Scene Grammars, Factor Graphs, and Belief Propagation

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I will describe a general framework for probabilistic modeling of complex scenes and inference from ambiguous observations. The approach is motivated by applications in image analysis and is based on the use of priors defined by stochastic grammars. We define a class of grammars that capture relationships between the objects in a scene and provide important contextual cues for statistical inference. The distribution over scenes defined by a probabilistic scene grammar can be represented by a graphical model and this construction can be used for efficient inference with loopy belief propagation.