Manually select:
• Vanishing points and lines;
• Planar surfaces;
• Occluding boundaries;
• Etc..
Automatic Photo Pop-up

Hoiem et al, 05
Automatic Photo Pop-up

Hoiem et al, 05...
Automatic Photo Pop-up

Make3D

Saxena, Sun, Ng, 05...

Training

Image

Depth

Prediction

Plane Parameter MRF

\[
P(\alpha|X, \nu, y, R; \theta) = \frac{1}{Z} \prod_i f_1(\alpha_i|X_i, \nu_i, R_i; \theta) \prod_{i,j} f_2(\alpha_i, \alpha_j|y_{ij}, R_i, R_j)
\]

Planar Surface Segmentaion

(a) Connectivity

(b) Co-Planarity

youtube
A software: Make3D
“Convert your image into 3d model”

http://make3d.stanford.edu/
http://make3d.cs.cornell.edu/
Depth map reconstruction using deep learning

Eigen et al., 2014

3D Layout estimation

Dasgupta, et al. CVPR 2016
3D Layout estimation
Coherent object detection and scene layout estimation from a single image

Y. Bao, M. Sun, S. Savarese, CVPR 2010, BMVC 2010