Learning-based symmetry detection in natural images

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1. Outline – Contributions
- Automatic ridge detection in natural images.
- Learning-based approach allows flexibility; our detector can be tailored to a specific task.
- Exploitation of color, brightness, texture and spectral cues.
- Frontend for higher-level tasks such as object detection and shape representation.

2. Algorithm pipeline

3. Ground-truth construction
- Berkeley Segmentation Dataset (BSDS300).
- 5-6 segmentations by different human subjects per image.
- Human-assisted selection of symmetric segments.
- Combination of skeletons for selected parts gives the final image ground-truth.

4. Feature Extraction – Training
- Color: CIE Lab color space
- Texture: texton map.
- Hard binning (32 bins for 3 color channels, 64 textons).
- Differences of histograms (“gradients”) of color and texture content → symmetry indication.
- Rectangle filters extract features at multiple scales and orientations.
- Integral images for fast extraction.

5. Results

6. References

Code available here: http://www.centrale-ponts.fr/personnel/tsogkas/