End-to-end Training of Hybrid CNN-CRF Models for Stereo

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Abstract

Stereo
Find the disparity for each pixel in an image

Method

Energy and Inference

\[
\begin{align*}
\min_x f(x) & = \sum_i w_i(x_i) + \sum_{i,j} w_{ij}(x_i,x_j) \\
\text{s.t. } & \exists x \\n\end{align*}
\]

“Costs for candidate disparities”

\[
f(x) = -\epsilon(\theta(x), \phi(x))
\]

Optimize total of unary and pairwise cost on a 4-connected grid

Benchmark Results

Middlebury 2014

Kitti 2015


table

References


Conclusion

- Principled approach without post-processing: only optimization
- Accurate and fast
- Exploit GPU based CRF solver
- Learn unary and pairwise term such that the CRF works best
- All parameters learned from data
- Code online: https://github.com/VLOGroup/cnn-crf-stereo