In The Name of God.
The Merciful, The Compassionate.

PMBP: PatchMatch Belief Propagation for Correspondence Field Estimation

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1 Abstract and Introduction

This paper draws a new connection between PatchMatch(PM) and Particle Belief Propagation (PBP). The key contributions are as follows:

1. description of PM and BP in terms that allow the connection between them be clearly described.

2. use of this analysis to define a new algorithm PMBP which is more accurate than PM and faster than BP.

1.1 Belief Propagation

Correspondence field is parametrized by a vector grid $\{\mathbf{u}_s\}_{s=1}^n$ where s indexes nodes (correspondence to image pixels) and $\mathbf{u}_s \in \mathbb{R}^d$ parametrizes the correspondence vector at s.

Problems with the data term for weighted patch flow are as follows:

1. it implicitly assumes a constant correspondence field in the $(2h+1) \times (2h+1)$ patch surrounding every pixel (?). Large h over-smooths the output. More complex parametrization of flow field can be suggested. However, they are not computationally tractable.

2. h may be reduced. This causes the data term to be ambiguous. This causes the introduction of pairwise terms.