16-CVPR- Patches, Planes and Probabilities: A Non-local Prior for Volumetric 3D Reconstruction

# Probabilistic approaches model and expose the uncertainty in the reconstruction

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# Previous works impose smoothness constraints via pairwise potentials that encourage adjacent voxels to take on the same occupancy state

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# Condition surface orientations on semantic information

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# Approximated by piecewise smooth regions with discontinuities at object boundaries

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# High-order spatial priors in 2D

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# Non-local segmentation

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# Stereo matching

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# On planar multi-view stereo or Manhattan world representations treat these as hard constraints

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# Review

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#### 44

# Volumetric Reconstruction

### Early work

###### 1

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###### 28

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### A volumetric reconstruction method that updates the occupancy and color of each voxel sequentially for each image

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###### GPU 9 49

### lacks a global probabilistic formulation leading to evidence overcounting

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### Phrased 3D volumetric reconstruction as MRF inference

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# Reconstruction with Primitives

### Planar patches

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### Manhattan world

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### piecewise planar depth map fusion

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### Sample planes from depth and exploit a semantic classifier to classify the iamge into planar and non-planar regions

###### 17

### Optimizes 3D primitives and a mesh using an objective that combines photo-consistency terms, mesh smoothness and priors on pairwise primitive arrangements

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### Semantic and shape information for stereo matching

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### Semantic and shape information for multi-view reconstruction

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### Constraining the set of plausible geometries

###### 2

###### 11

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### Class specific normal distribution

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# Basic SfM

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# Extension of

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# Superpixelization

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