

Associative Hierarchical Random Fields

Members:

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Abstract:

Random fields are widely used in vision for problems such as segmentation, counting, labeling. MAP inference over pairwise random fields, defined over more than two labels, has been shown to be an NP-hard problem. However there exist approximate inference methods that often converge to near optimal solutions in practice. These include α -expansion, belief propagation, $\alpha\beta$ swap etc. which are widely used in practice. Inference over simple lattice structures using only unary and binary costs ignores higher level image information, hence recent works have introduced costs for getting MAP solutions over grids or lattices that include additional cost terms that use groups of pixels. This paper proposes a hierarchical structure modeling that allows us to reduce all costs involving higher level information to a cost term that only includes unary and binary costs so that existing inference methods for grids can be used. This paper focuses on alpha expansion and on the problem of segmentation for demonstrating results.

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