Special Issue Call for Papers

Structured Prediction and Inference

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Background

Many computer vision problems can be formulated naturally as prediction tasks of structured objects. Image segmentation, stereo reconstruction, human pose estimation and natural scene analysis are all examples of such problems, in which the quantity one tries to predict consists of multiple interdependent parts. The structured output learning paradigm offers a natural framework for such tasks, and recently introduced methods for end-to-end discriminative training of conditional random fields (CRFs) and structured support vector machines (S-SVMs) for image classification and interpretation show that computer vision is not just a consumer of existing machine learning developments in this area, but one of the driving forces behind their development. The complexity of structured prediction models makes the problem of inference in these models an integral part of their analysis. While the machine learning literature has largely focused on message passing, computer vision research has introduced novel applications of branch-and-bound and graph cuts as inference algorithms. Articles addressing these issues are particularly encouraged for submission to the special issue.

Topics

Original papers are being solicited that have as topic one or more aspects of the structured prediction framework in a computer vision setting, that is they address the problem of prediction from an input space, such as images or video, to a structured and interdependent output space. Submissions can be theoretic or applied contributions as well as position papers. Topics of interest include, but are not limited to:

- Training for structured output learning
  - Probabilistic vs. max-margin training
  - Generative vs. discriminative training
  - Semi-supervised or unsupervised learning
  - Dealing with label noise

- Inference methods for structured output learning
  - Exact vs. approximate inference techniques
  - Pixel, voxel, and superpixel random field optimization
  - Priors and higher order clique optimization
  - Approaches that scale to large amounts of training and test data

- Computer vision applications of structured output learning
  - Segmentation
  - Stereo reconstruction
  - Relationship between scene components
  - Hierarchical models