Matching Local Self-Similarities across Images and Videos

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Matching Local Self-Similarities

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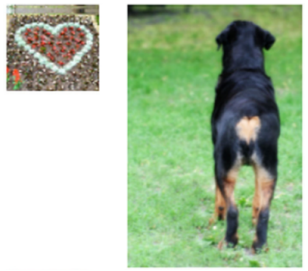
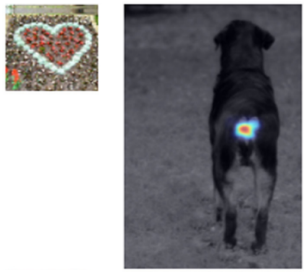
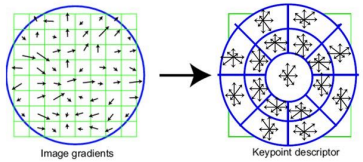


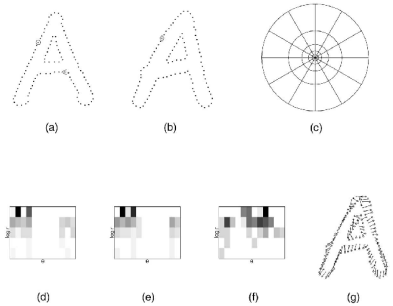
Matching Local Self-Similarities



GLOH



Shape Context



Template matching

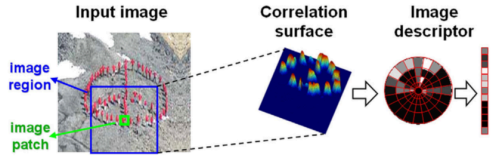
- Template image F to target image G
- Not the same size
- Similarity not in appearance, but structure
- Local self-similarity

Self-similarity descriptors

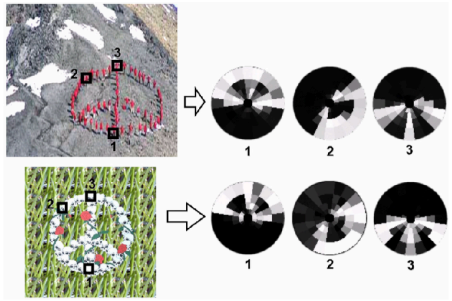
- Sum of Square Differences
- $S_q(x,y) = \exp\left(-\frac{SSD_q(x,y)}{\max\left(var_{noise}, var_{auto}(q)\right)}\right)$

Self-similarity descriptors

- 20 angles for 4 intervals = 80 bins



Self-similarity descriptors

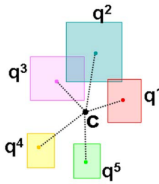


Self-similarity descriptors

- Very local
- Takes maximal values for bins
- Accounts for small affine transformations
- Patch over pixel

Matching ensembles of descriptors

- Creating “ensembles”
- Relative positions of descriptors
- Filter out non-information



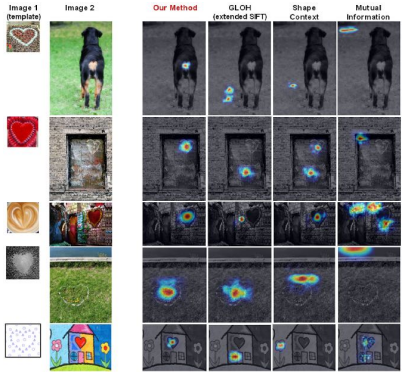
Matching ensembles of descriptors

- Similarity with sigmoid of L1 distance
- Likelihood map of the template
- Gaussian image pyramid, normalisation

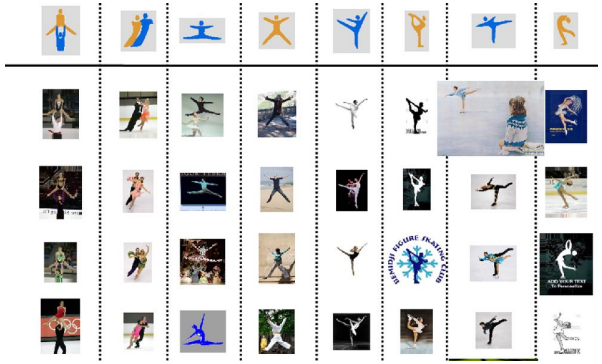
Results

- 60 challenging image pairs
- Other methods failed in majority of cases
- LSS 86% correct

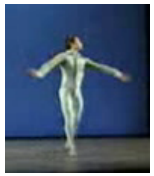
Other methods



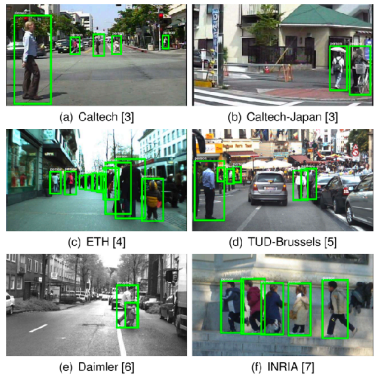
Pose sketches



Video

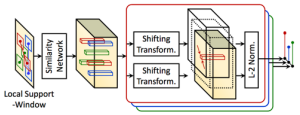


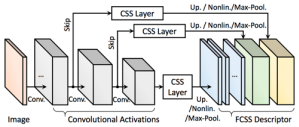
Object classification



Cross-modal matching

Deep learning





Discussion

- No extensive evaluation on good dataset

Questions?