



Object Interpretation: Extending and Validating Object Recognition

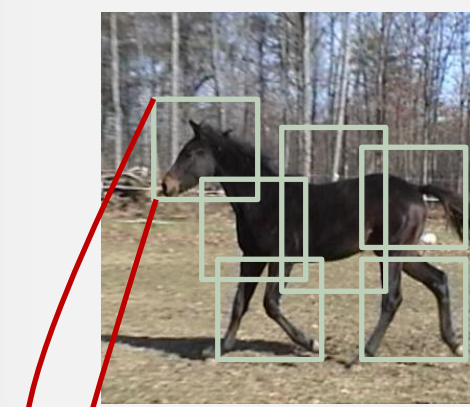
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Motivation & Goal

Motivation: To explore small local configurations



Typical part model

explore 'out-of-part':

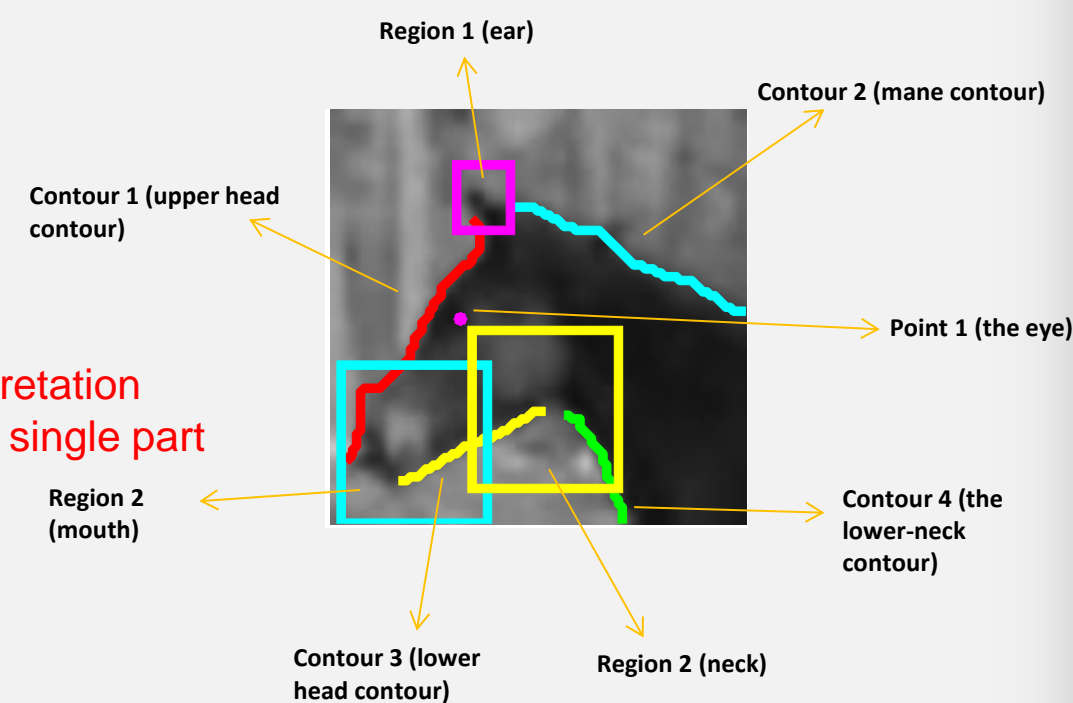
- Each part remains ambiguous
- Recognition is achieved by combinations of parts to compensate



Full Interpretation

explore 'in-part':

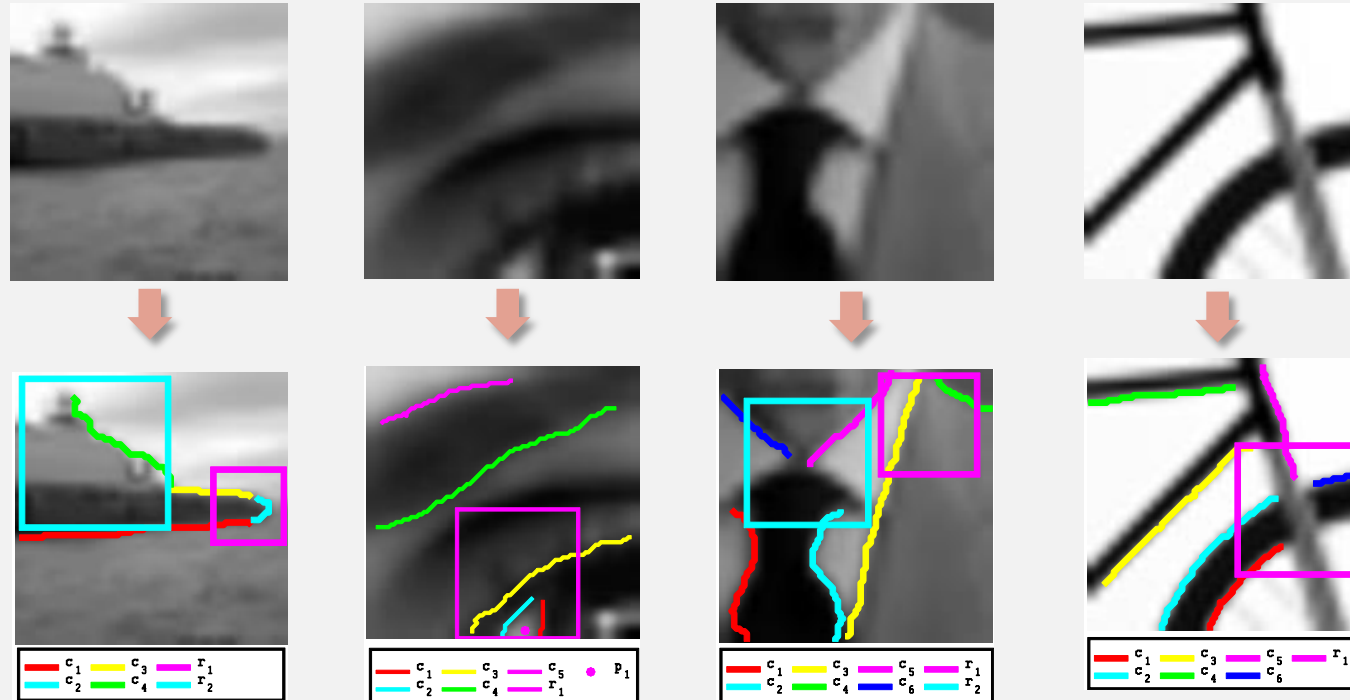
- Validate the part by full interpretation
- Recognition is achieved from single part



The 'full interpretation' problem:

To obtain the identity of the object, and also the identity and locations of a rich set of internal object features.

Examples for 'full interpretation':



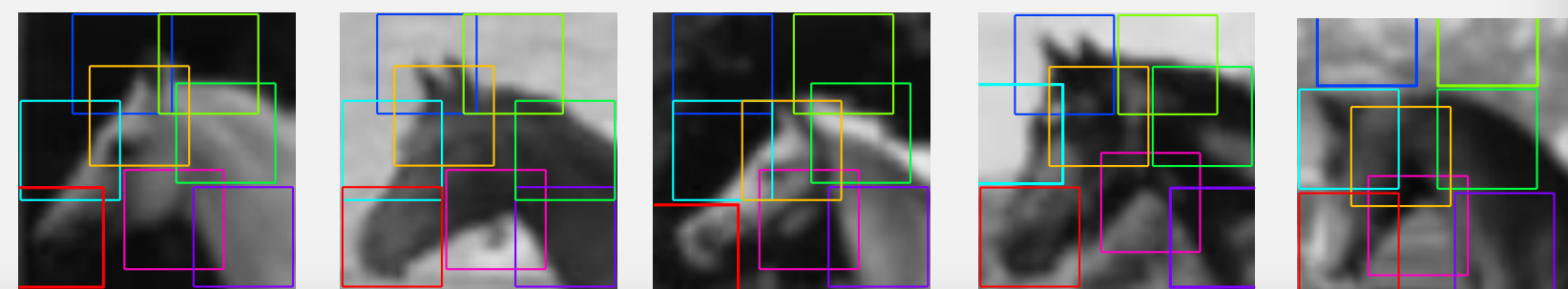
Goal: To produce full interpretation automatically

Currently there are no computational models for such full interpretation

Related models include:

Deformable Part Model

[Felzenszwalb et al. (ver 2012)] Internal features are image regions with their likelihood and relative position.



Problem Setting

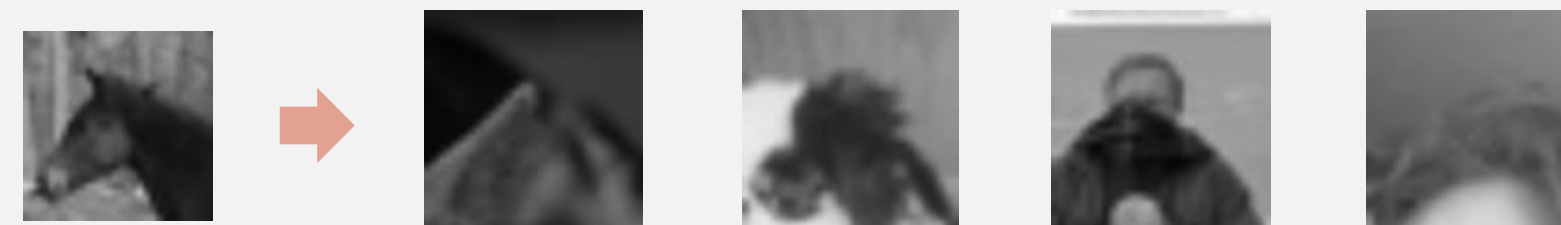
Input: small recognizable local configurations

- Interpretation & recognition are possible on small configurations of the object in a *fully local manner*.
- The number of internal features needed for interpretation is small. Hence a 'full interpretation' task can be computationally practical.
- 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

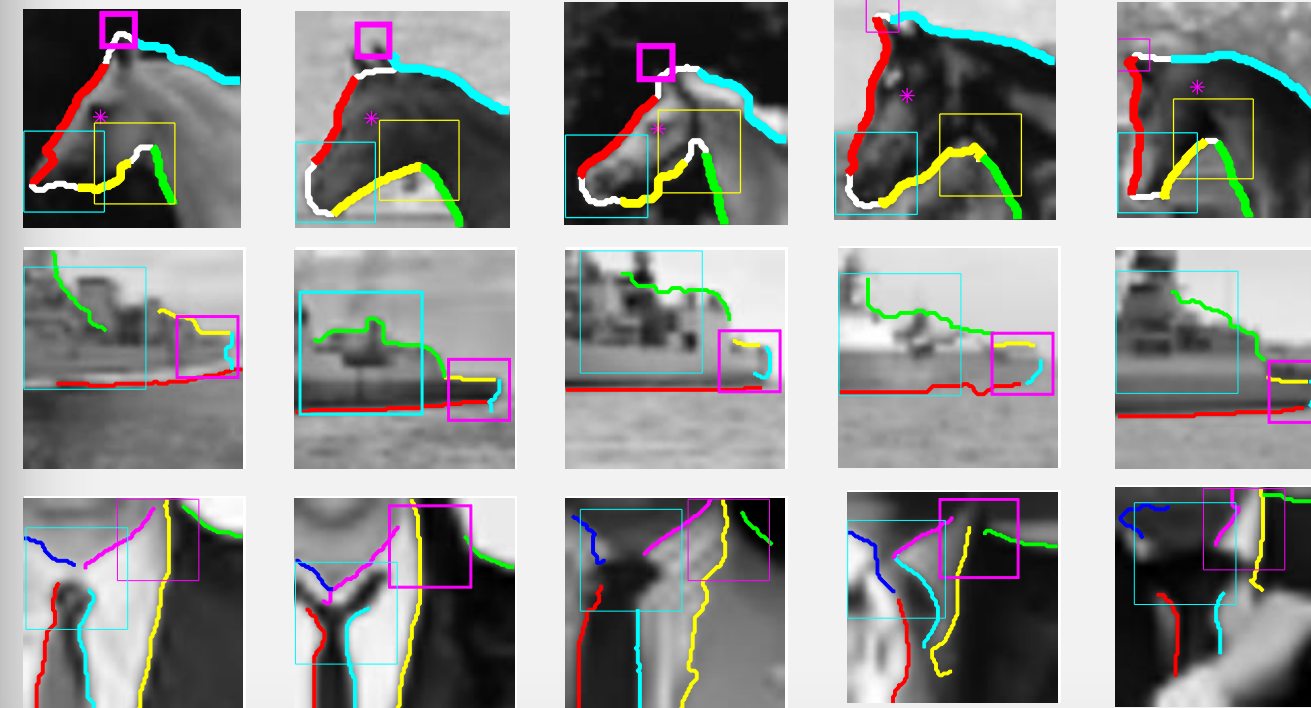
- When humans recognize an object image, they also recognize its internal features. We assume that reaching human recognition performance must involve accurate full interpretation of the image.

Visually similar negative examples:

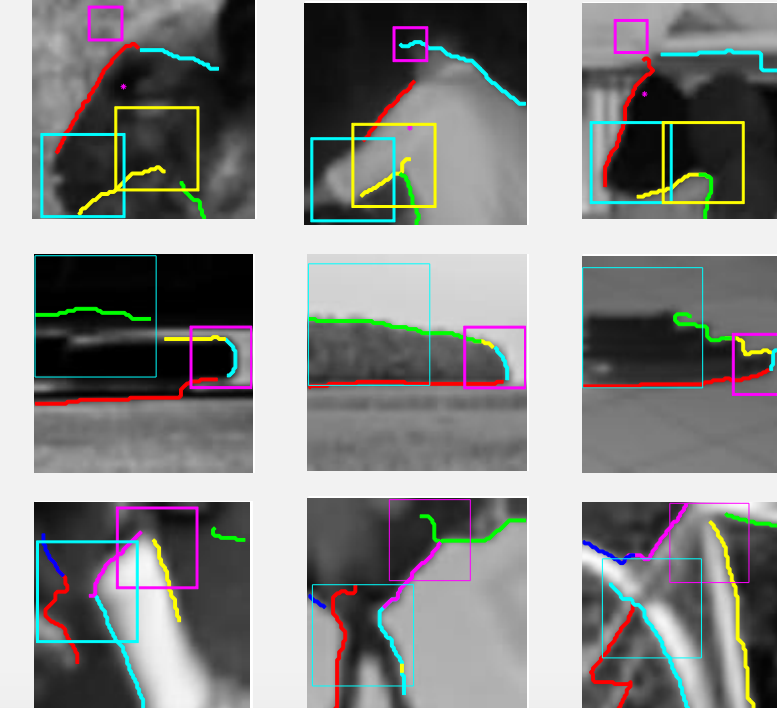


Model results & Discussion

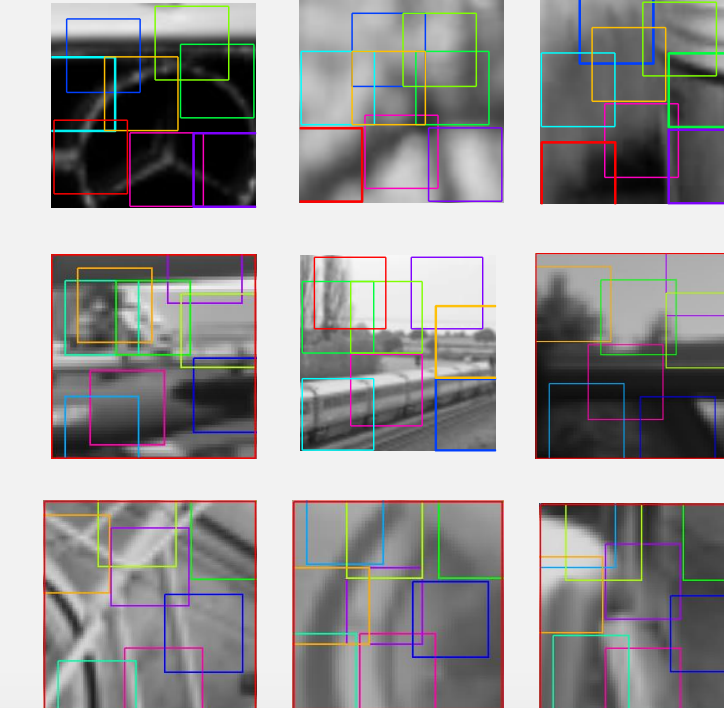
Positive examples



Top Negative examples

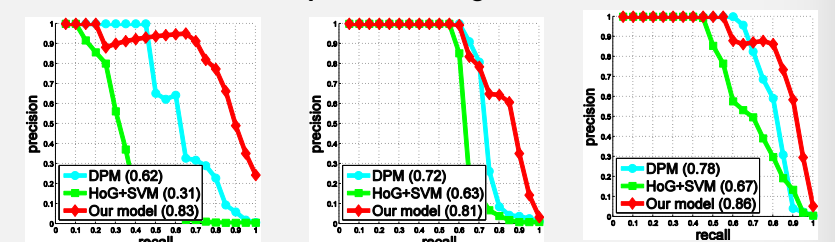


Top Negative examples DPM



Validation

Validation score over output of first-stage detector:



Full set of relations Vs. Reduced set of spatial relations:

