DEPTH FROM SINGLE IMAGE







Input

Output

LOCAL PREDICTIONS

Superpixels:





Achanta et al., PAMI'12

LOCAL PREDICTIONS

Train a regressor to predict superpixel depth:





—> Noisy predictions.

FAVORING CONSISTENCY

Connect the neighboring superpixels



Encourage their depths to be consistent.

Saxena et al., PAMI'09

MARKOV RANDOM FIELD



Assign values to the nodes to minimize $E(Y) = \sum_{i} \varphi(y_{i}) + \sum_{(i,j)} \psi(y_{i}, y_{j})$ unary pairwise

REASONING ABOUT EDGES







Liu et al., CVPR 2014

HIGHER ORDER TERMS

Larger regions can help reason about the scene



Local

Mid-level

Global

Zhuo et al., CVPR 2015

DEEP LEARNING WITH MRF



DEPTH FROM A SINGLE IMAGE





Test image

Ground-truth

Eigen et al. [3]

DCNF-FCSP

Liu et al., PAMI 2016

PREDICTING NORMALS

Using deep learning



Wang et al., CVPR 2015

NORMALS FROM A SINGLE IMAGE



Wang et al., CVPR 2015

TASK CONSISTENCY



Zamir et al., CVPR'18

STRENGTHS AND LIMITATIONS

Strengths:

- More general than shape-from-texture.
- Leverages data.

Limitations:

- Requires training data for specific scenes.
- Currently, only limited geometrical reasoning.