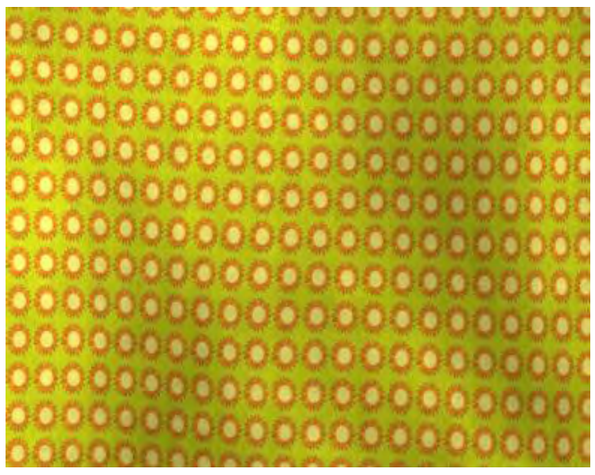


Shading map

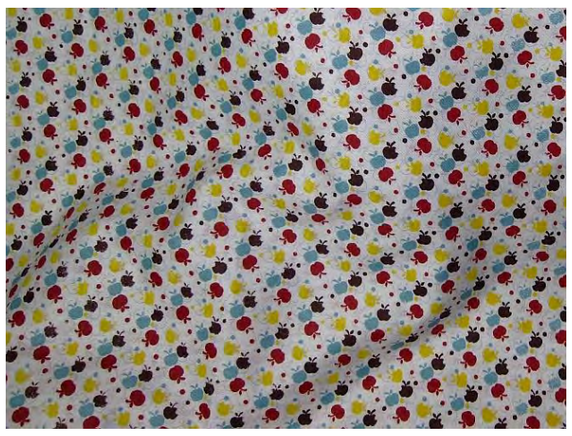
New texel



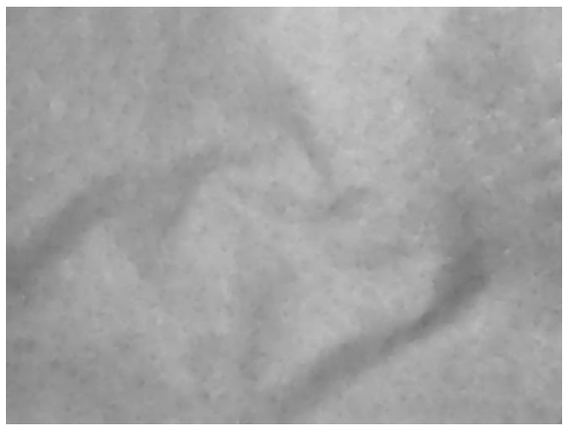




(b)



Input image



Shading map

New texel





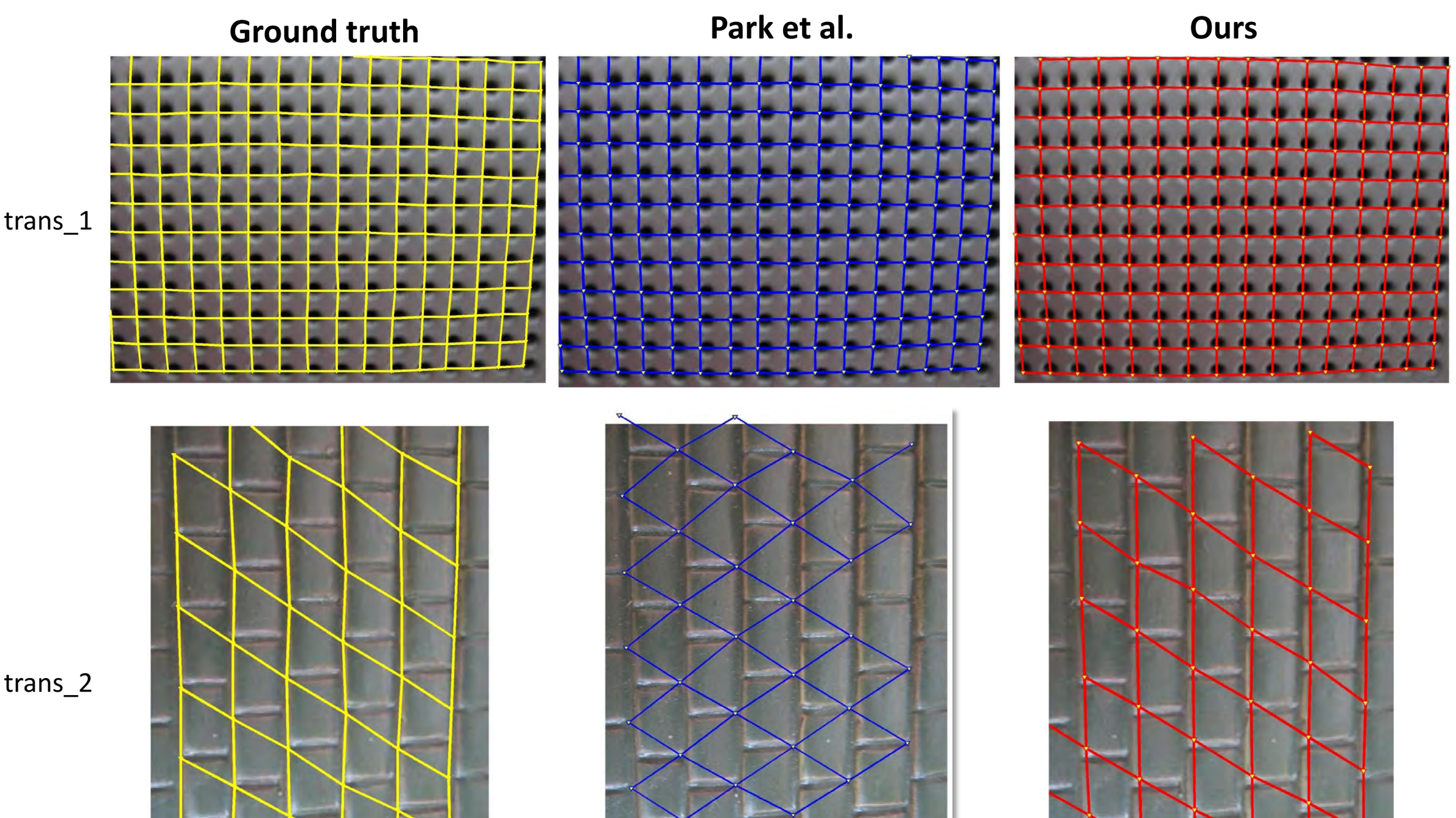
(c)

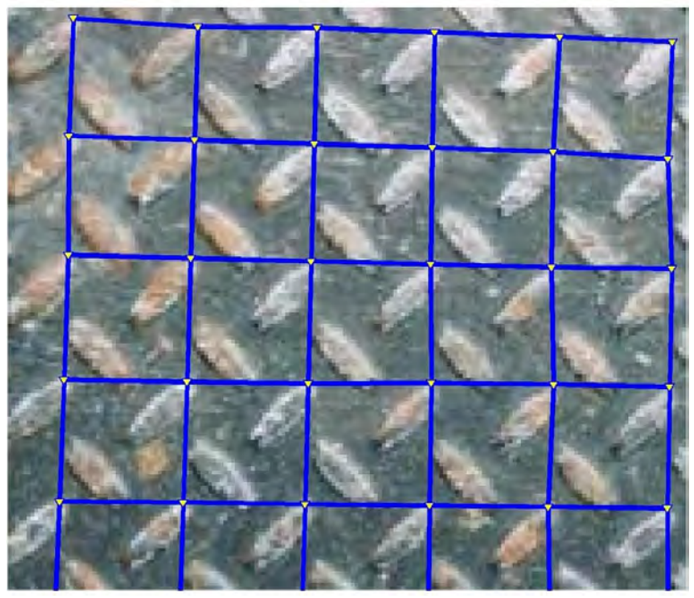
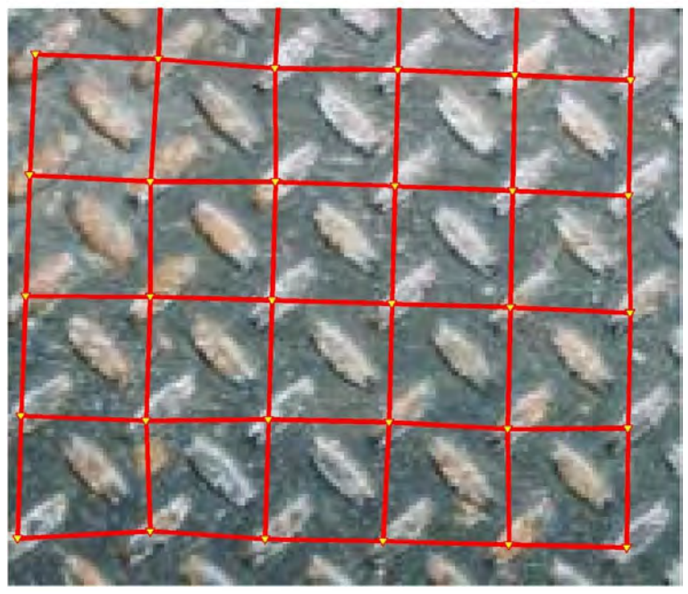
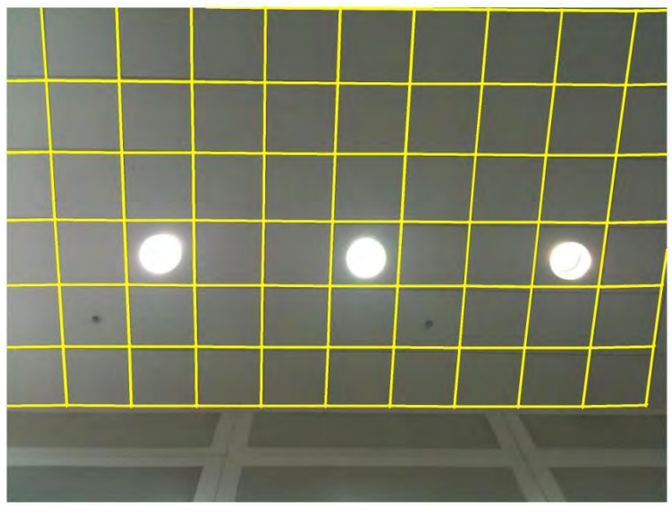
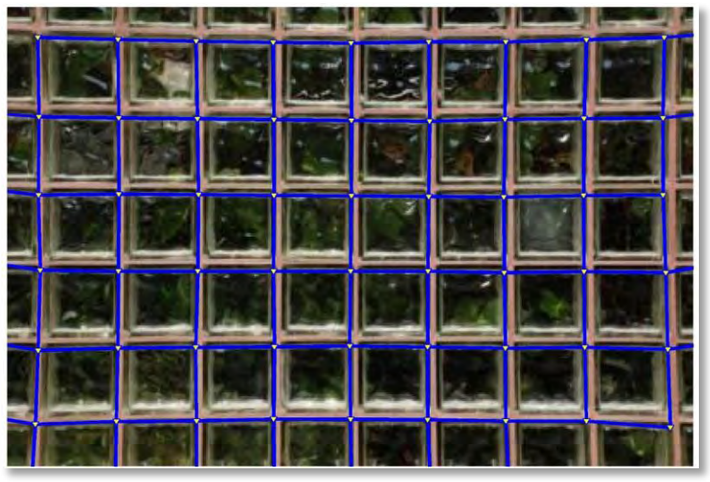
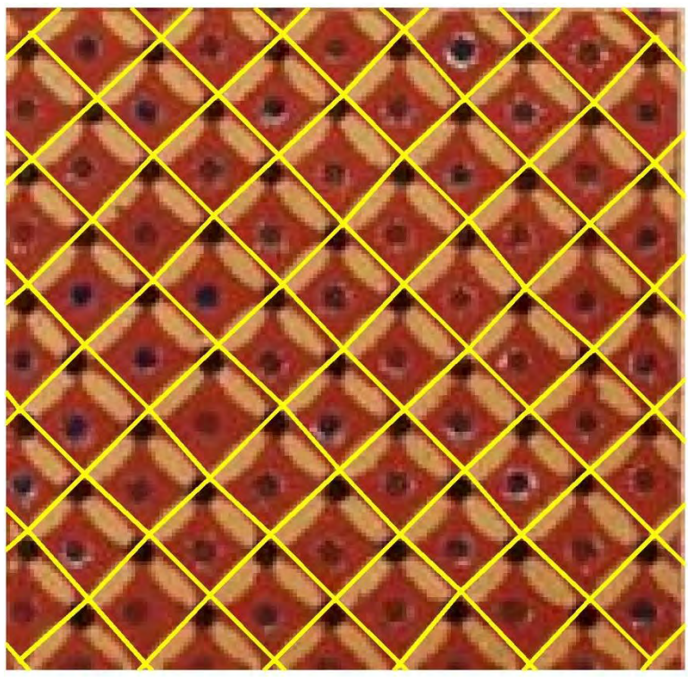
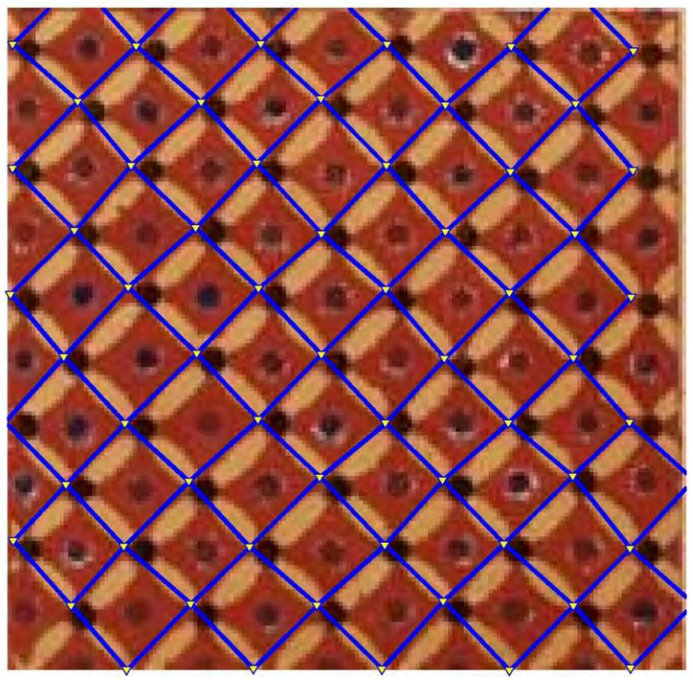
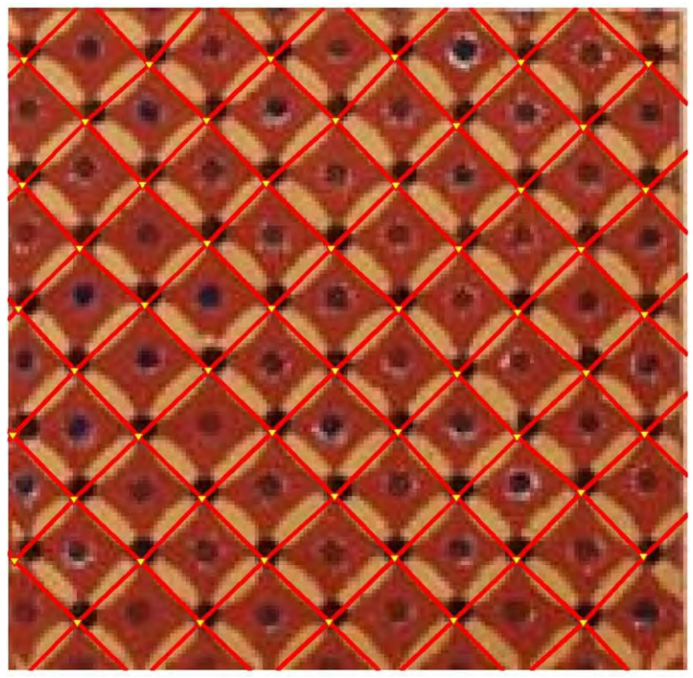
Fig. 1: Retexturing based on detected lattices.

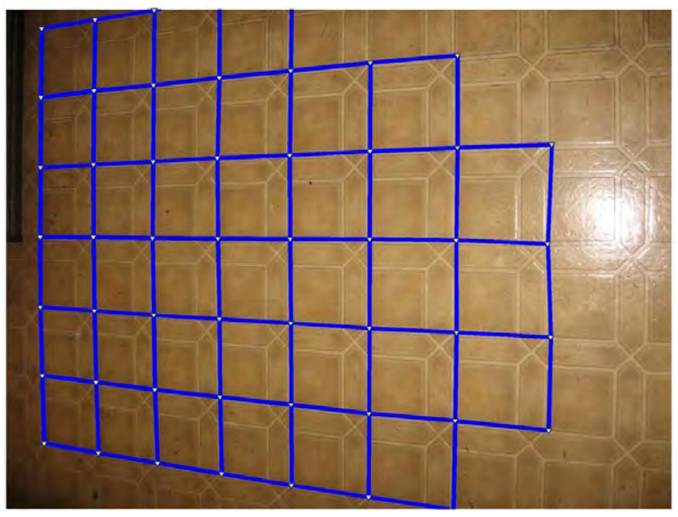
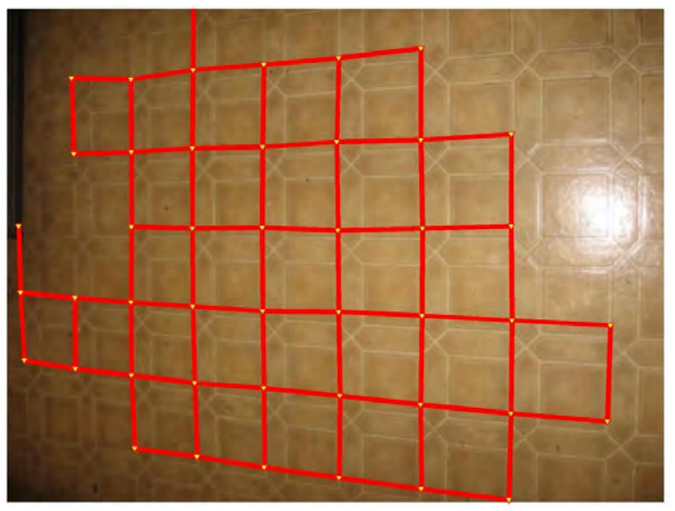
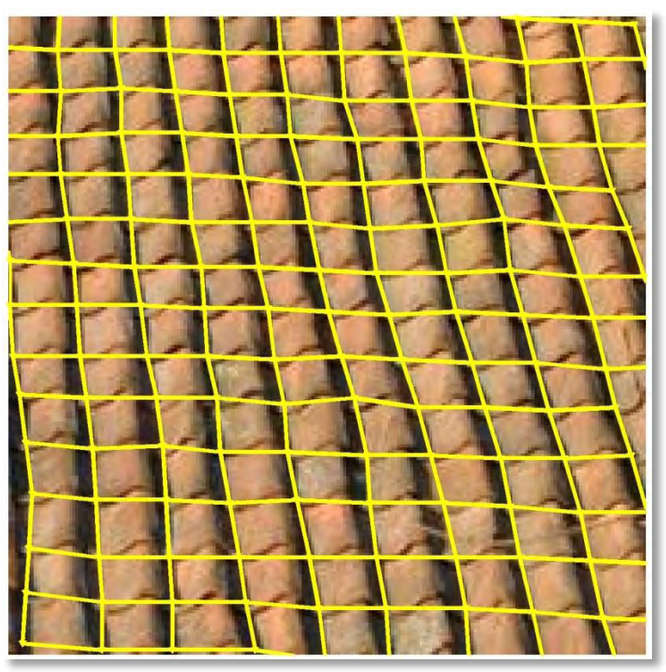
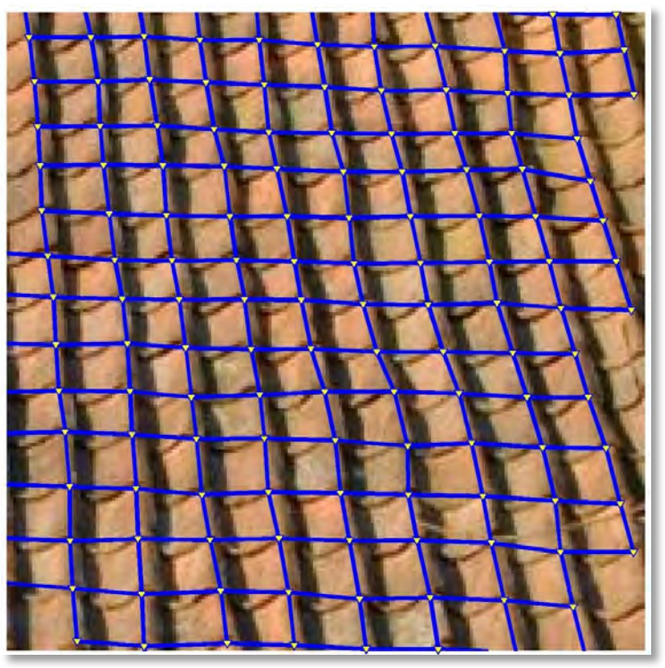
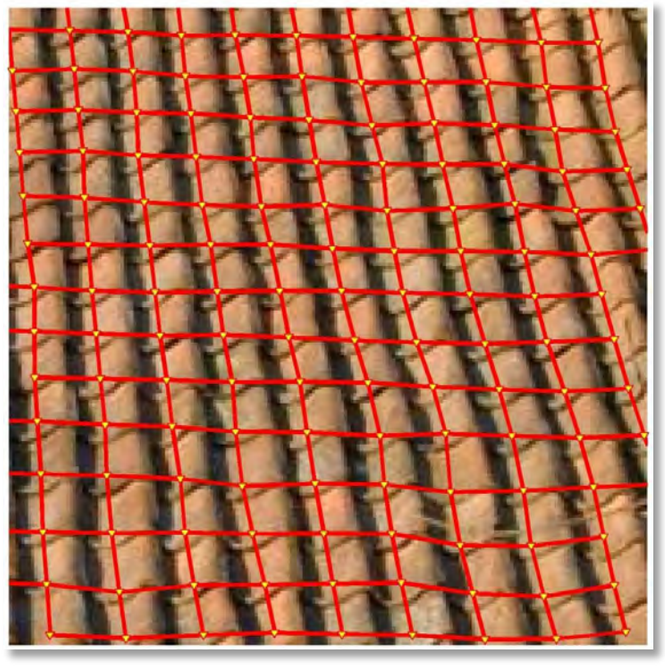
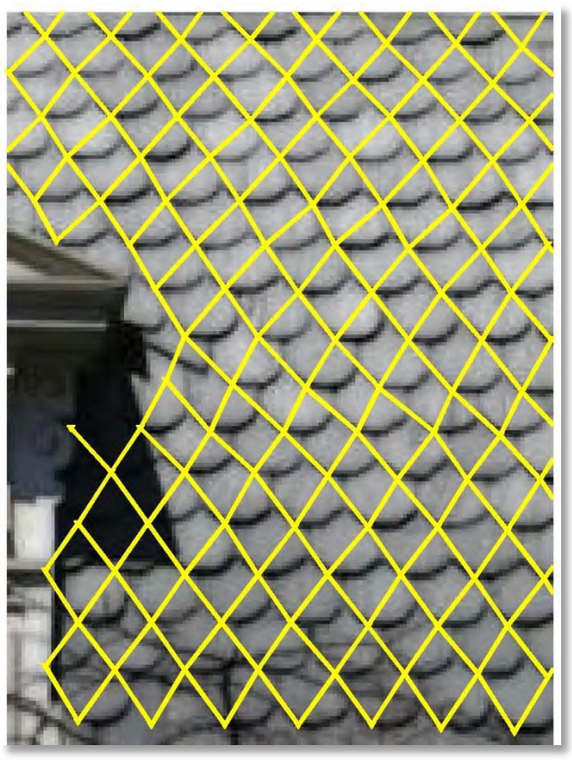
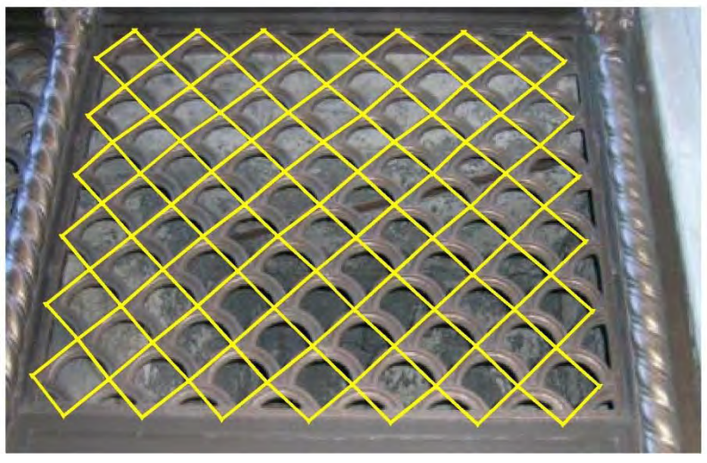
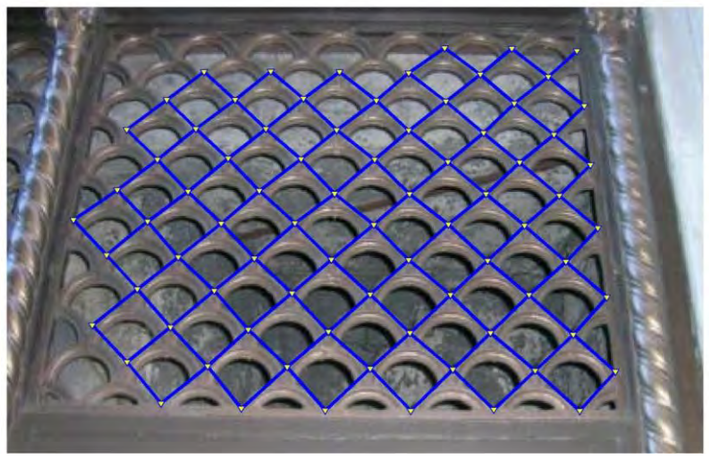
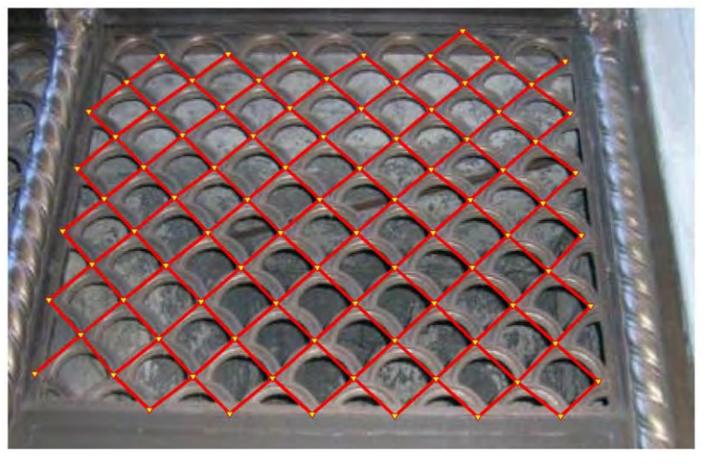
## 2. Visual Result Comparison

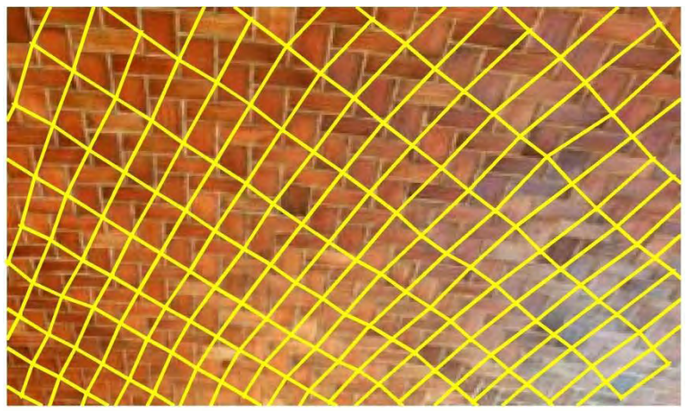
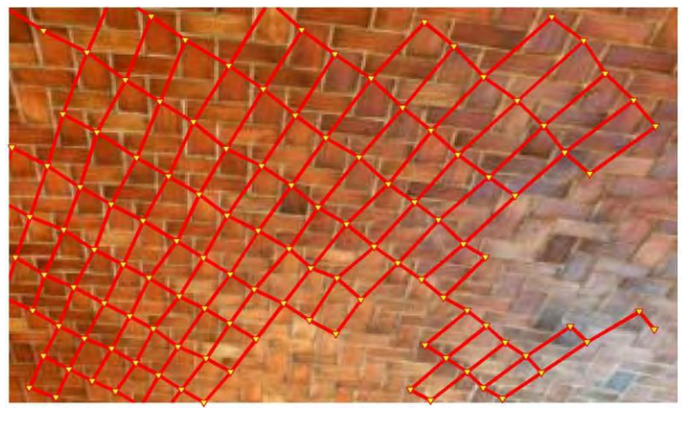
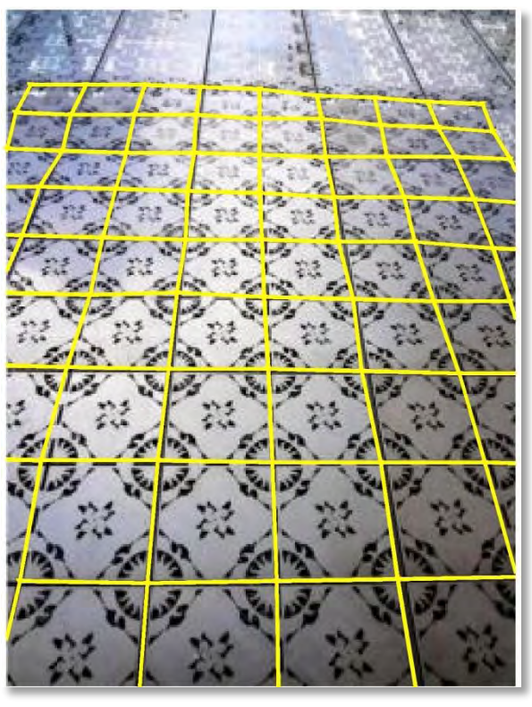
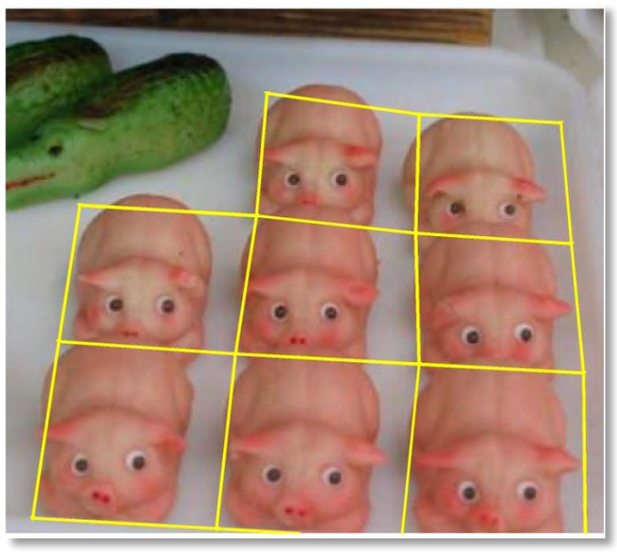
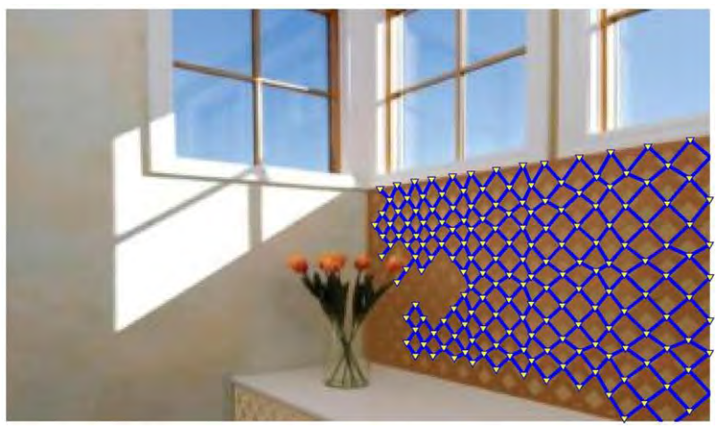
The following shows result comparisons on test data provided in Symmetry Detection from Real World Images Competition 2013, termed “Set A” in the main paper. Failure cases are boxed in yellow. Best viewed in color.

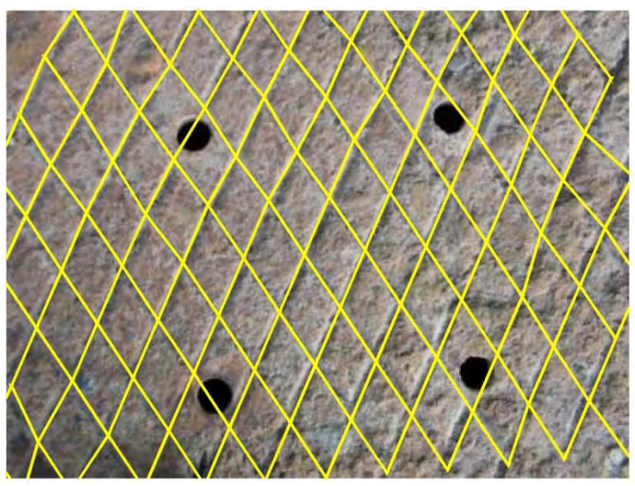
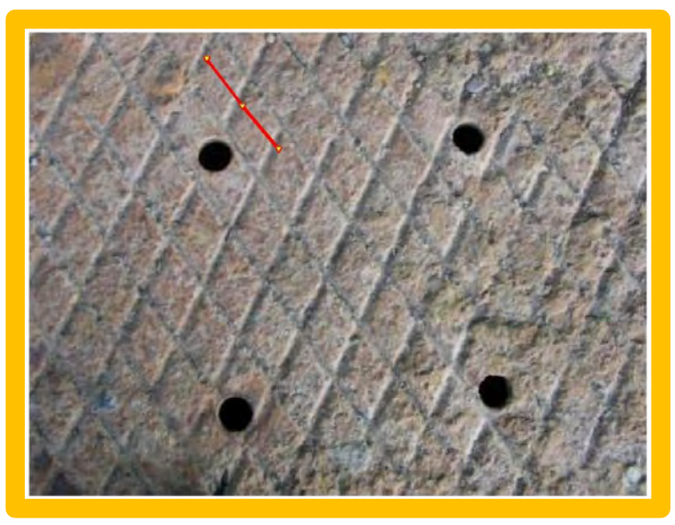
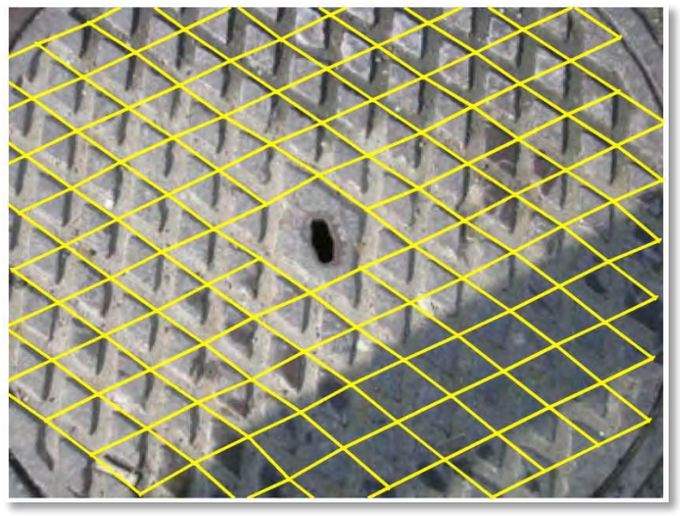
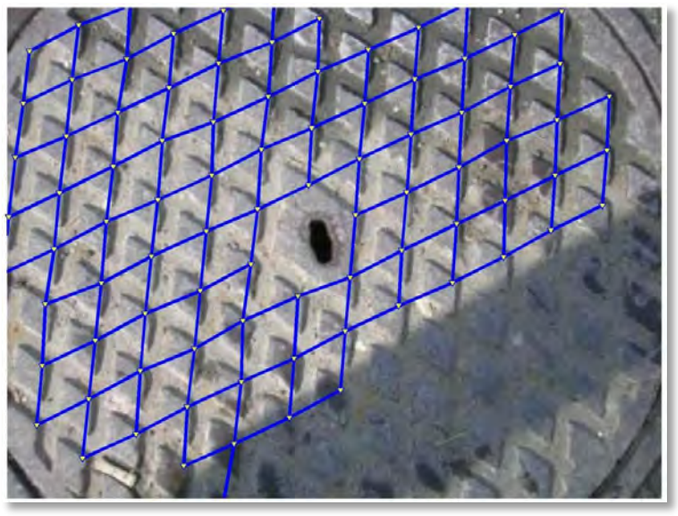
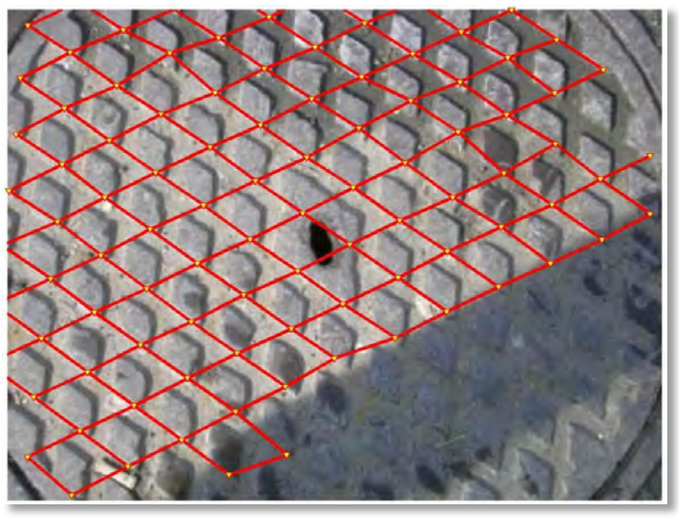
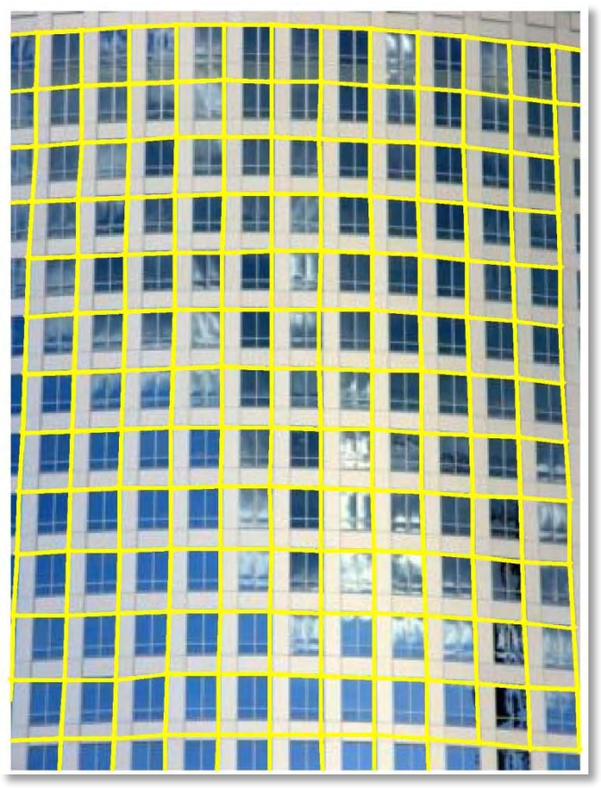
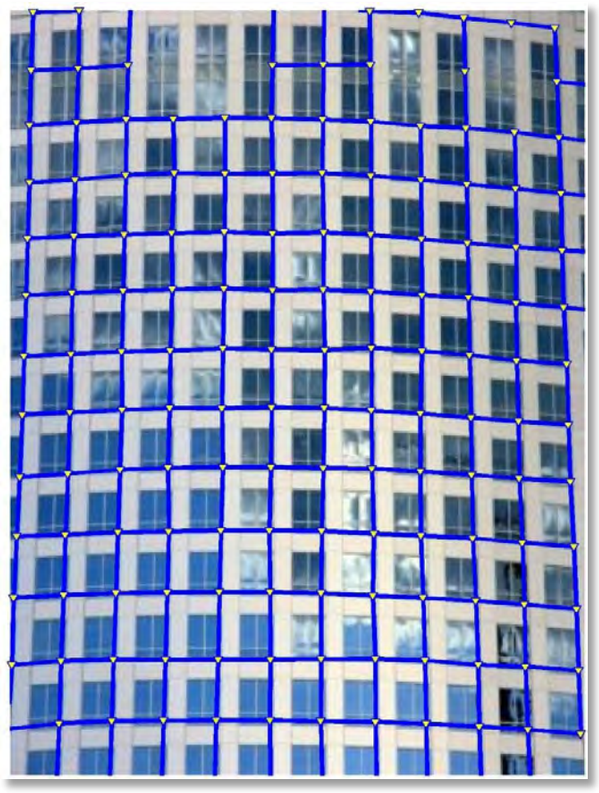
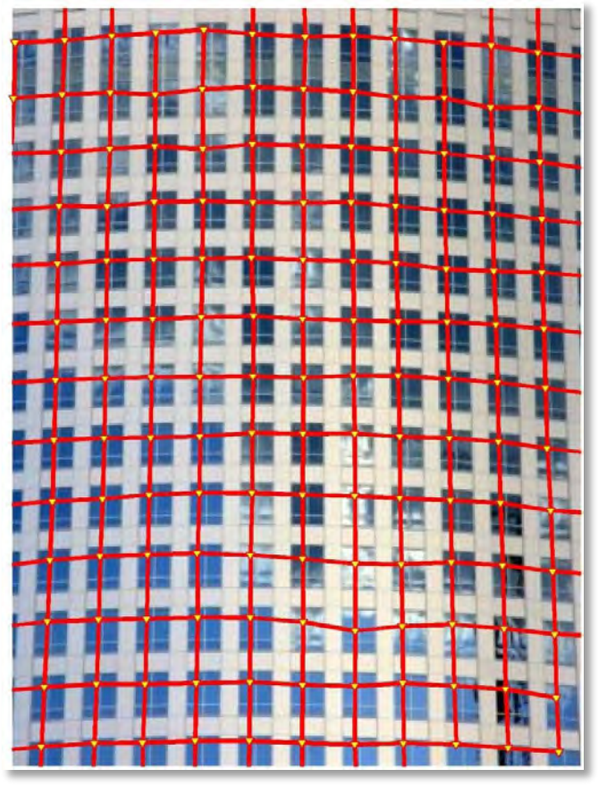
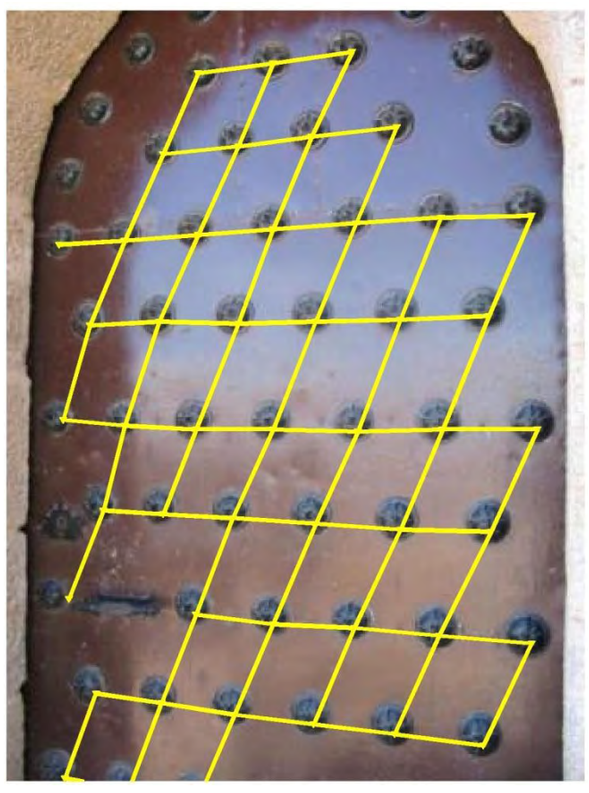
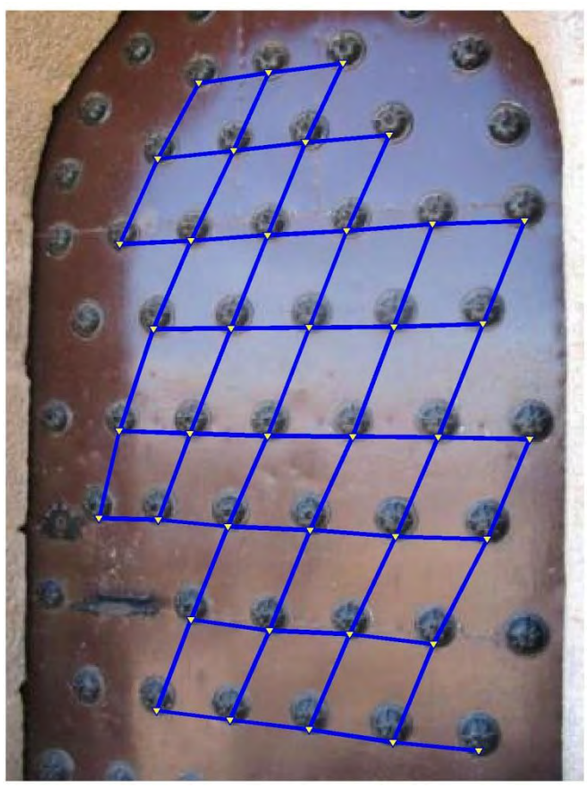
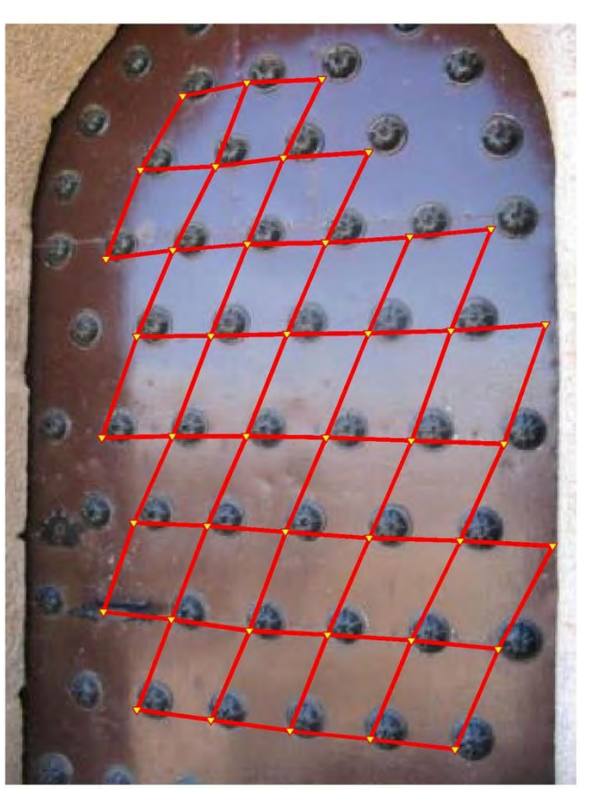
Subset “General”

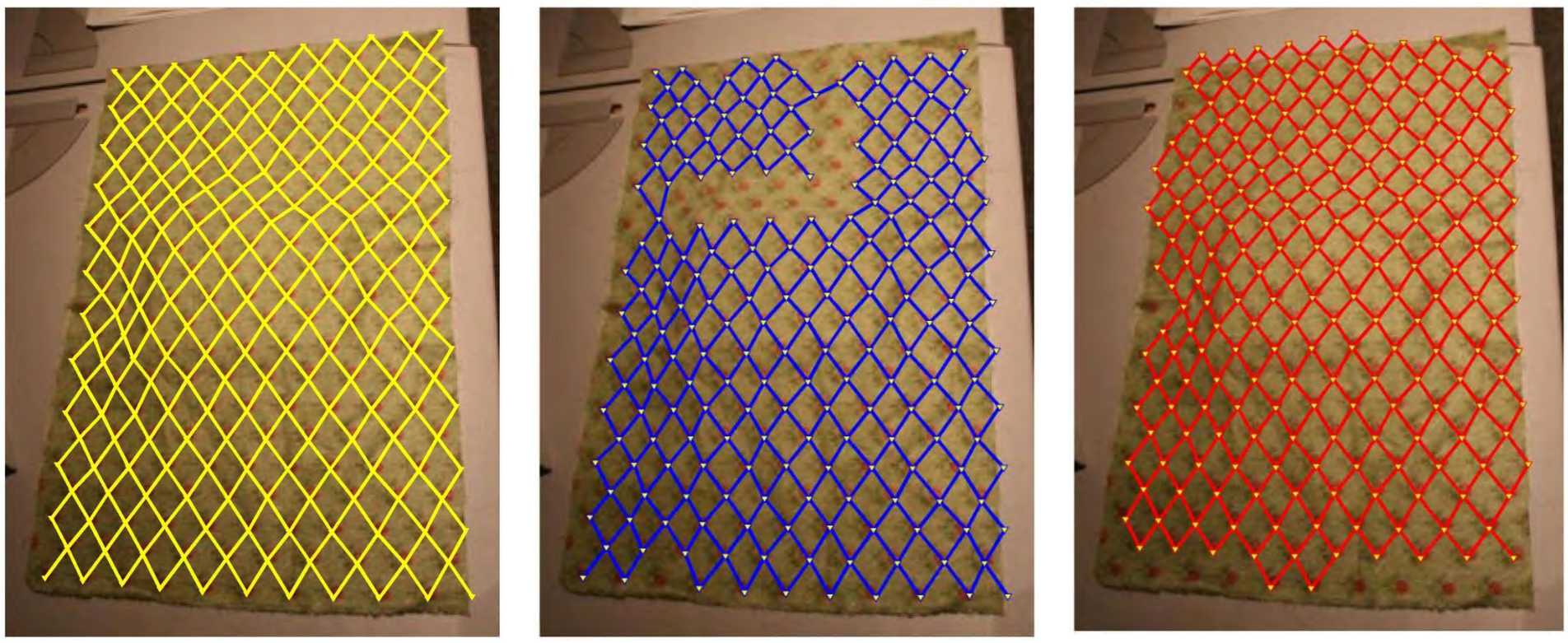
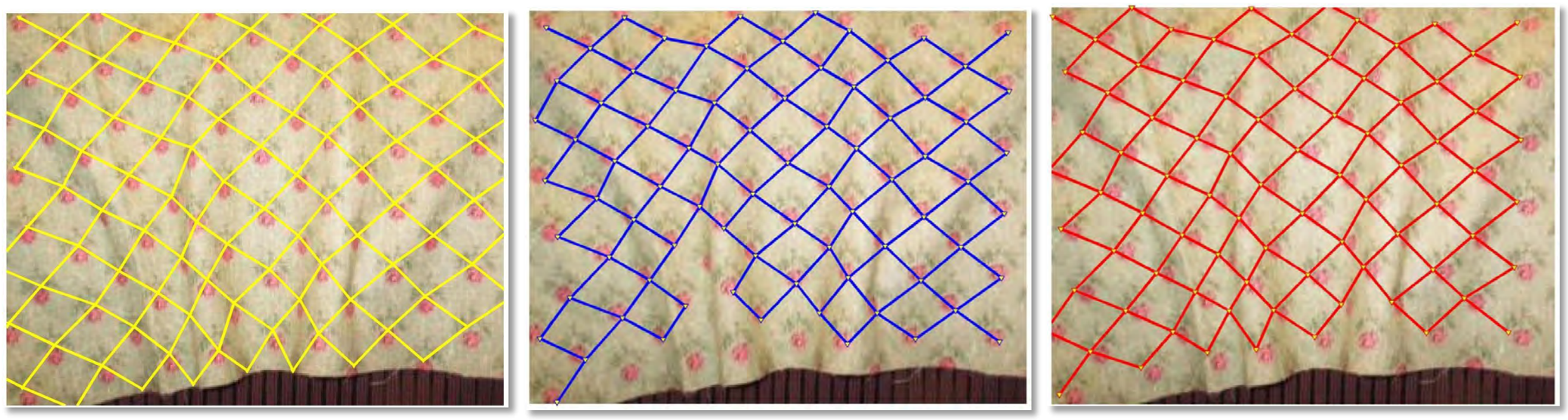
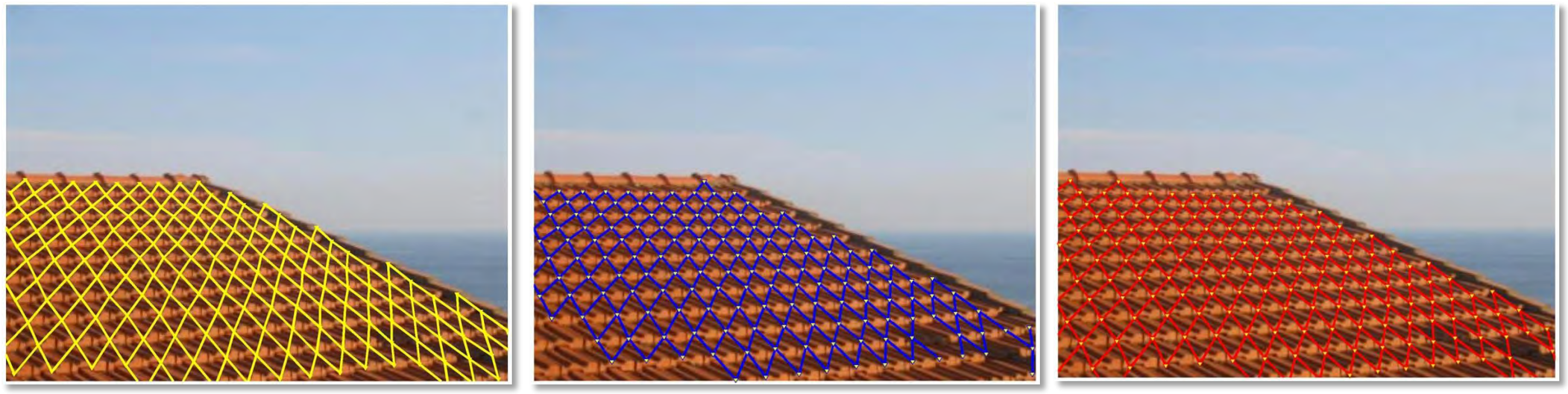
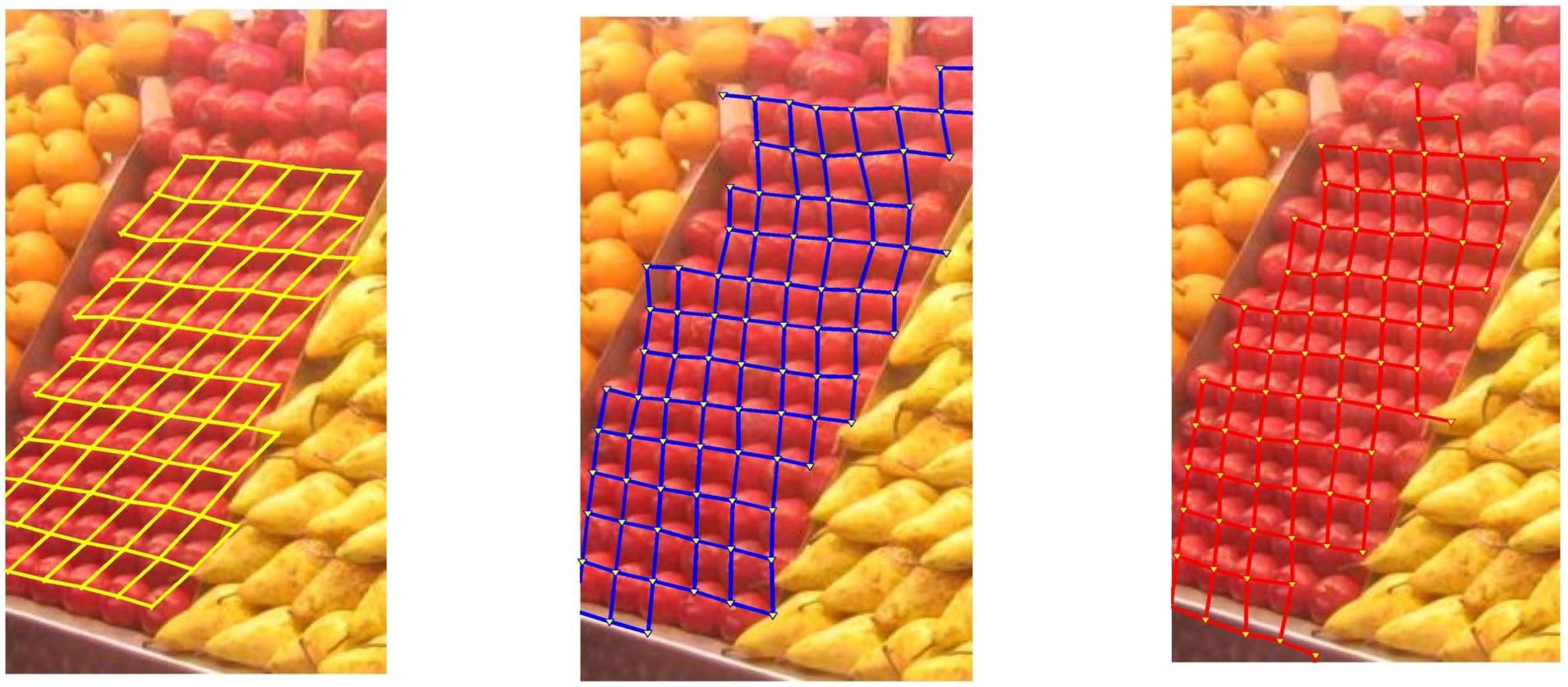


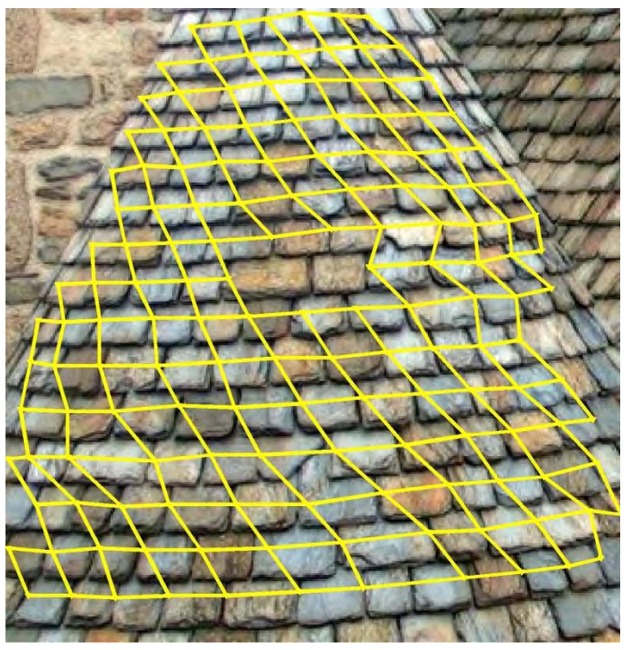
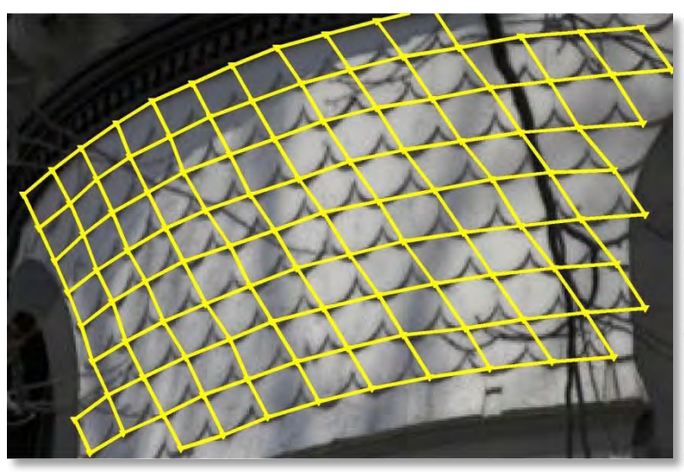
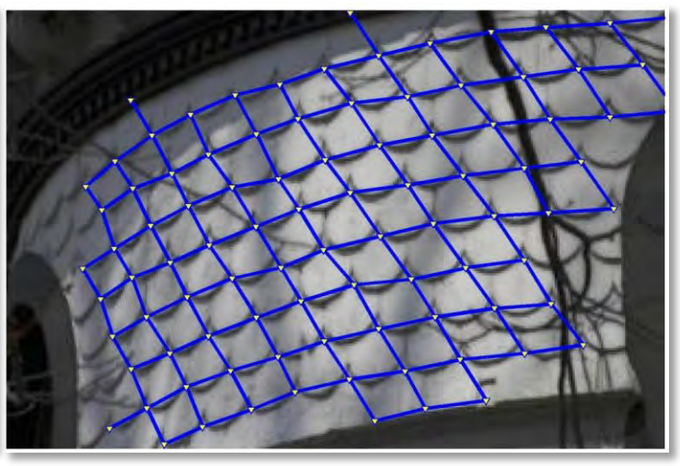
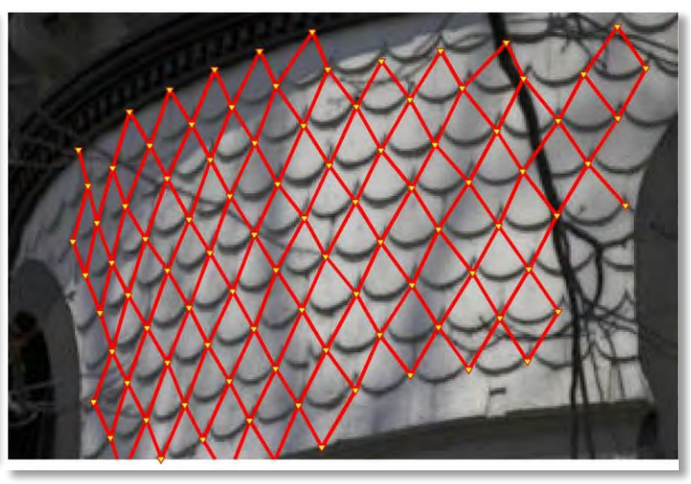
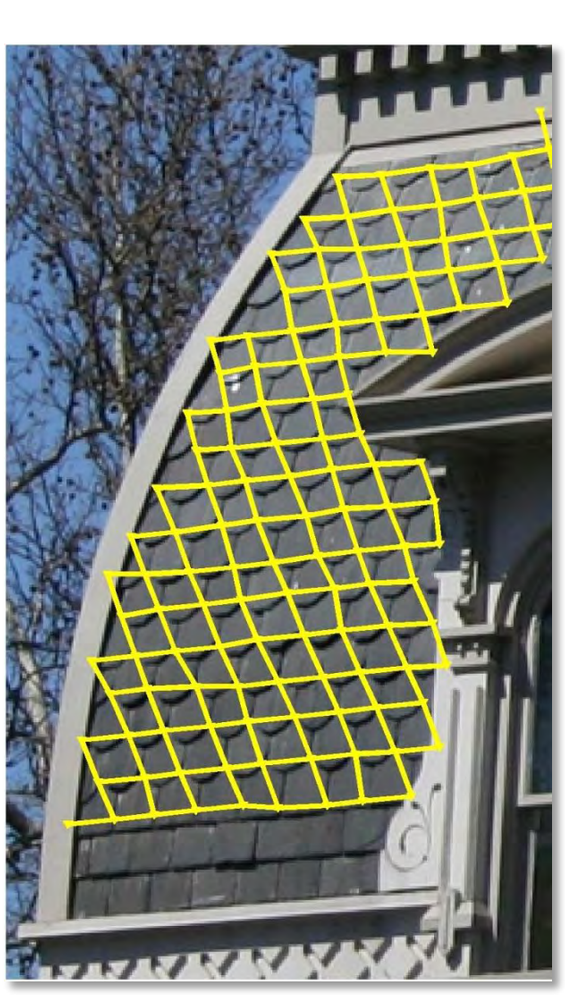
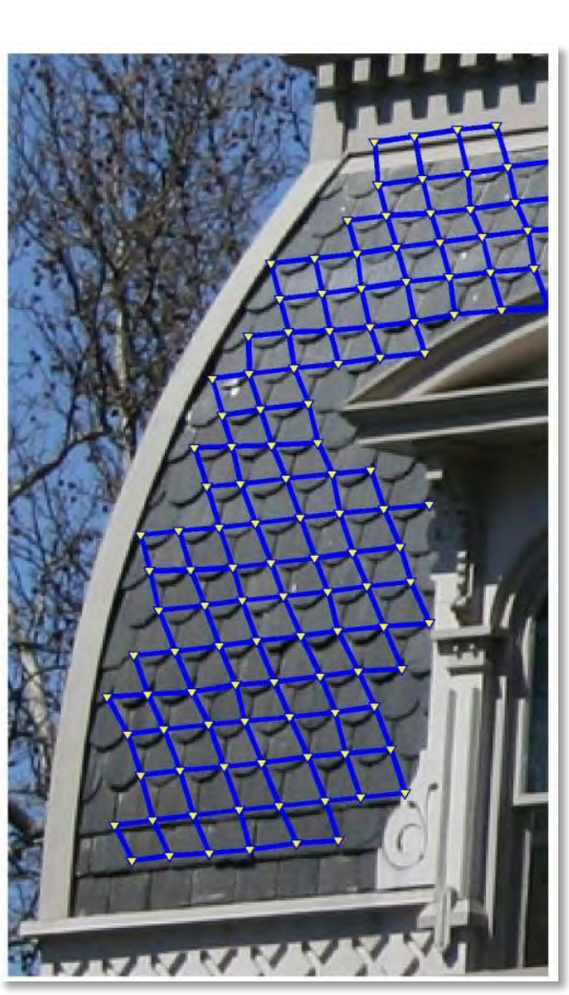
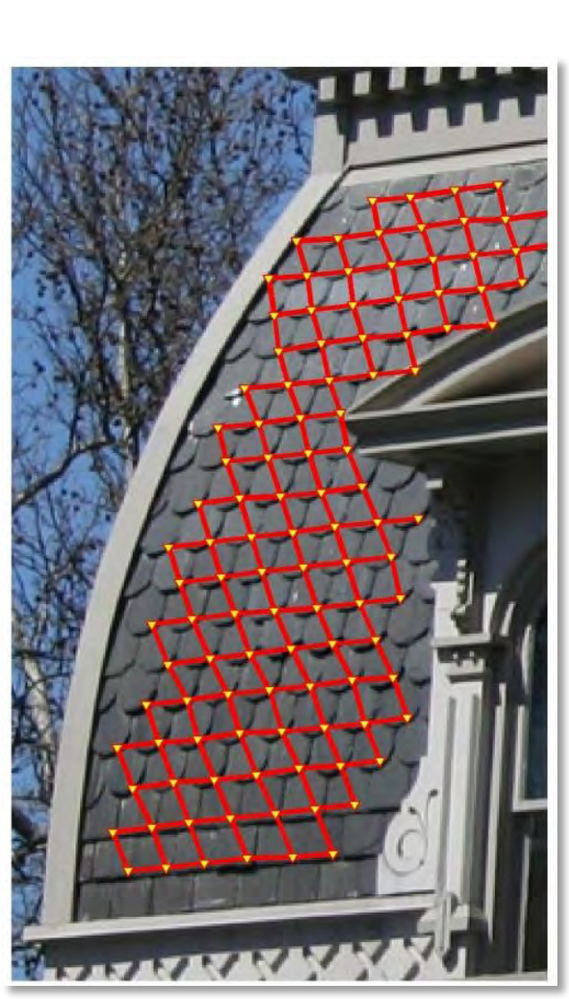
| | Ground truth | Park et al. | Ours |
|---|---|---|---|
| trans_4 |  |  |  |
| trans_5 |  |  |  |
| trans_6 |  |  |  |
| trans_7 |  |  |  |

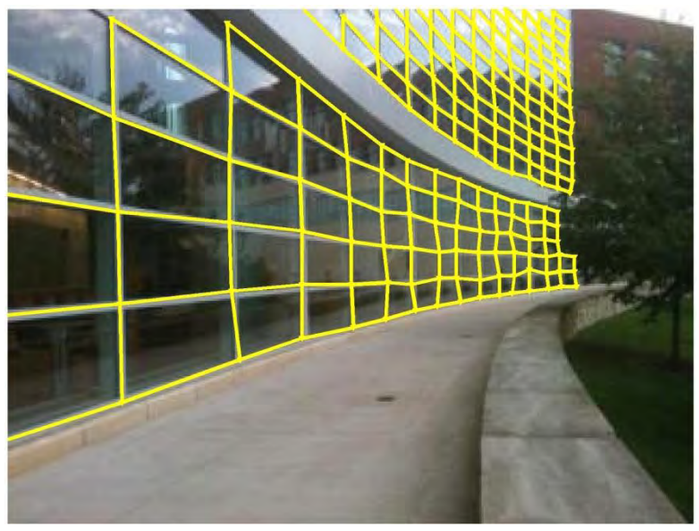
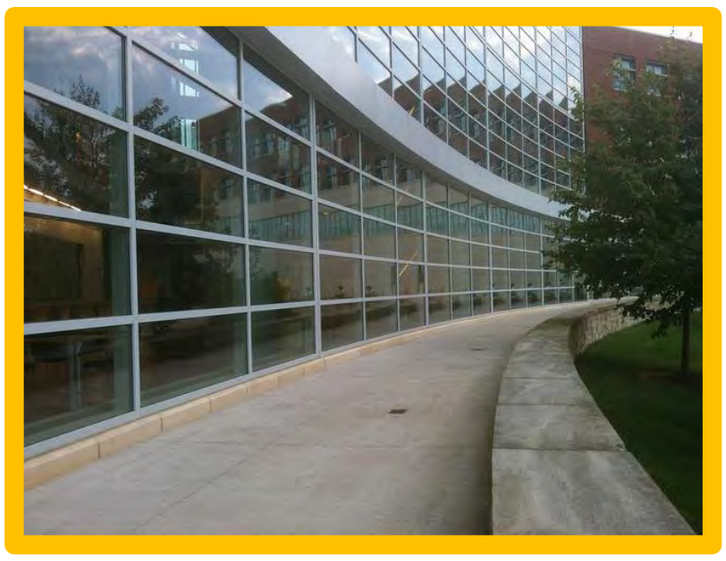
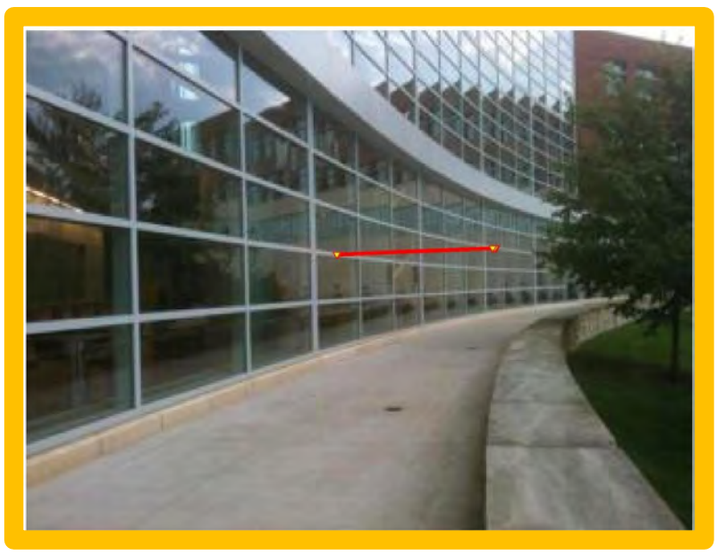
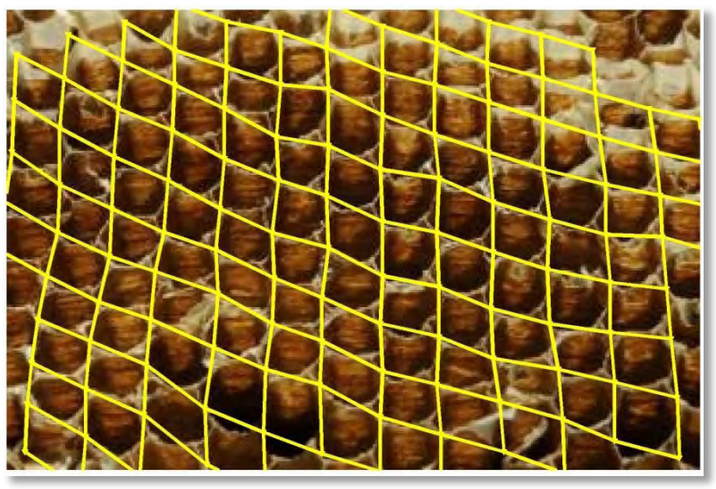
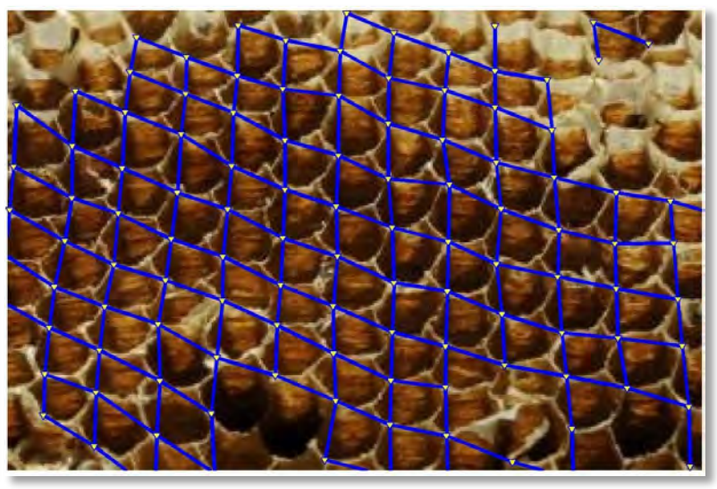
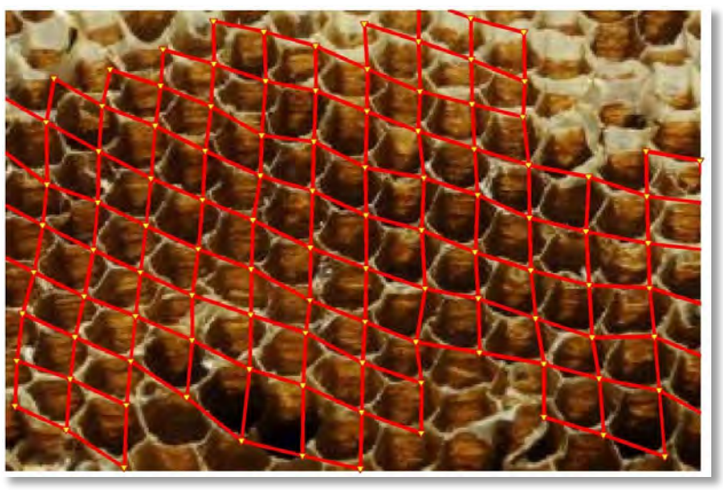
| | Ground truth | Park et al. | Ours |
|---|---|---|---|
| trans_8 |  |  |  |
| trans_9 |  |  |  |
| trans_10 |  |  |  |
| trans_11 |  |  |  |

| | Ground truth | Park et al. | Ours |
|---|---|---|---|
| trans_12 |  |  |  |
| trans_13 |  |  |  |
| trans_14 |  |  |  |
| trans_15 |  |  |  |

| | Ground truth | Park et al. | Ours |
|---|---|---|---|
| trans_16 |  |  |  |
| trans_17 |  |  |  |
| trans_18 |  |  |  |
| trans_19 |  |  |  |

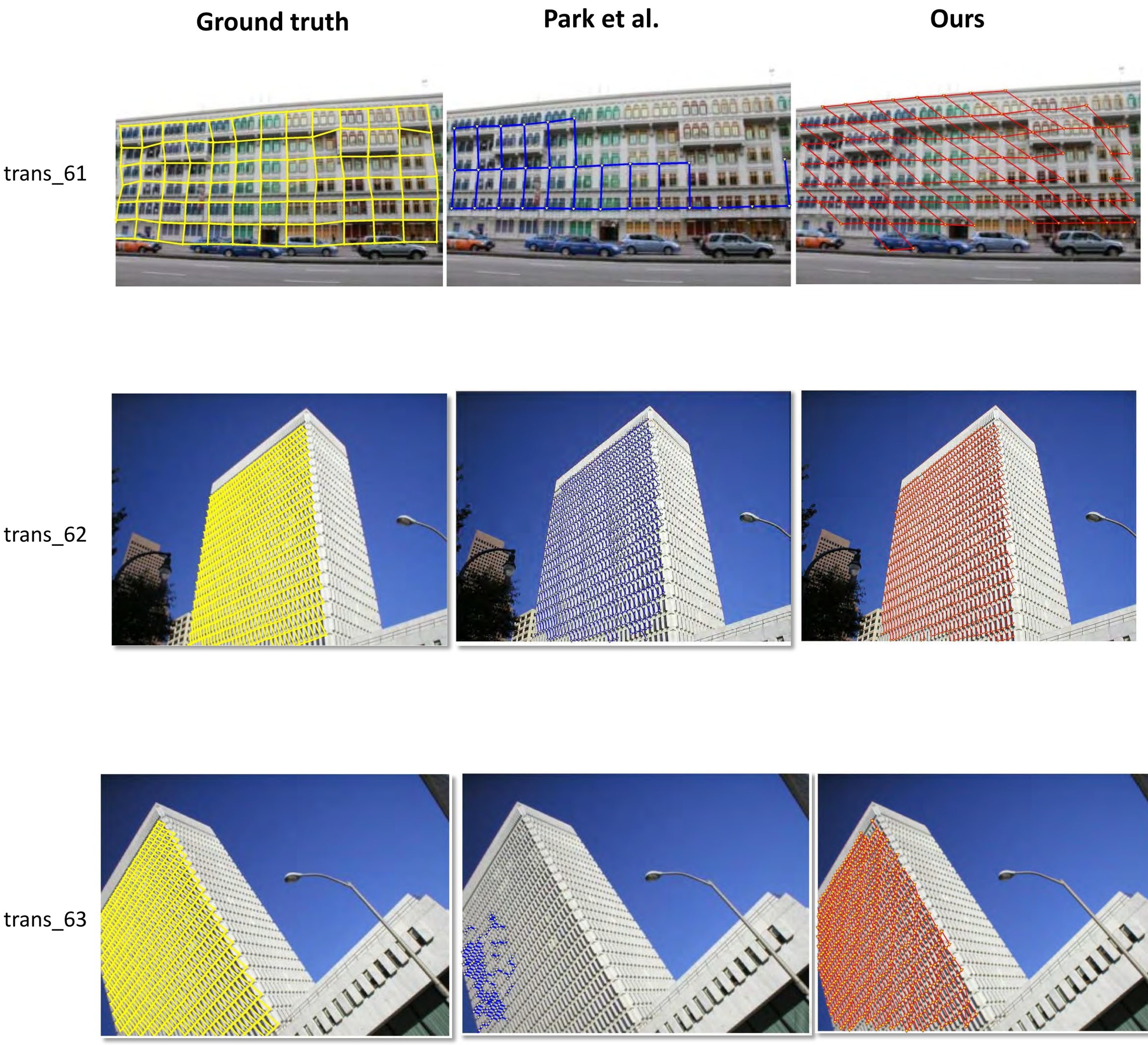
| | Ground truth | Park et al. | Ours |
|---|---|---|---|
| trans_20 |  | | |
| trans_21 |  | | |
| trans_22 |  | | |
| trans_23 |  | | |

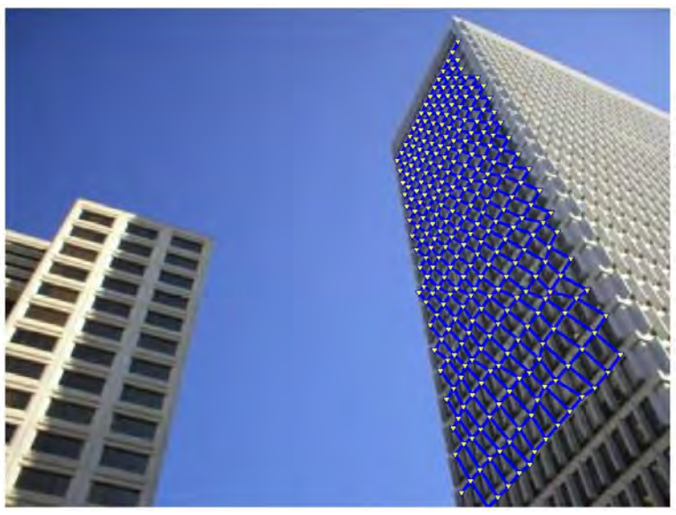
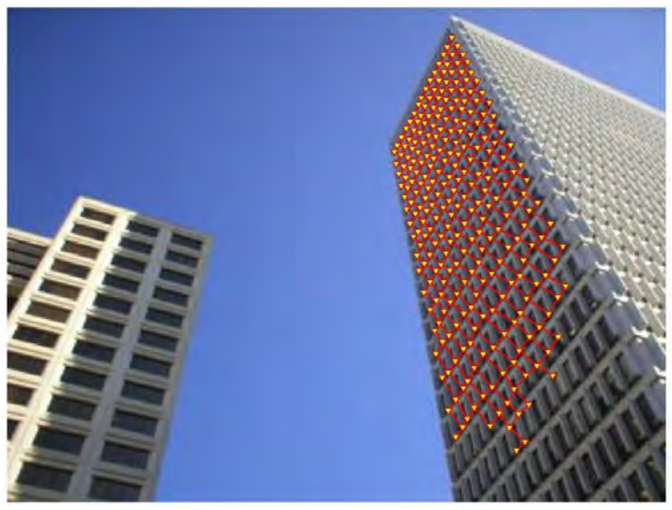
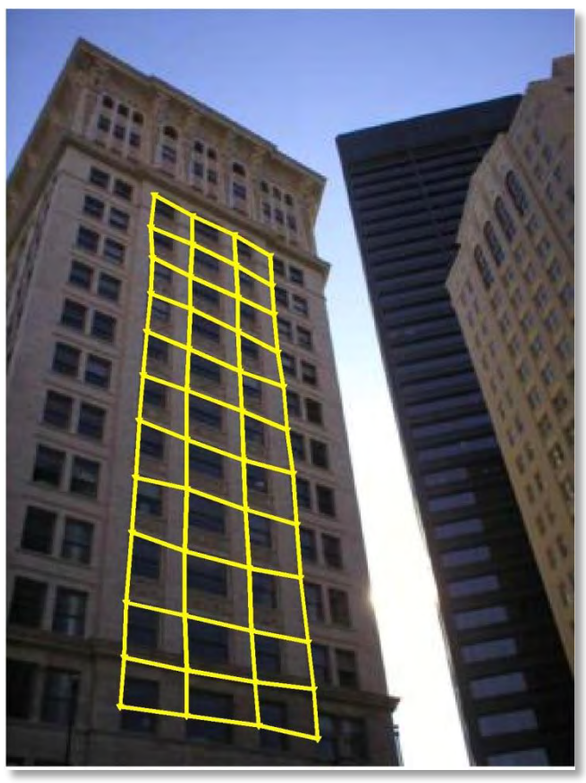
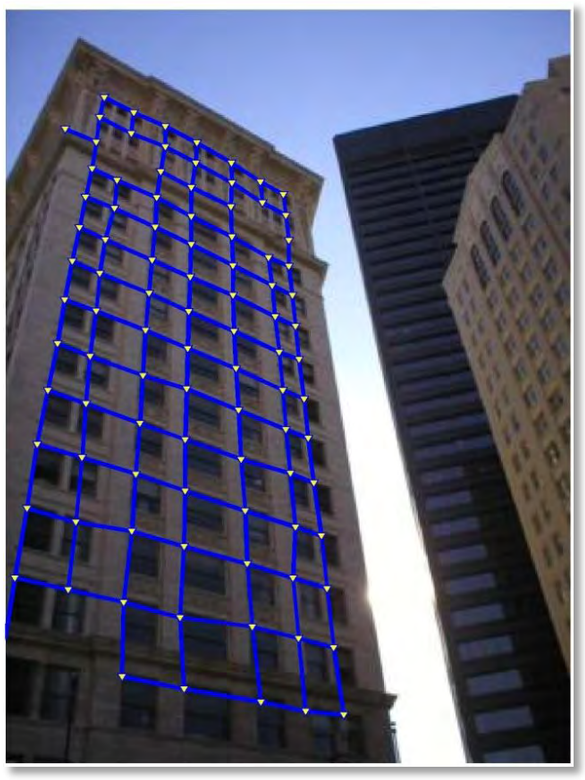
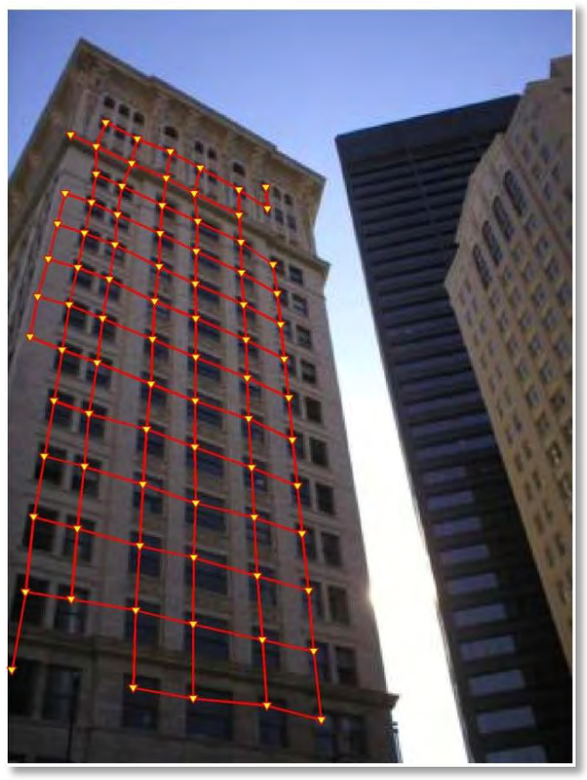
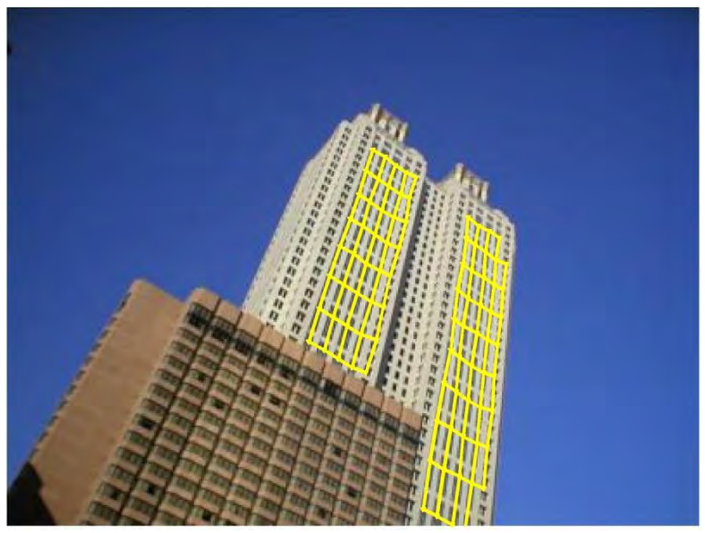
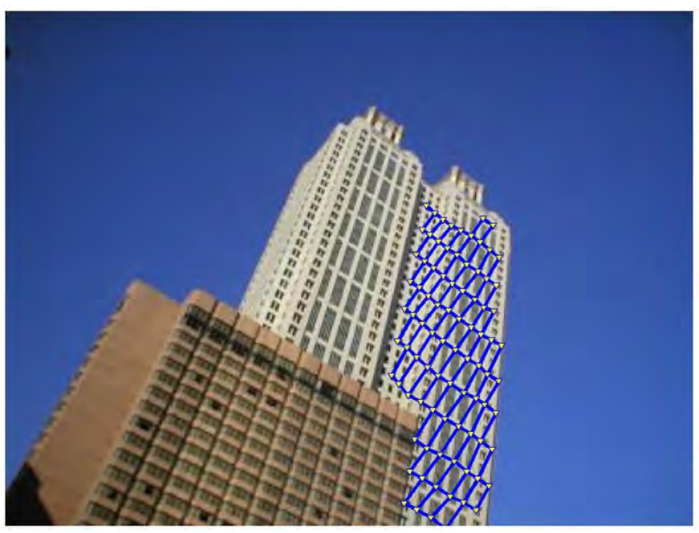
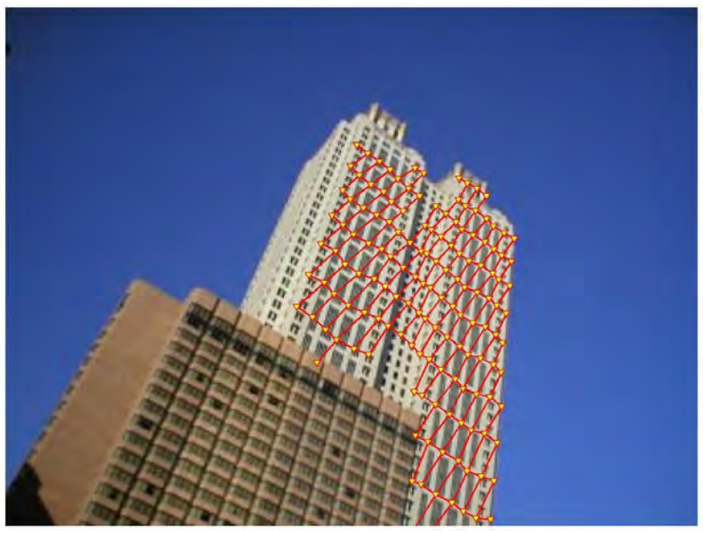
| | Ground truth | Park et al. | Ours |
|---|---|---|---|
| trans_24 |  |  |  |
| trans_25 |  |  |  |
| trans_26 |  |  |  |
| trans_27 |  |  |  |

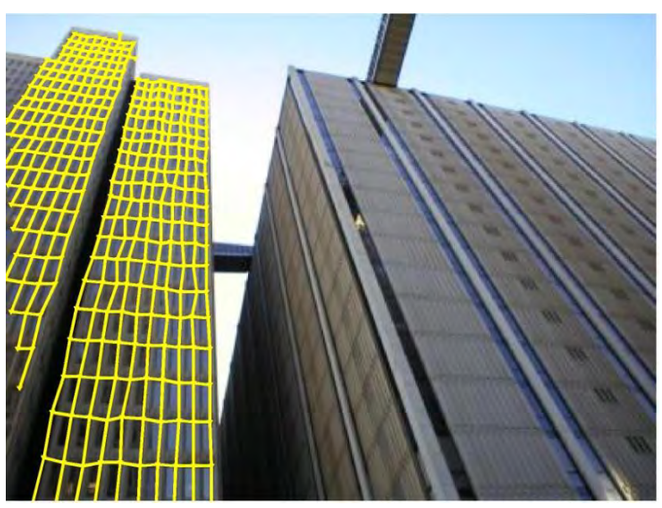
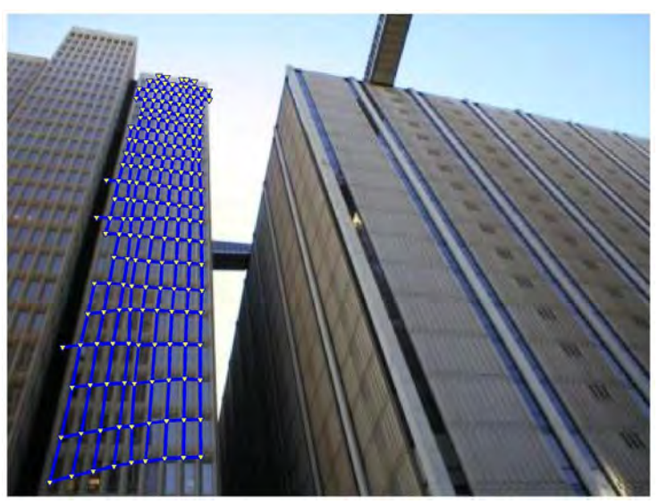
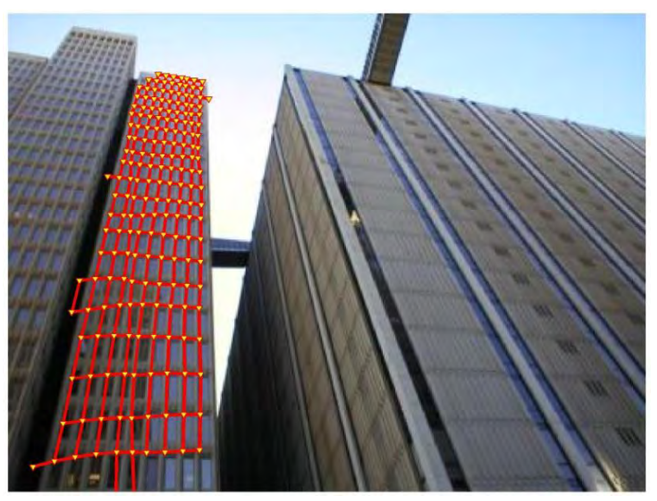
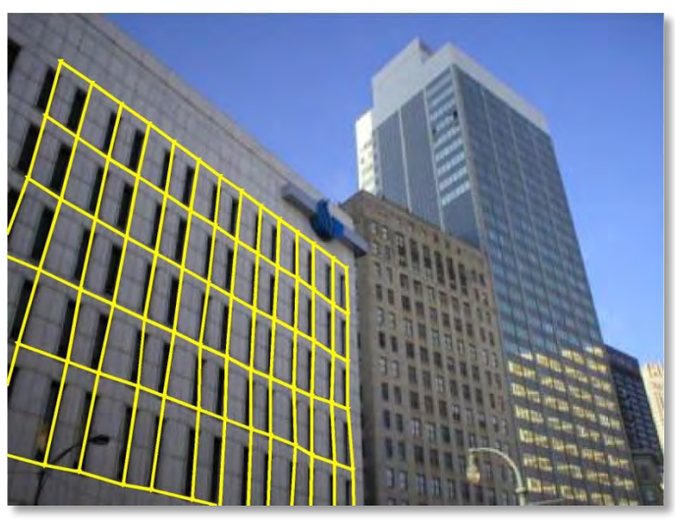
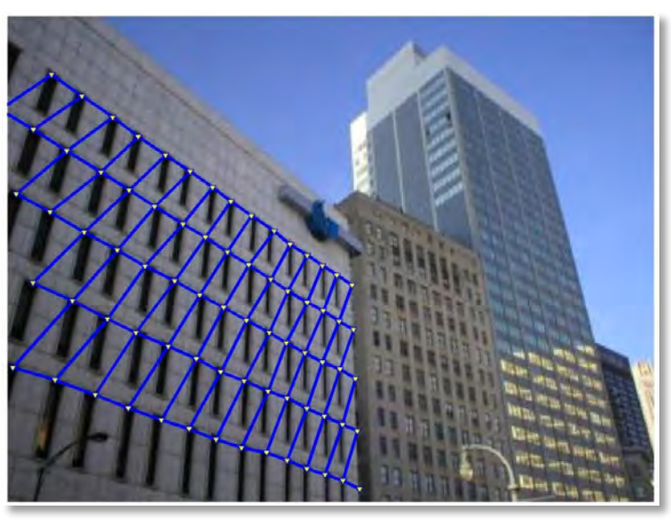
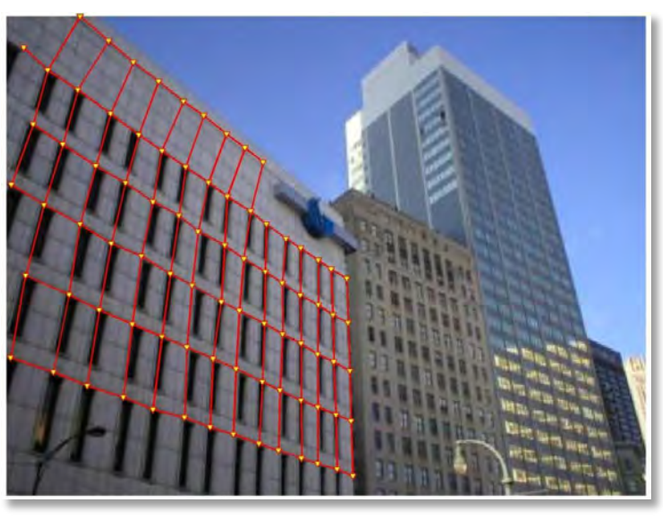
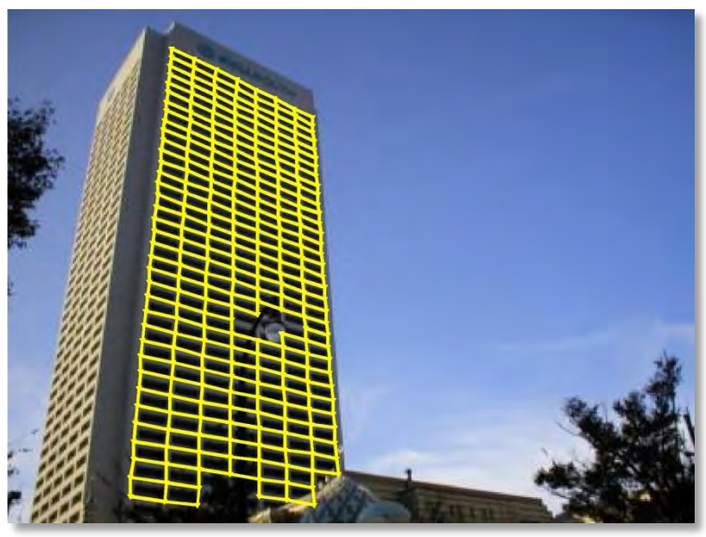
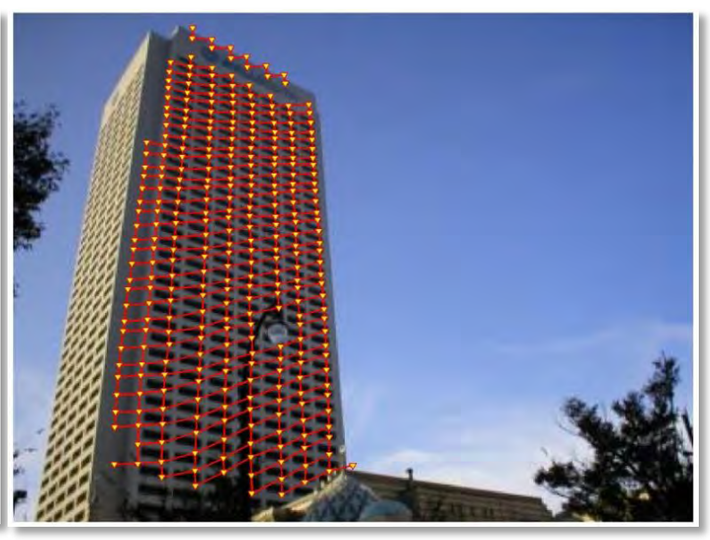
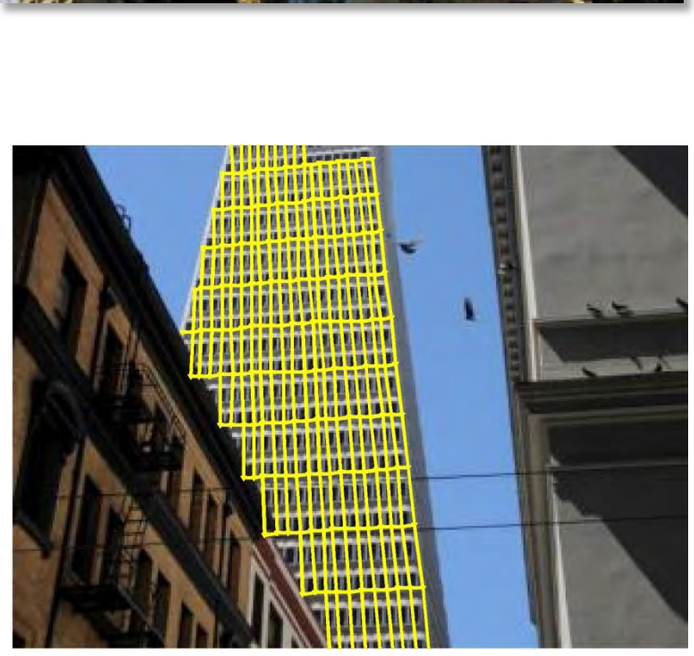
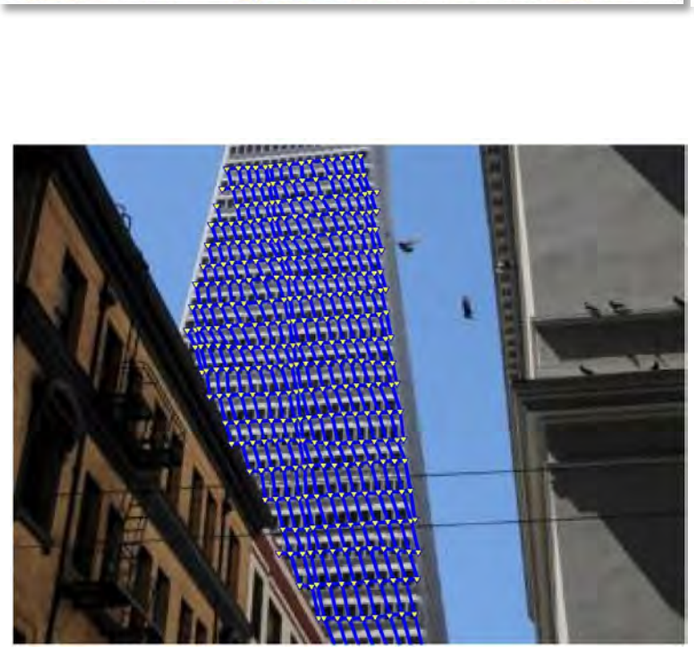
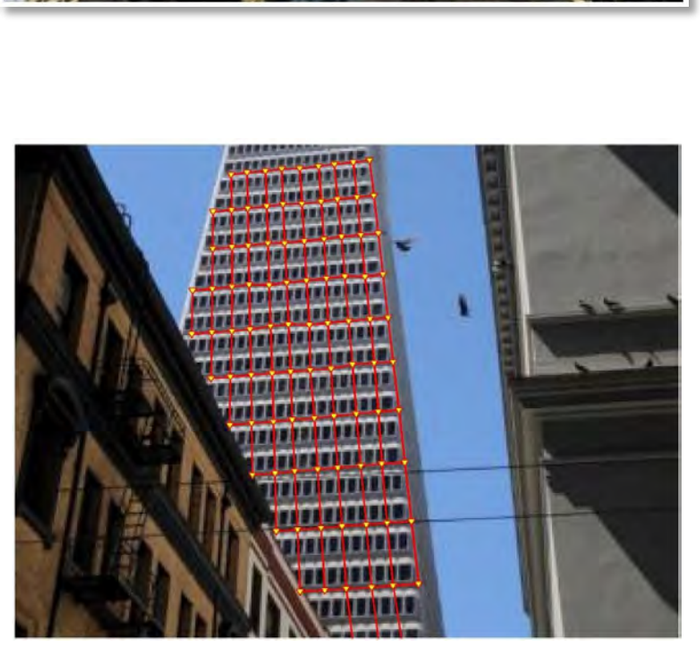
| | Ground truth | Park et al. | Ours |
|---|---|---|---|
| trans_28 |  |  |  |
| trans_29 |  |  |  |
| trans_30 |  |  |  |

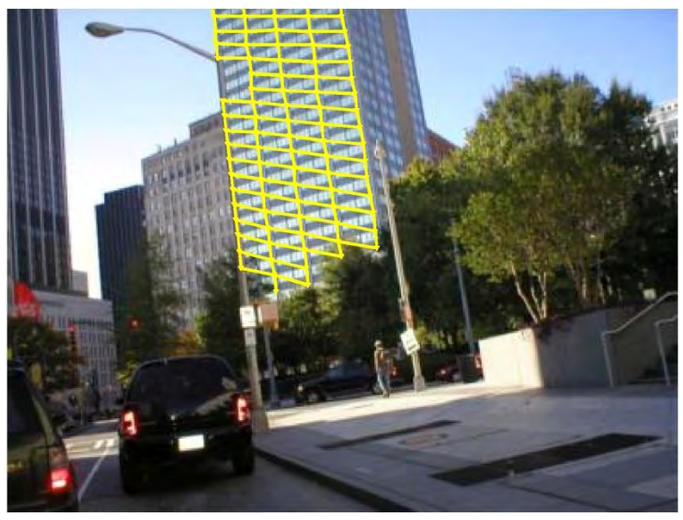
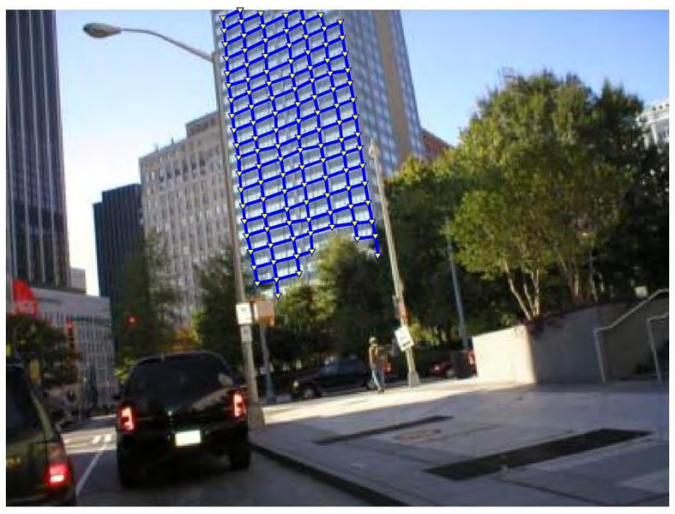
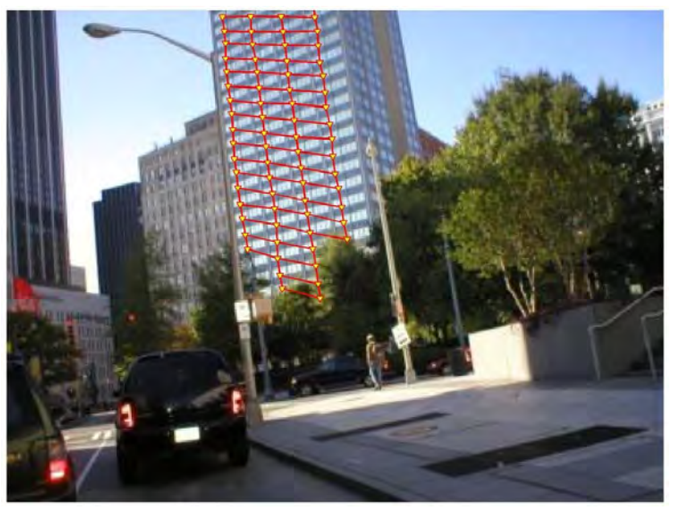
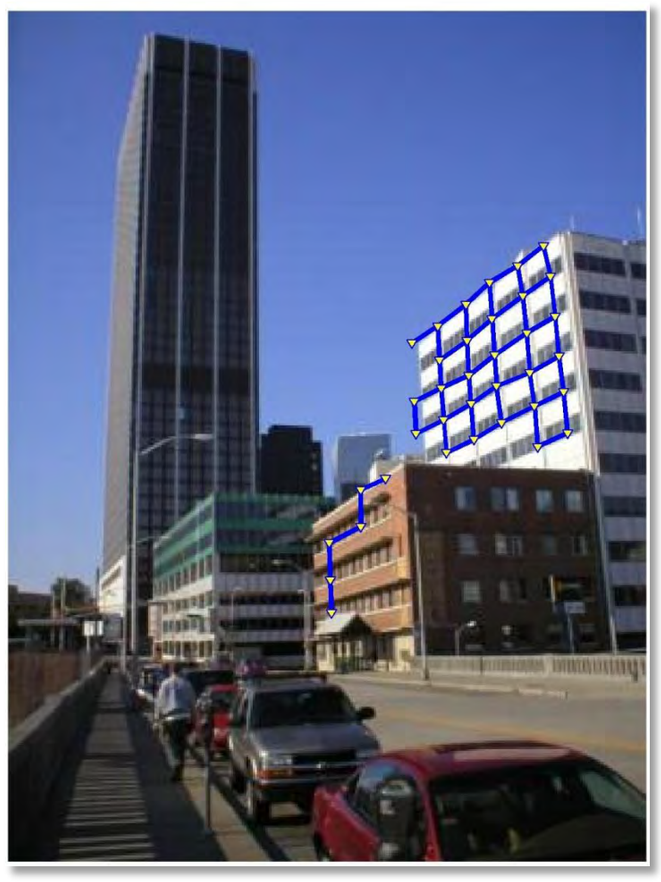
The following shows result comparisons on test data provided in Symmetry Detection from Real World Images Competition 2013, termed “Set A” in the main paper. Failure cases are boxed in yellow. For scenes with multiple facades, both algorithms were run 3 times to obtain lattice detection on the same façade. An exception is “trans_77”, where no common lattices were detected by both methods after 5 independent runs. Another exception is “trans_82”, where the ground truth texels are of much bigger sizes than the detected ones, making it had to count the detected textels. All exceptions are boxed in red and they were excluded from the evaluation. Results are best viewed in color.

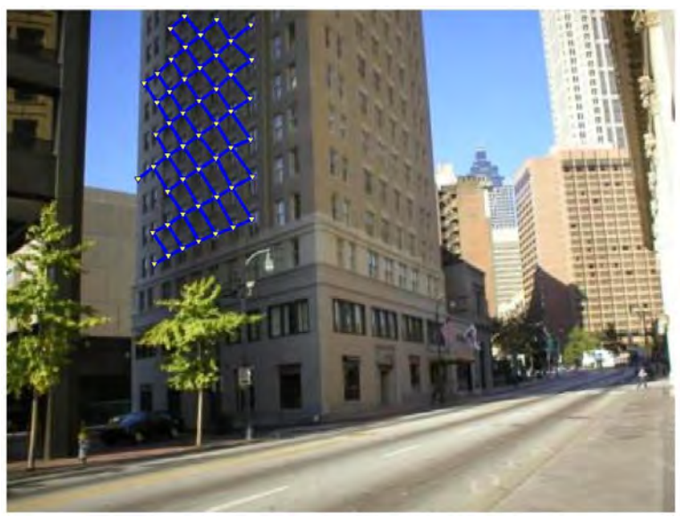
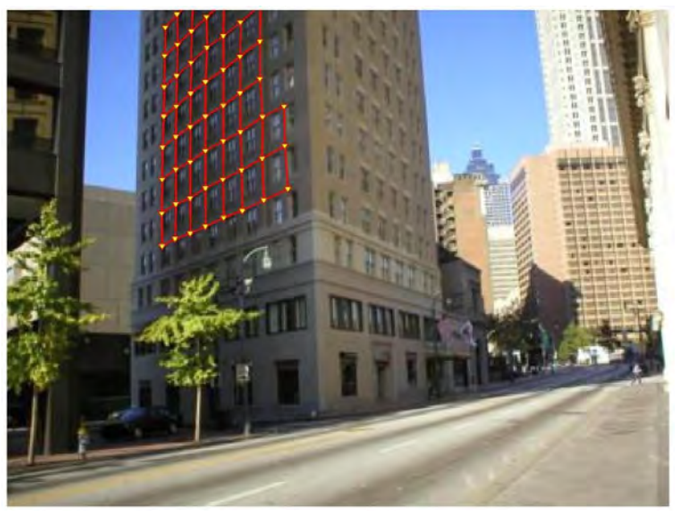
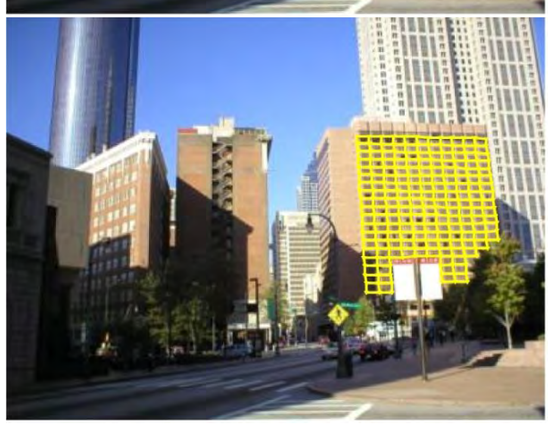
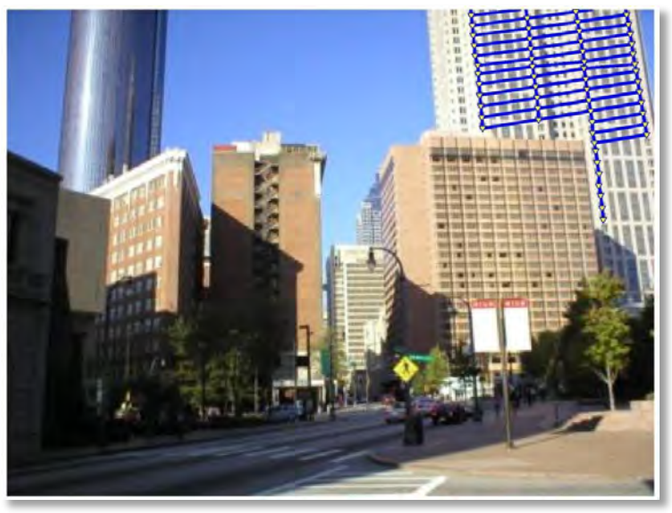
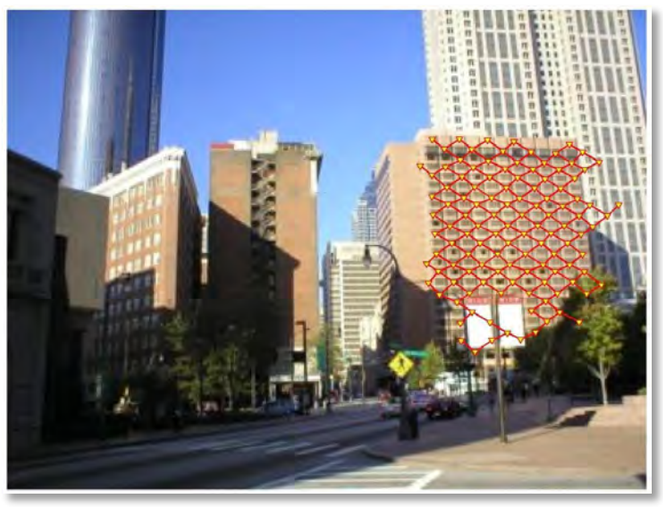
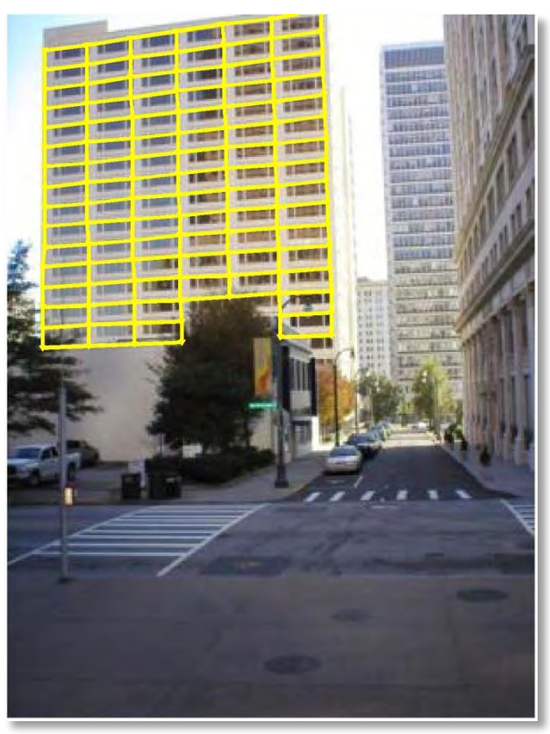
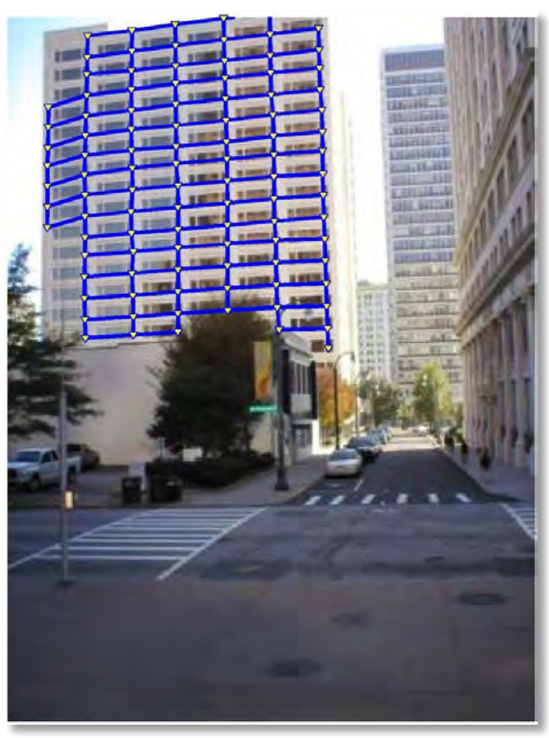
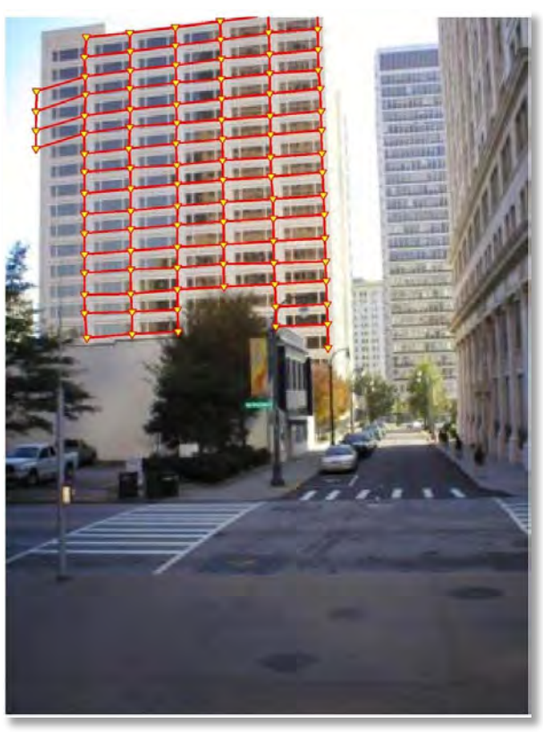
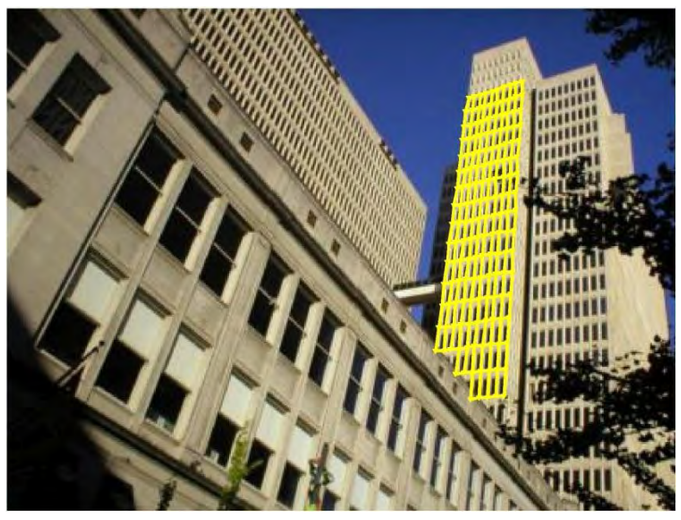
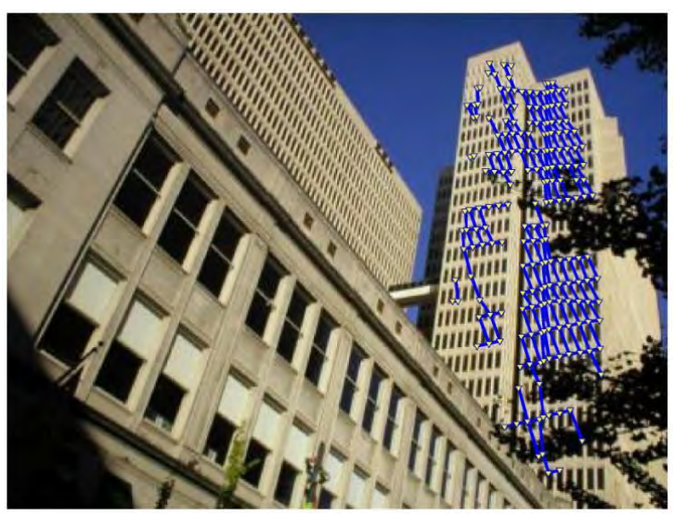
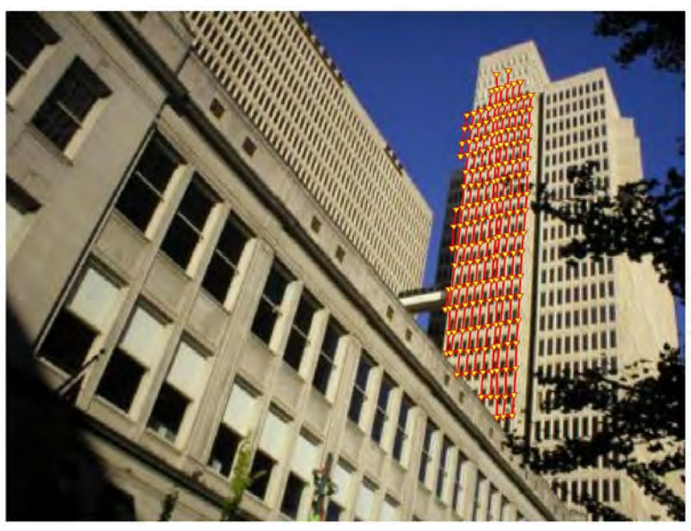
Subset “Urban”

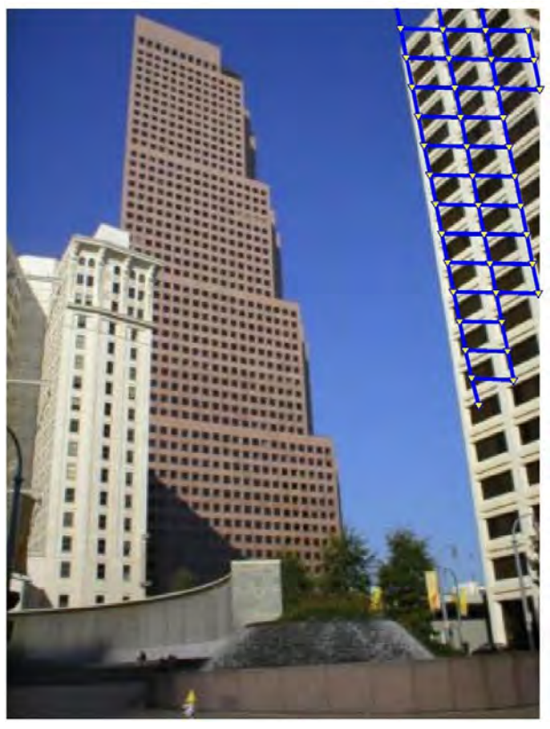
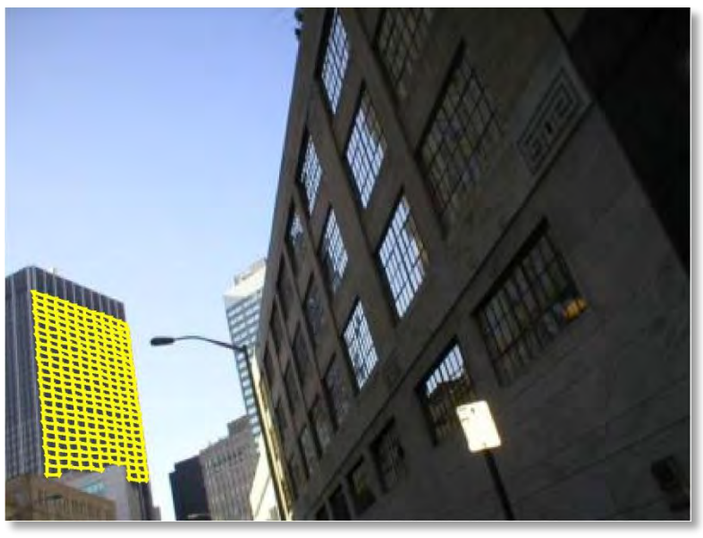
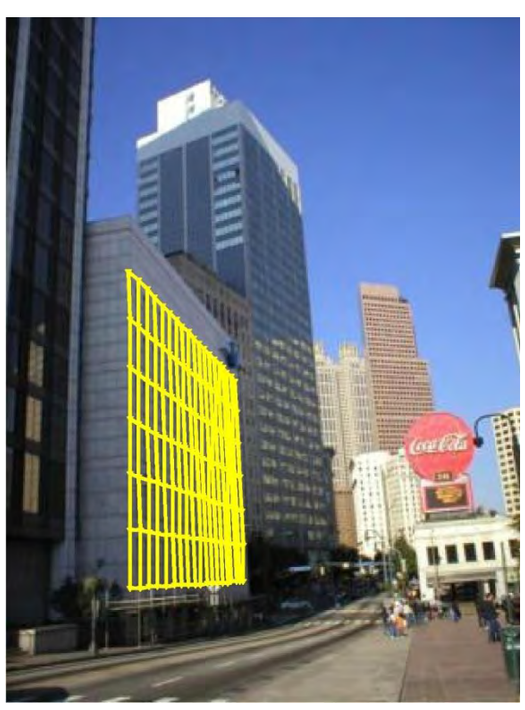
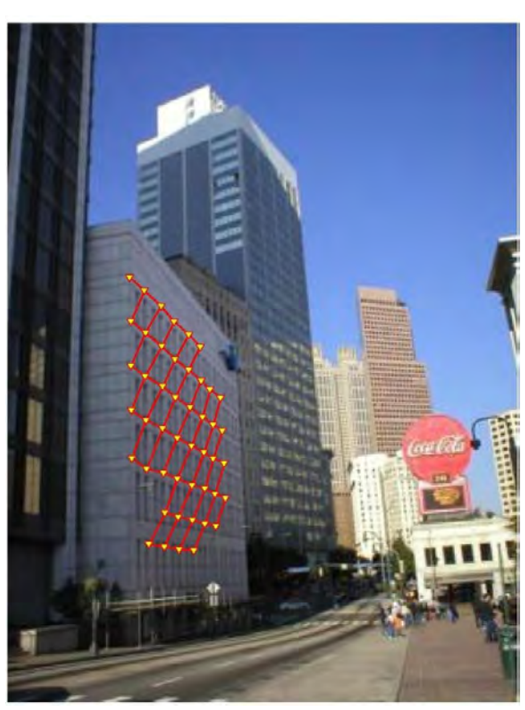


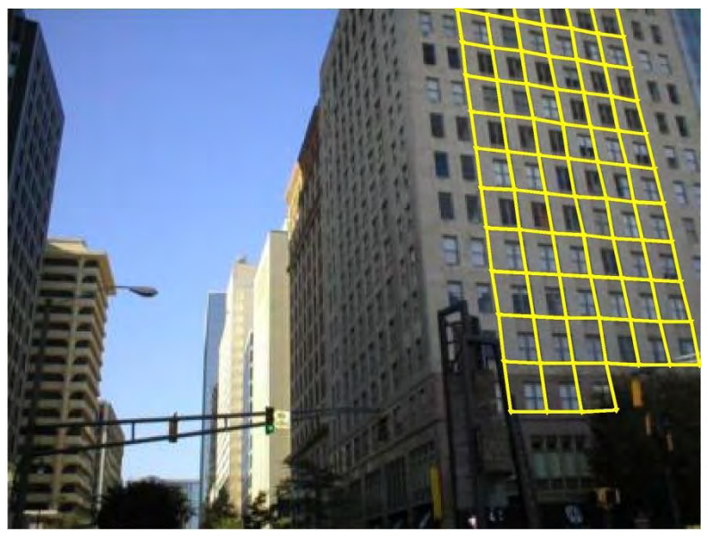
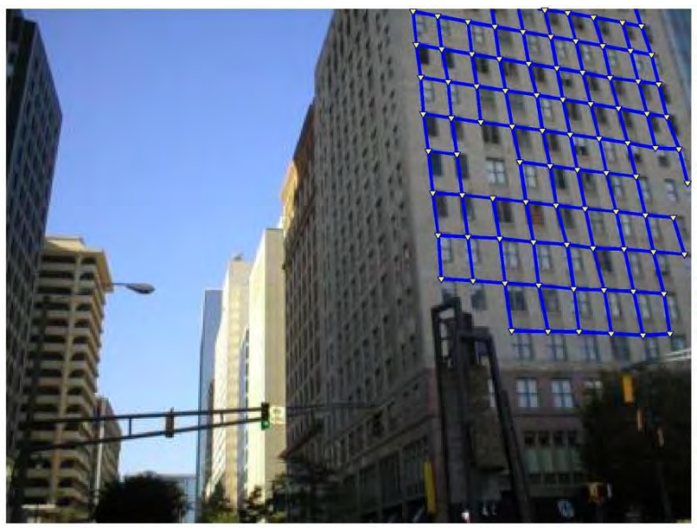
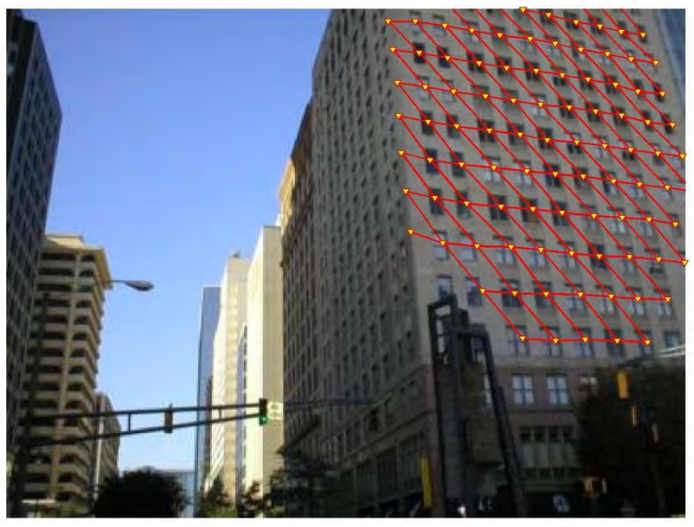
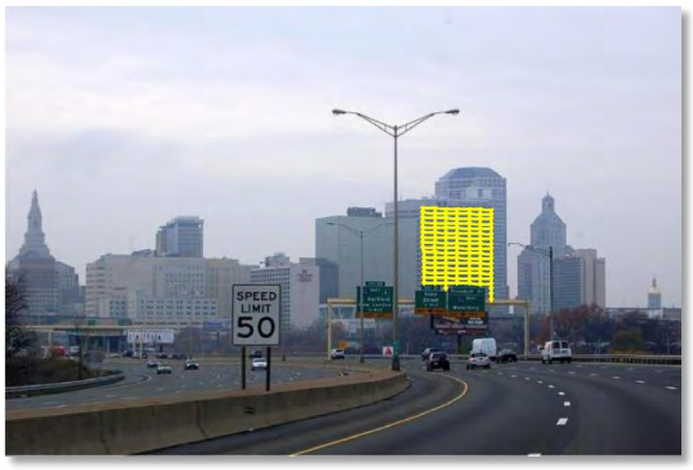
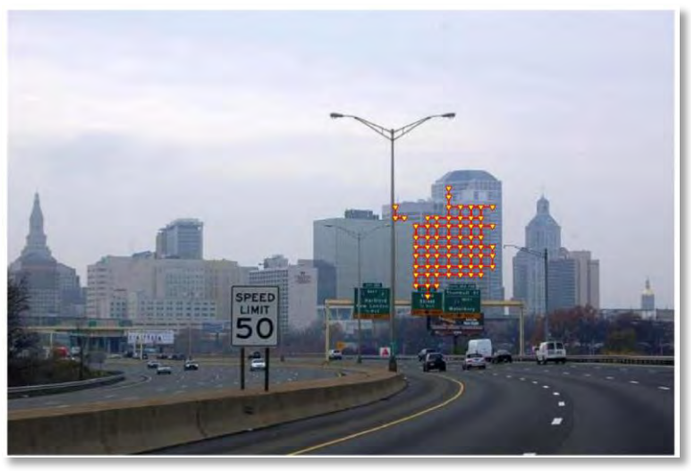
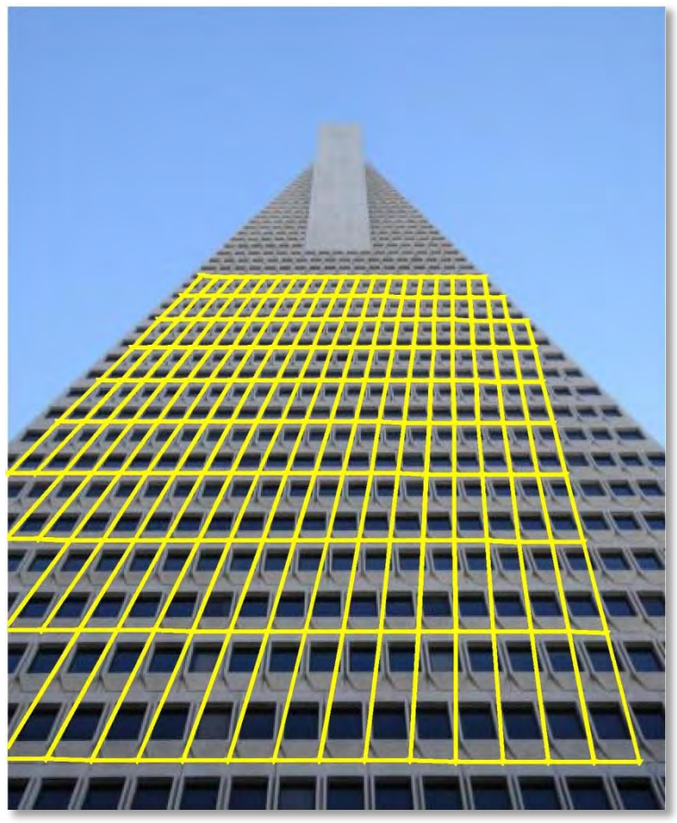
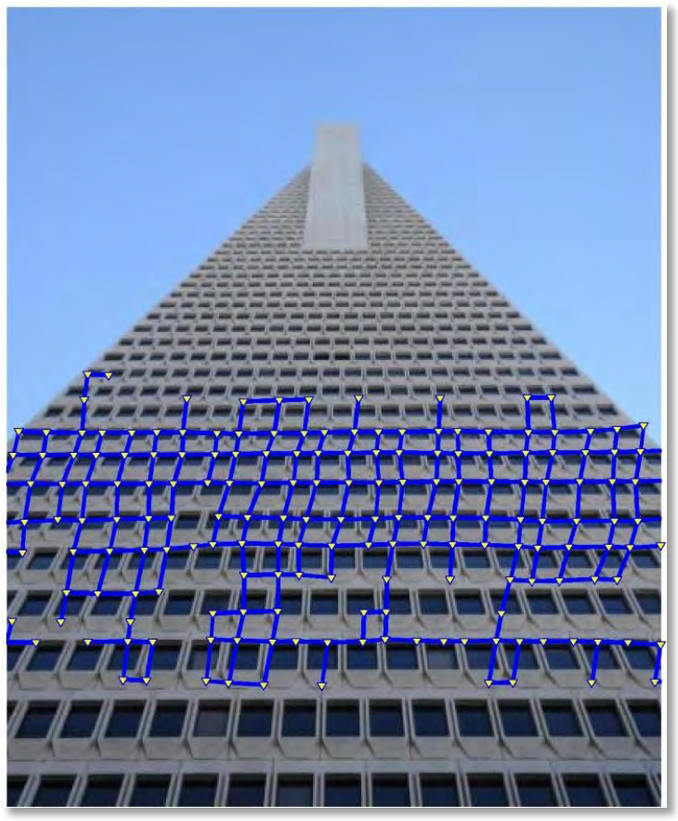
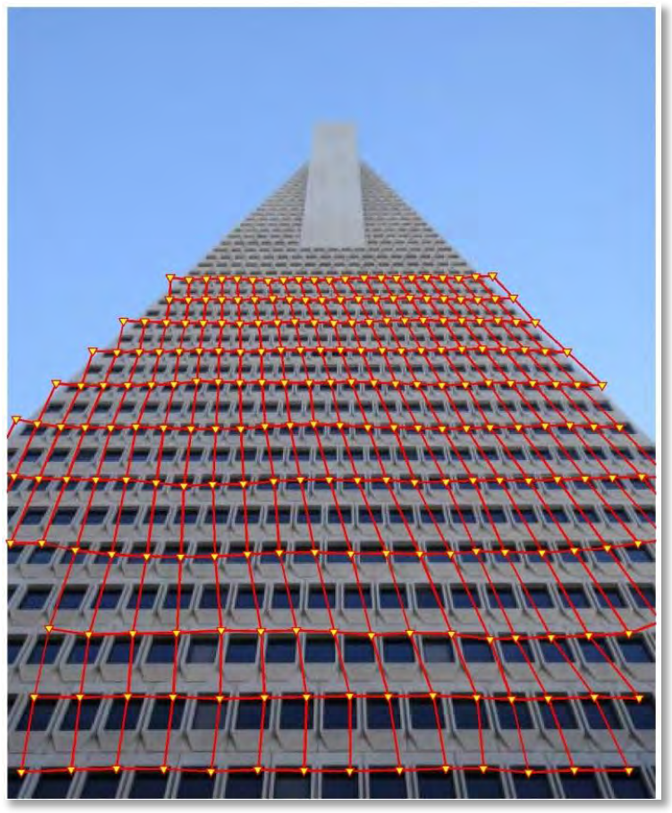
| | Ground truth | Park et al. | Ours |
|---|---|---|---|
| trans_64 |  |  |  |
| trans_65 |  |  |  |
| trans_66 |  |  |  |
| trans_67 |  |  |  |

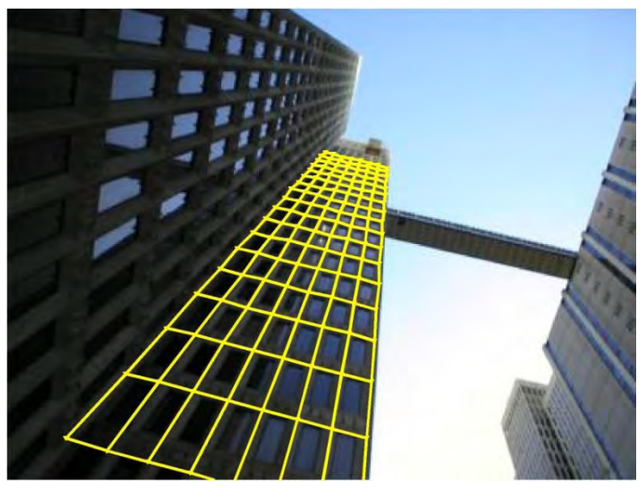
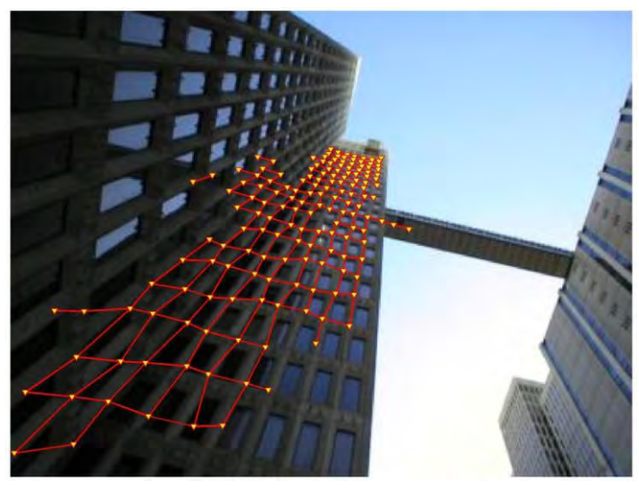
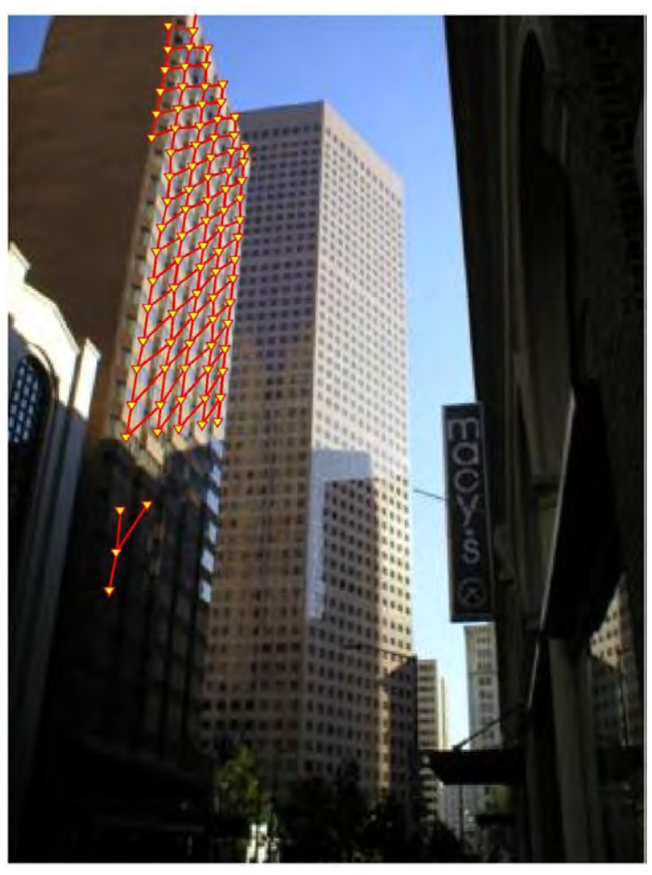
| | Ground truth | Park et al. | Ours |
|---|---|---|---|
| trans_68 |  |  |  |
| trans_69 |  |  |  |
| trans_70 |  |  |  |
| trans_71 |  |  |  |

| | Ground truth | Park et al. | Ours |
|---|---|---|---|
| trans_72 |  |  |  |
| trans_73 |  |  |  |
| trans_74 |  |  |  |
| trans_75 |  |  |  |

| | Ground truth | Park et al. | Ours |
|---|---|---|---|
| trans_76 |  |  |  |
| trans_77 |   |  |  |
| trans_78 |  |  |  |
| trans_79 |  |  |  |

| | Ground truth | Park et al. | Ours |
|---|---|---|---|
| trans_80 |  |  |  |
| trans_81 |  |  |  |
| trans_82 |  |  |  |
| trans_83 |  |  |  |

| | Ground truth | Park et al. | Ours |
|---|---|---|---|
| trans_84 |  |  |  |
| trans_85 |  |  |  |
| trans_86 |  |  |  |
| trans_87 |  |  |  |

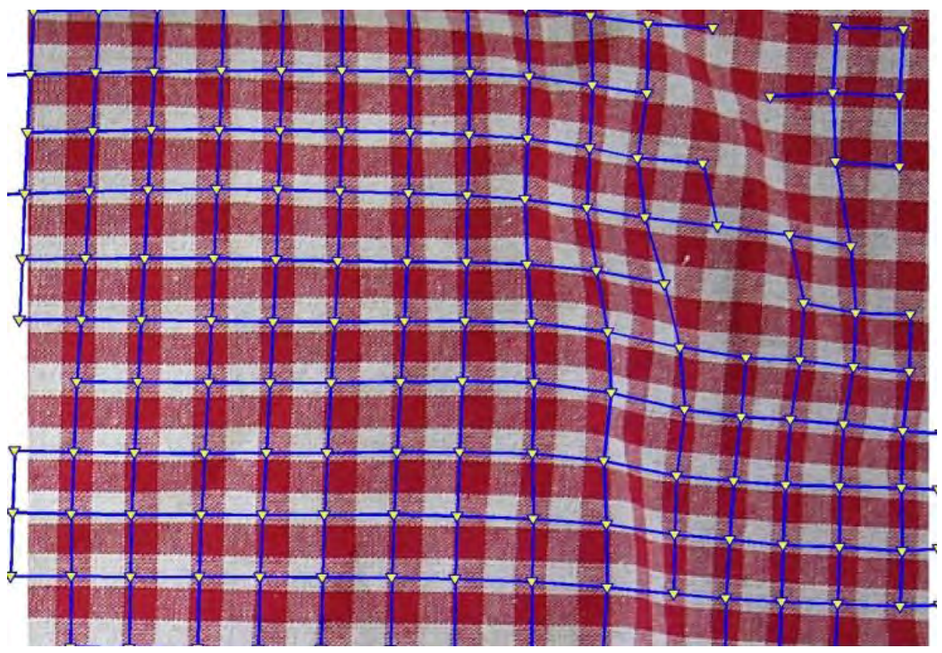
| | Ground truth | Park et al. | Ours |
|---|---|---|---|
| trans_88 |  |  |  |
| trans_89 |  |  |  |
| trans_90 |  |  |  |

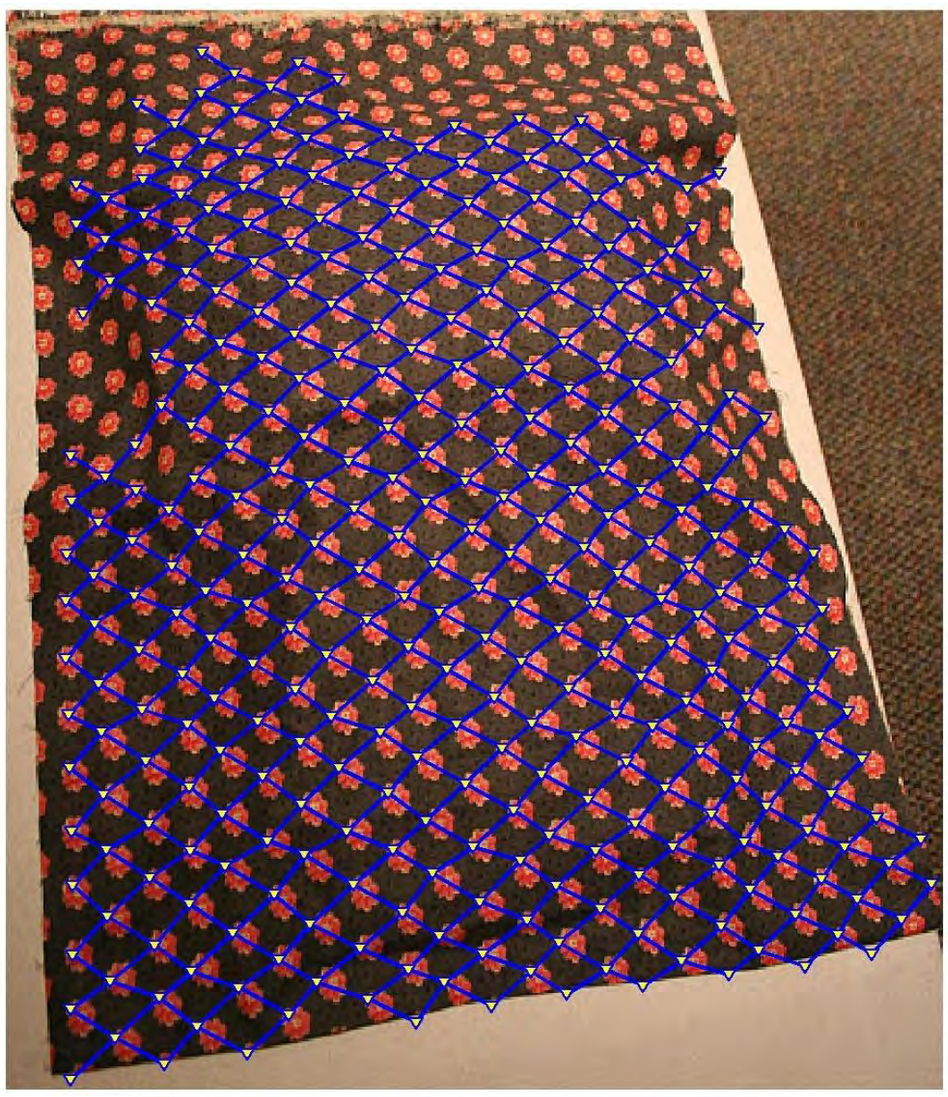
The following shows result comparisons on “Set B” test images mentioned in the main paper. The proposed method is more robust against geometric deformations and shading variations. Results are best viewed in color.

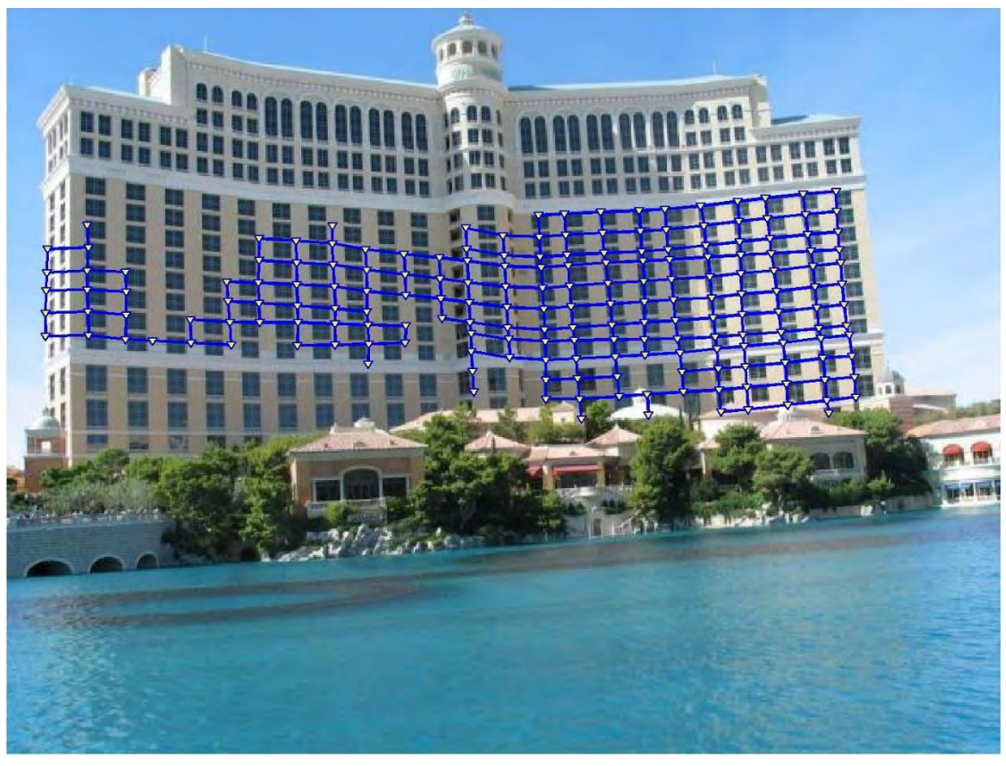
**Park et al.** **Ours**

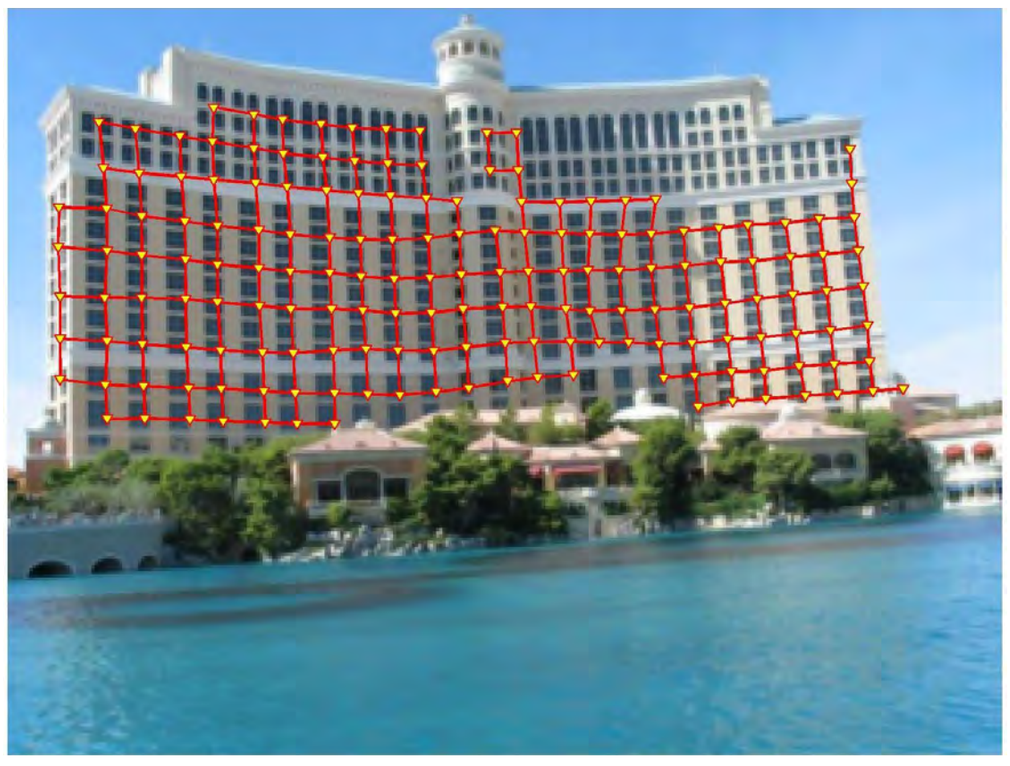
**Park et al.**

**Ours**



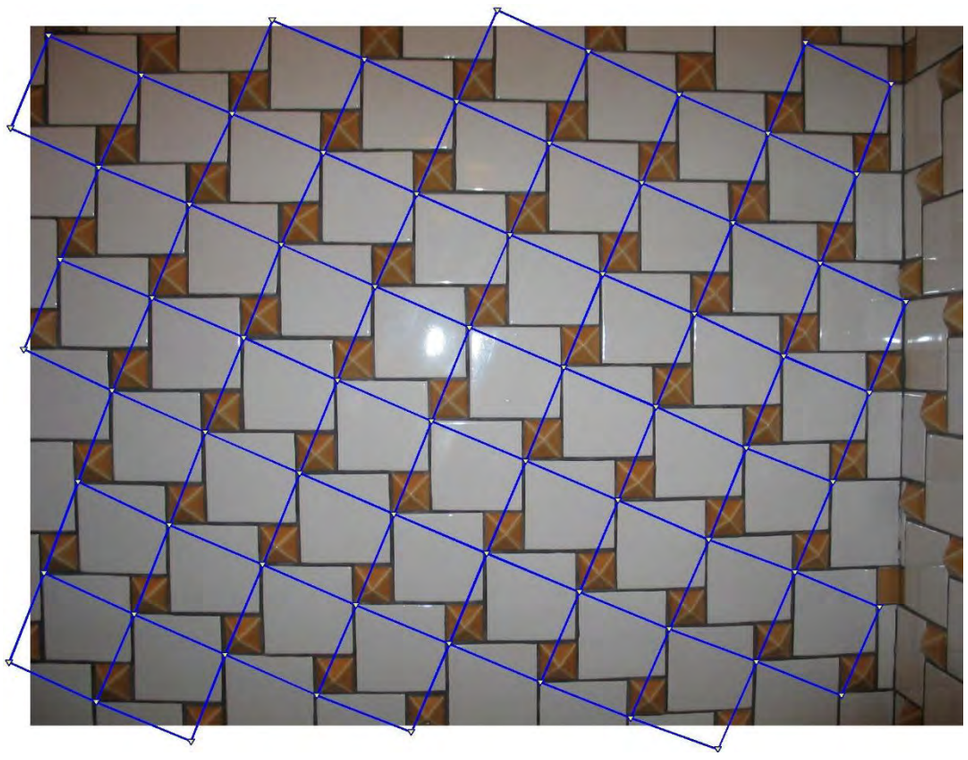


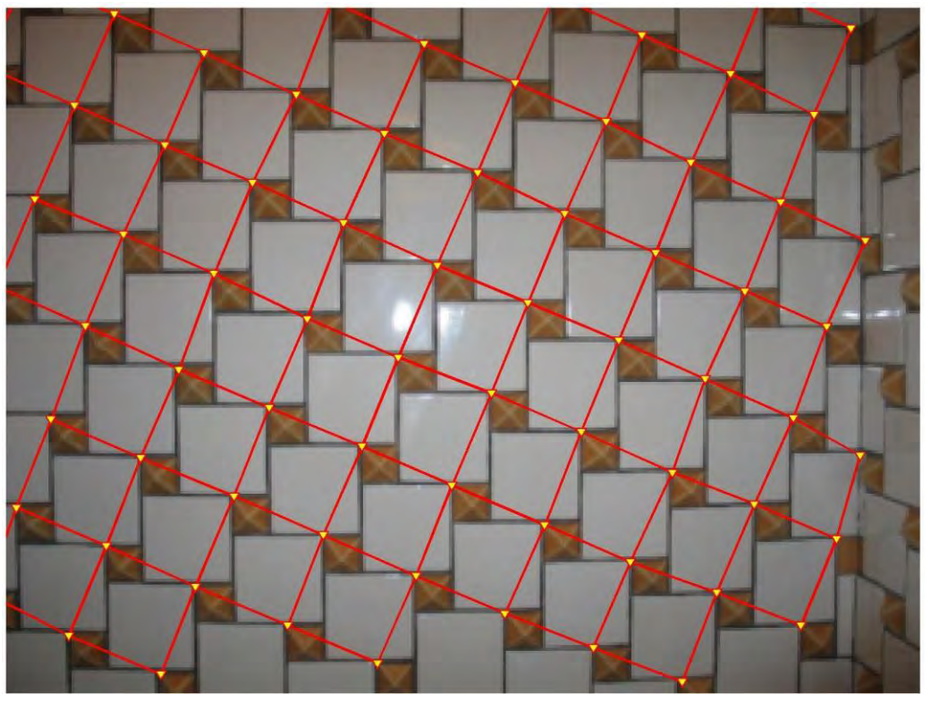


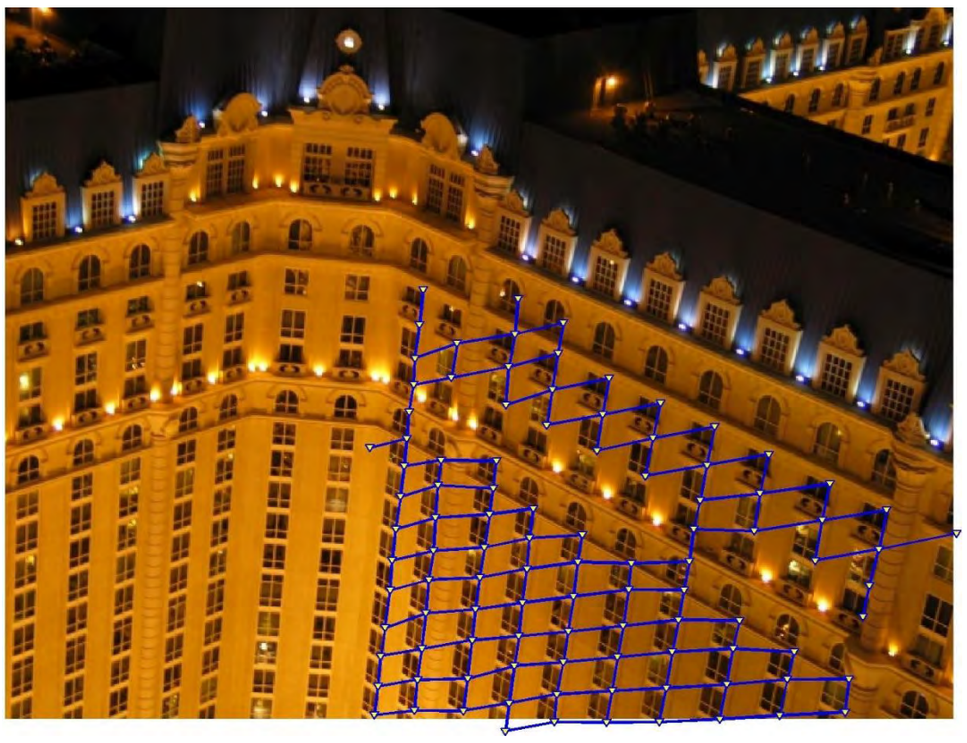


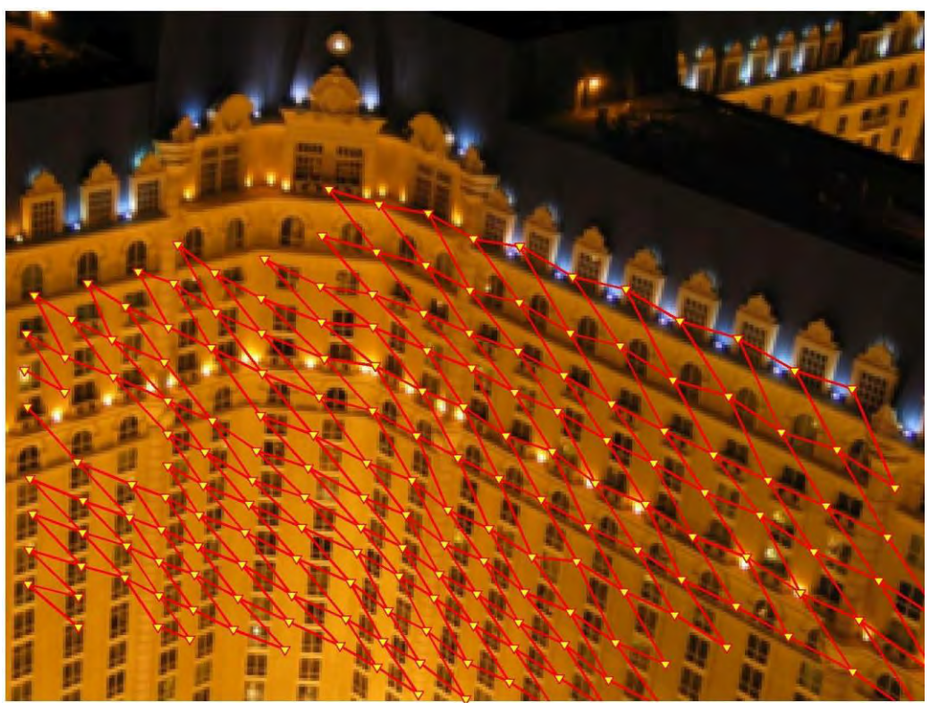
## Park et al.

## Ours









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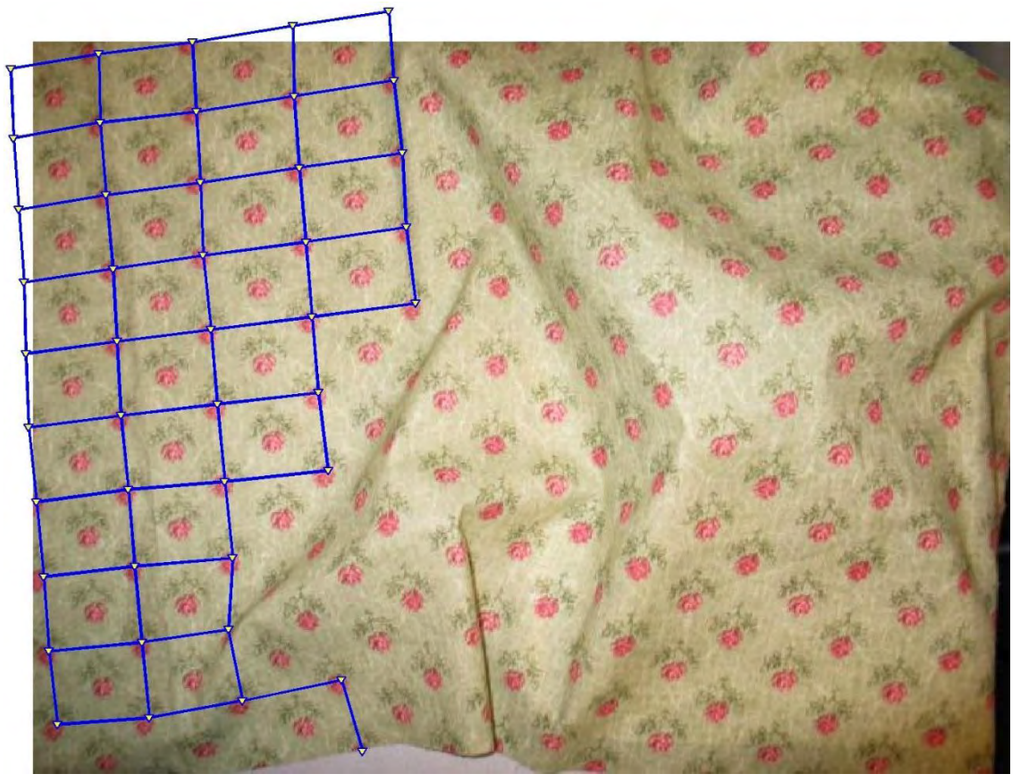

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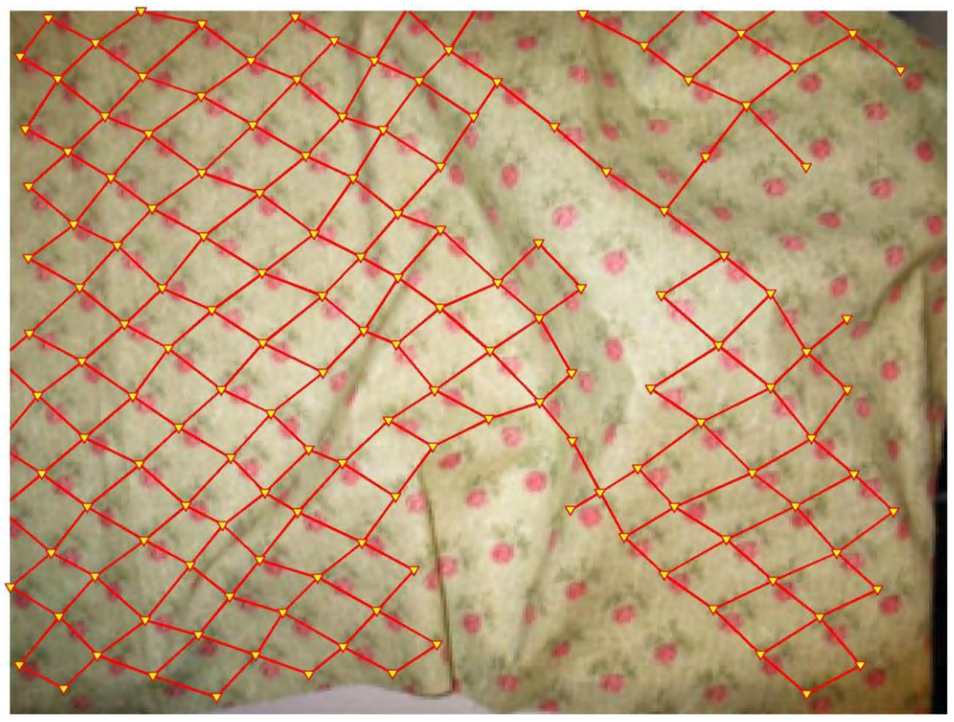

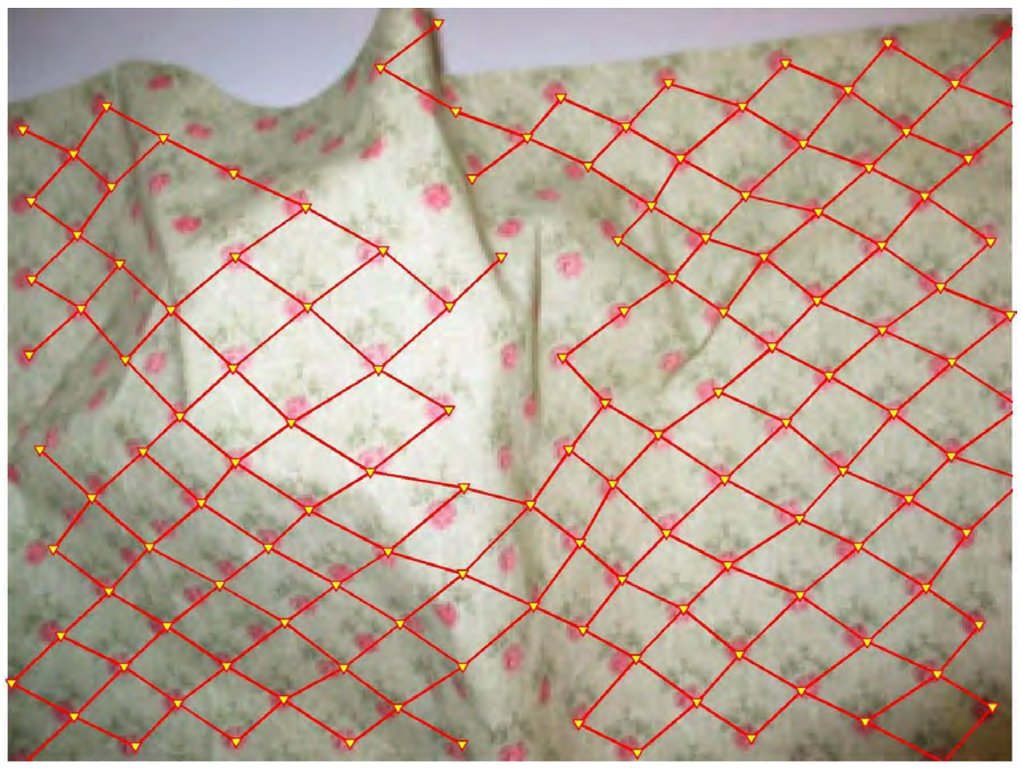

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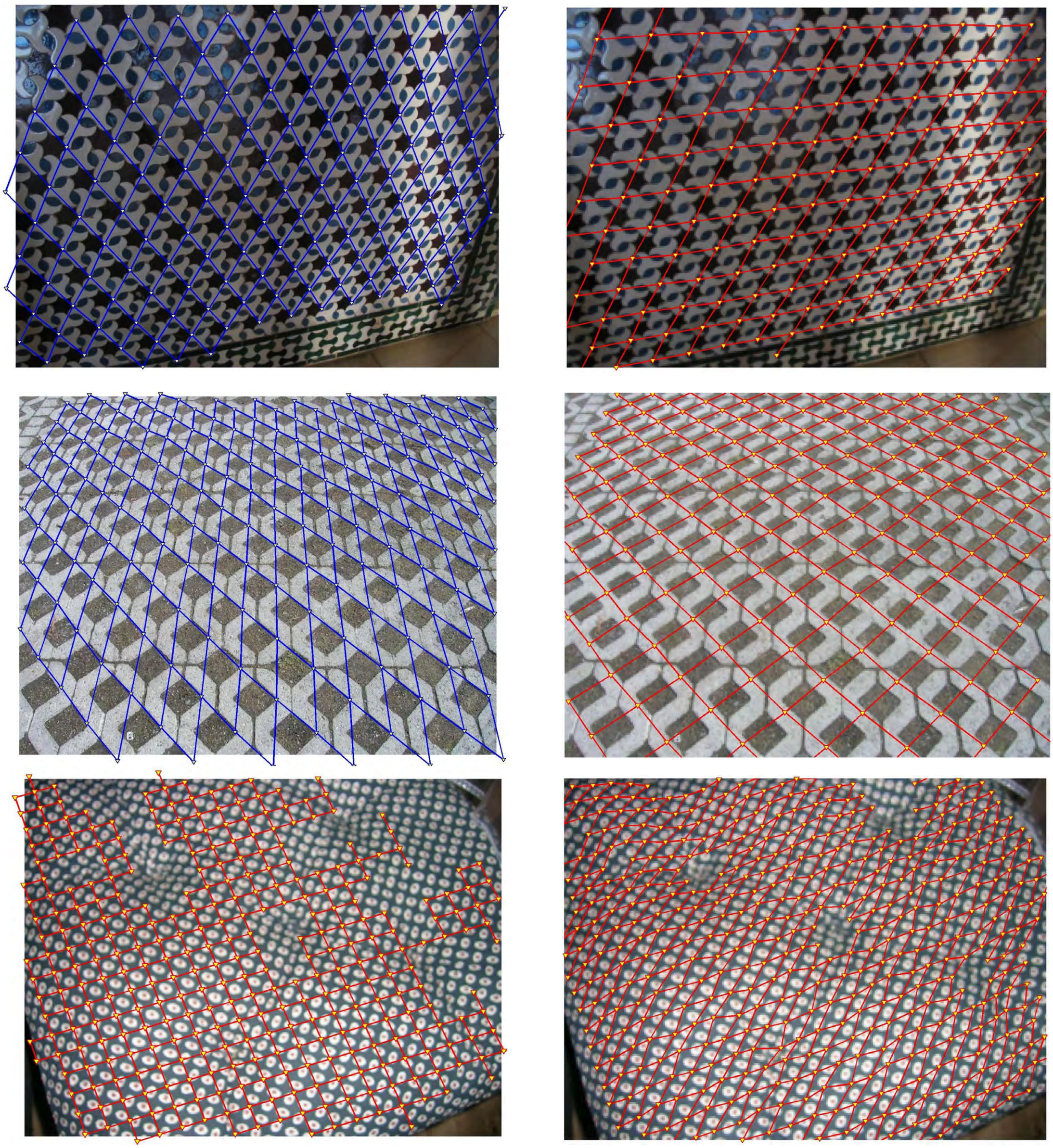
**Ours**



## References


[1] Q. Zhao, P. Tan, Q. Dai, L. Shen, E. Wu and S. Lin. A Closed-Form Solution to Retinex with Nonlocal Texture Constraints. *IEEE Trans. Pattern Anal. Mach. Intell. 34(7):1437-1444* (*2012*)