Detecting Bilateral Symmetry with Feature Mirroring

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General Strategy

- Finding candidate bilateral symmetric pairs of local patches
  - Previous method: Finding closest matching for each points (Loy, et al. 06')
  - Ours: Grouping sets of points, take all pairs within them
- Candidate pairs vote for symmetry axis
  - Previous method: Hough vote weighted by orientation, scale…
  - Ours: Simple Hough vote is enough
- Why?
  - SIFT detection is not perfect(local patch, invariance)
  - Aim at real world image(multi-way, imperfect symmetry)

Reference: G. Loy, J. Eklundh, "Detecting Symmetry and Symmetric Constellations of Features," ECCV, 2006

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Overview of method

Detecting interest points & Mirroring SIFT descriptors
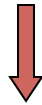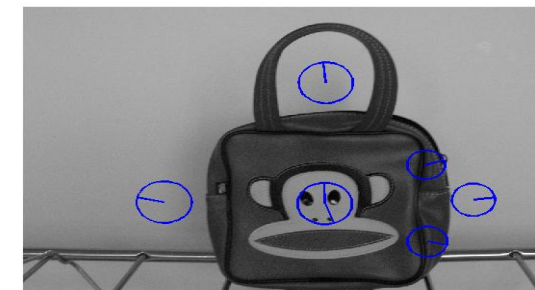
Construct distance measure & Clustering

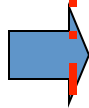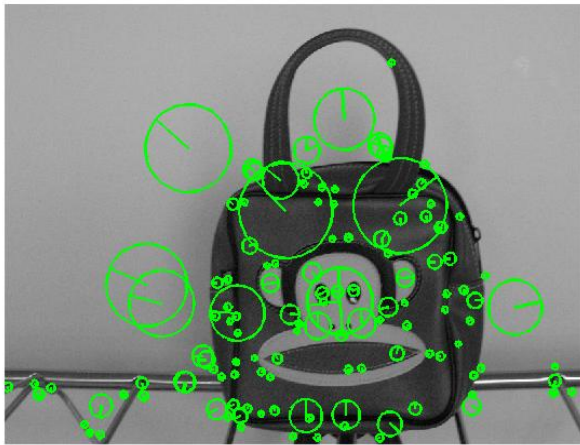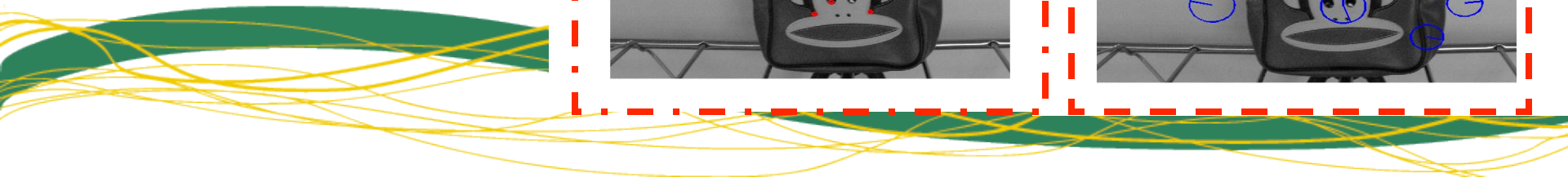**Hough voting on symmetric axis through all-pair-within-clusters**

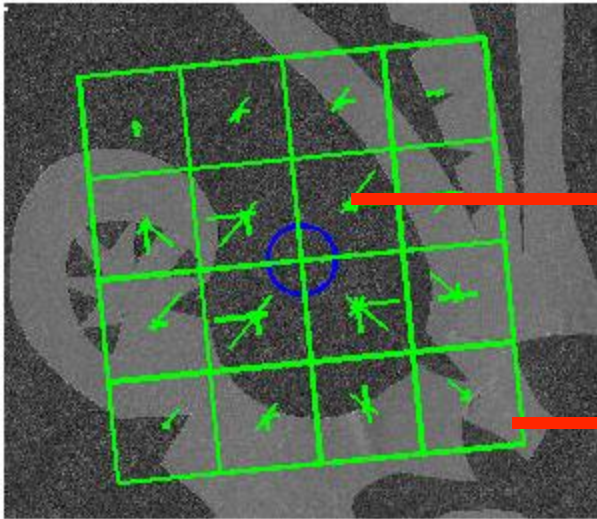Colorado State University

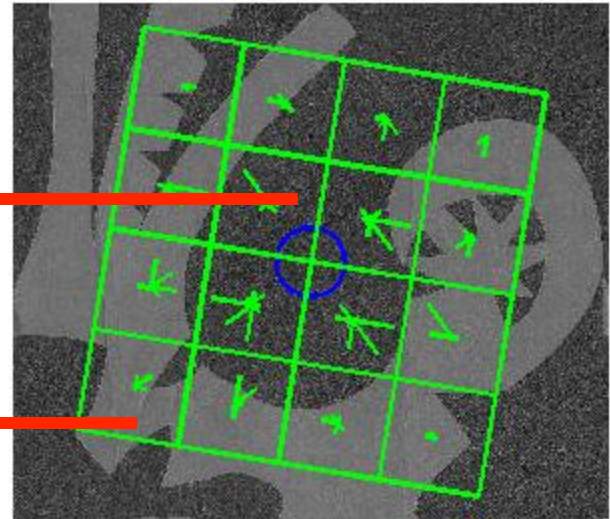**Clustering by Symmetry**

scale 0

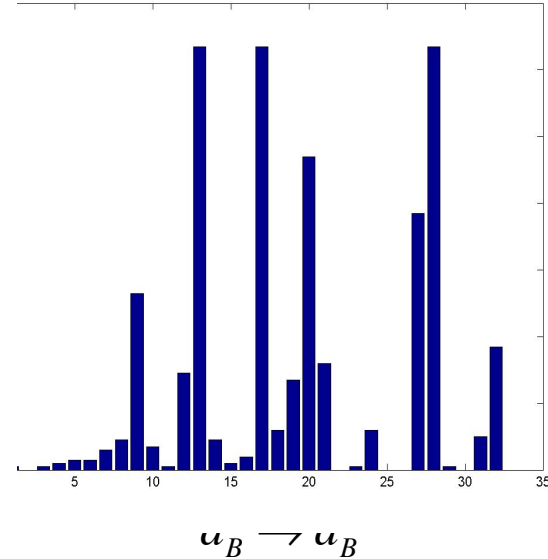scale 1

scale 2
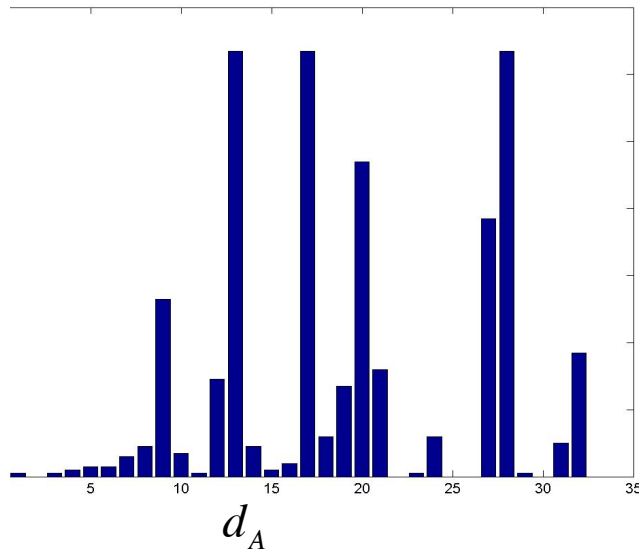
Mirroring SIFT descriptors

original patch A

perfect mirror patch B

Distance measure of bilateral symmetry

d_A

$d_B \rightarrow d_B$

$$Dist(i, j) =\parallel d_i - d_j^{mirror} \parallel_2 + \parallel d_j - d_i^{mirror} \parallel_2$$

Clustering by Symmetry
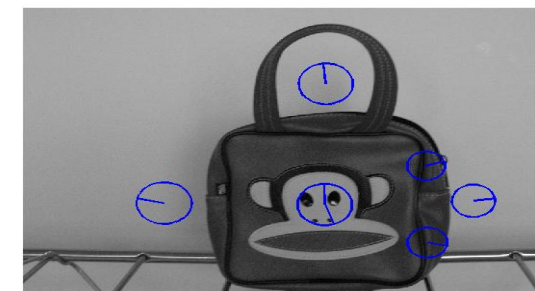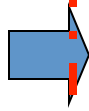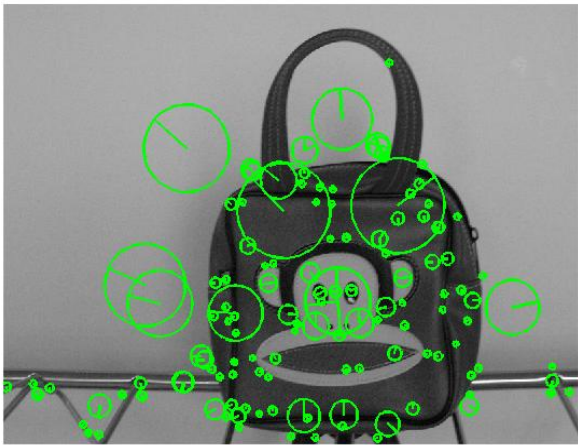
scale 2
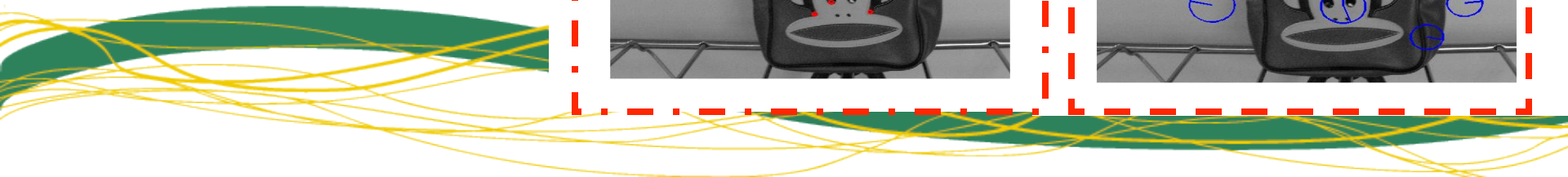
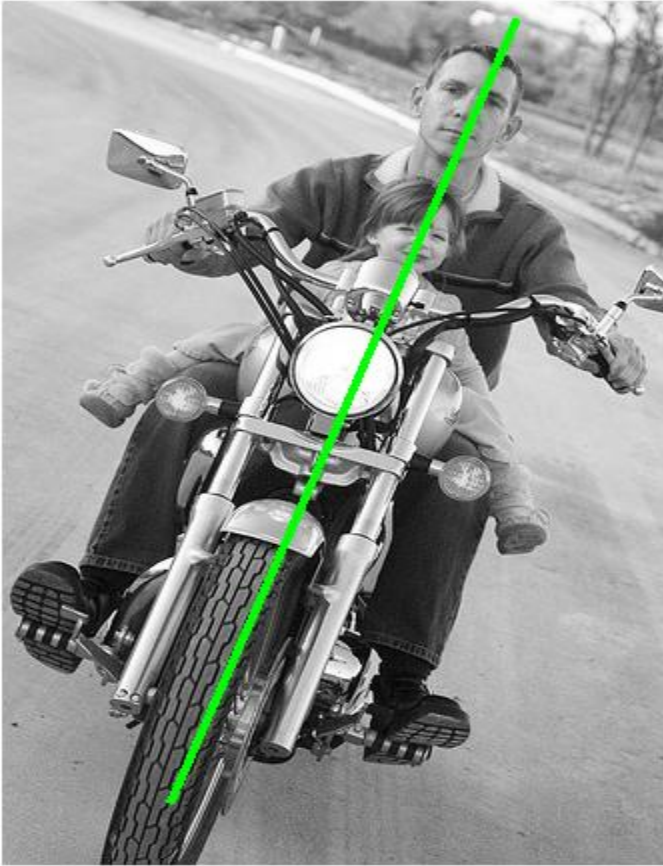# Sample results(1/5)

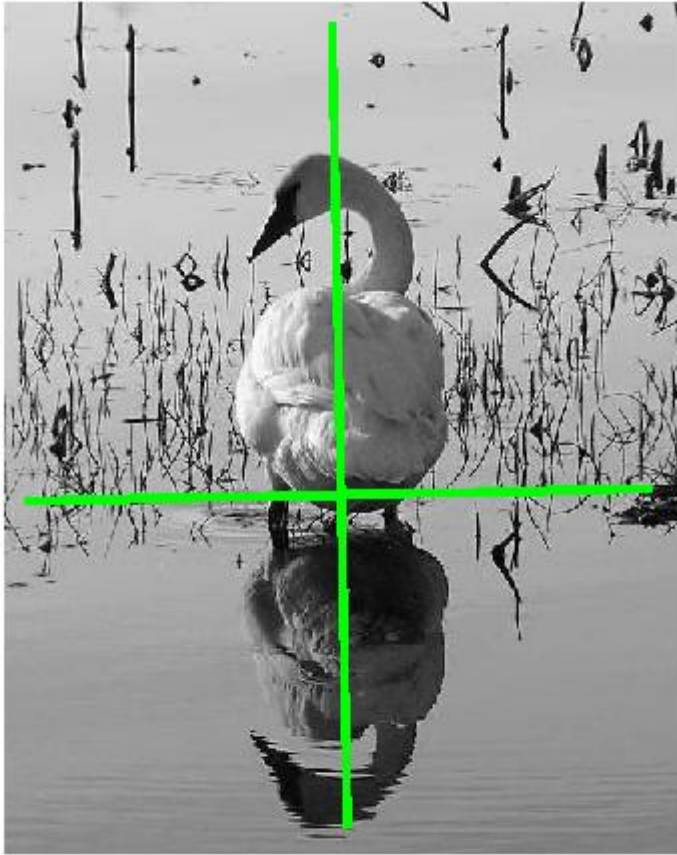Detection speed: 160 SIFT points, 0.32 second

175 SIFT points, 0.27 second

124 SIFT points, 0.18 second

Sample results(5/5)

214 SIFT points, 0.33 second

505 SIFT points, 0.82 second

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Summary

Method: Define symmetry measure,

+ Spectral clustering

+ Hough voting

Revision:

Ward's linkage hierarchical clustering is used instead for obtaining deterministic result, similar performance

Code is available by request to

qmo@cs.colostate.edu

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Thank You!

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