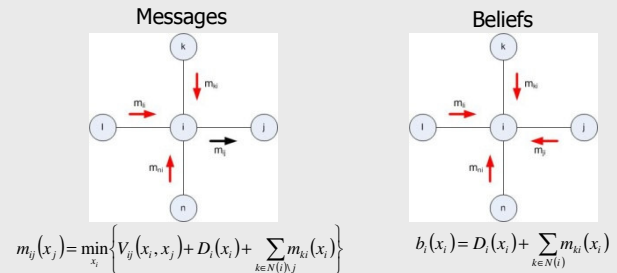


1. Introduction

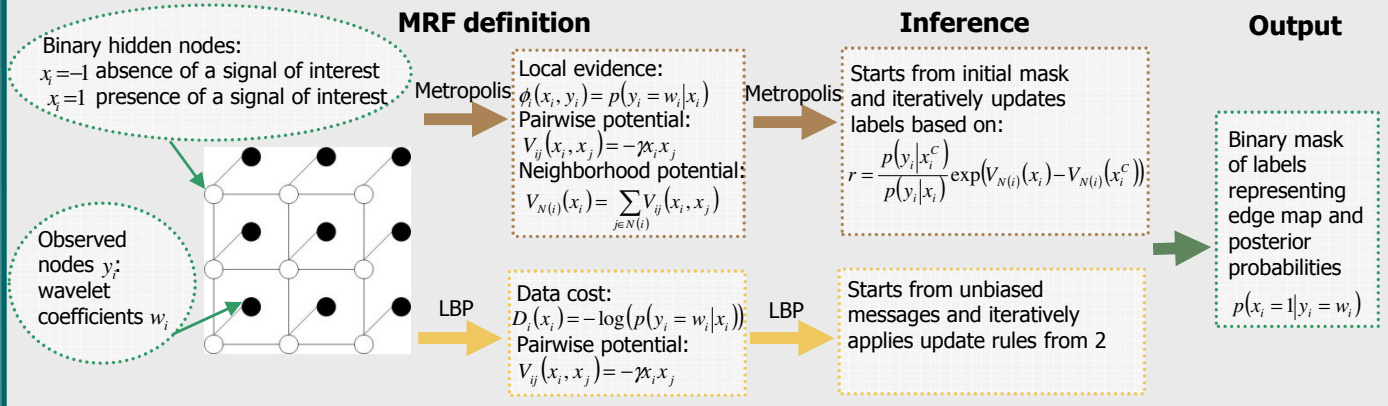
- Belief propagation is an algorithm for inference in graphical models
- In networks with loops results are approximate and convergence becomes a problem
- Nevertheless, it has been successfully applied to turbo codes and computer vision tasks
- We applied loopy belief propagation as inference engine for image denoising algorithm previously developed in our group
- Each wavelet band is modelled as Markov Random Field (MRF)
- The goal is to detect whether there is a signal of interest at certain location and to use the posterior probability as shrinkage factor for denoising

2. Loopy Belief Propagation

- Iteratively applies update rules:

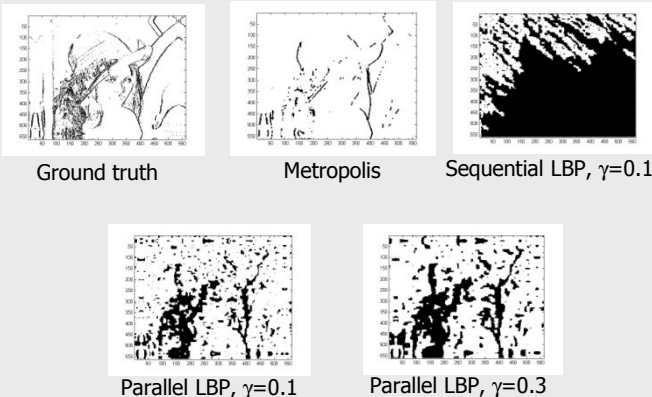


3. Detection of Signal of Interest Using Ising MRF Model



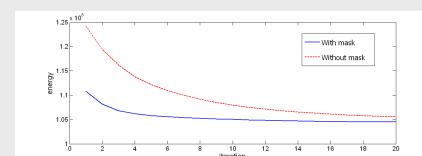
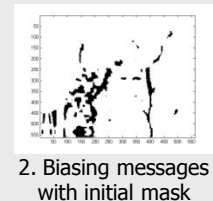
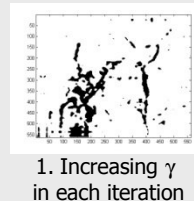
4. Results

- Binary mask for vertical component of edges



5. Possible Improvements

- Redefine spatial prior so it has more flexibility
- Simple experiments:



Total energy comparison of LBP with biased (experiment 2) and unbiased messages (standard)