Object Interpretation: Extending and Validating Object Recognition
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Motivation & Goal

Motivation: To explore small local configurations

Full Interpretation

Problem Setting

Input: small recognizable local configurations
1) Interpretation & recognition are possible on small configurations of the object in a fully local manner.
2) The number of internal features needed for interpretation is small. Hence a ‘full interpretation’ task can be computationally practical.
3) Components of such small local configurations are not likely to be recognized on their own. If so, recognition is done by the relations that hold between components.

Output: Interpretation & Recognition
1) When humans recognize an object image, they also recognize its internal features. We assume that reaching human recognition performance must involve accurate full interpretation of the image.

Approach

The interpretation scheme is based on a set of primitives and relations. The primitives are divided into three types, 2-D(regions), 1-D(contours), and 0-D(points).

The relations include unary (properties), binary, and more global relations between three or more primitives. Our set of relations go beyond relative location and relative distance. Examples are:
- local intensity extrema
- parallelism and continuity between two contours
- containment of point feature in region
- ‘ends-in’ relation between contour and point/region
- Cover of point feature by contour
- Segmentation and texture support along contours and between contours

The Interpretation process:
1) Extract image measurements for candidate primitives of type points, contours, and regions
2) Score combinations of primitive candidates by their comparability with learned relations.
3) Select the maximum-score combination as the final interpretation of the object structure.

Model results & Discussion

Currently there are no computational models for such full interpretation

Related models include:

Deformable Part Model (Felzenszwalb et al. (2012))
Internal features are image regions with their likelihood and relative position.