

Object Reconstruction with Surfaces

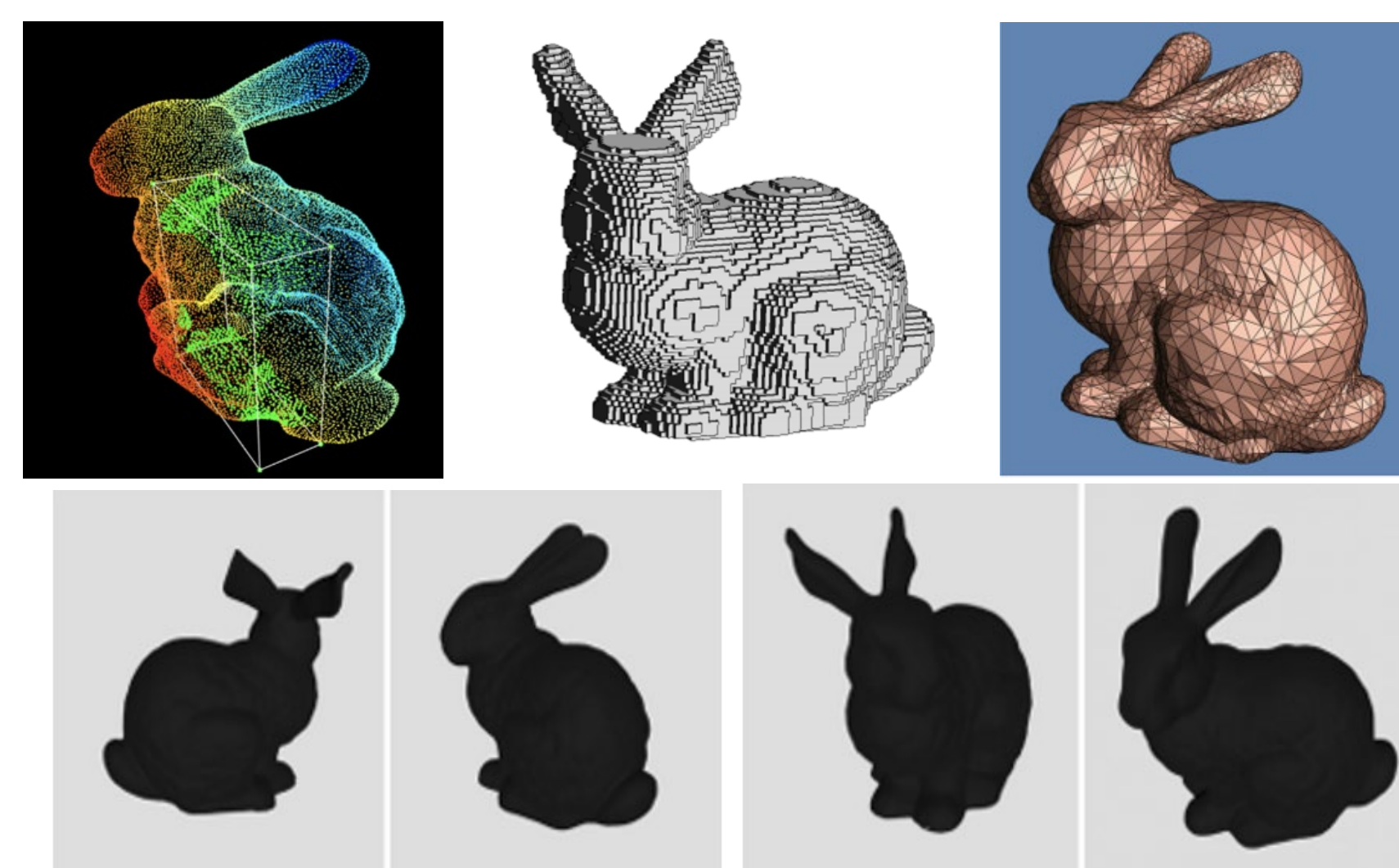
Reconstructing 3D object shape from one or more views is an important problem.

Applications

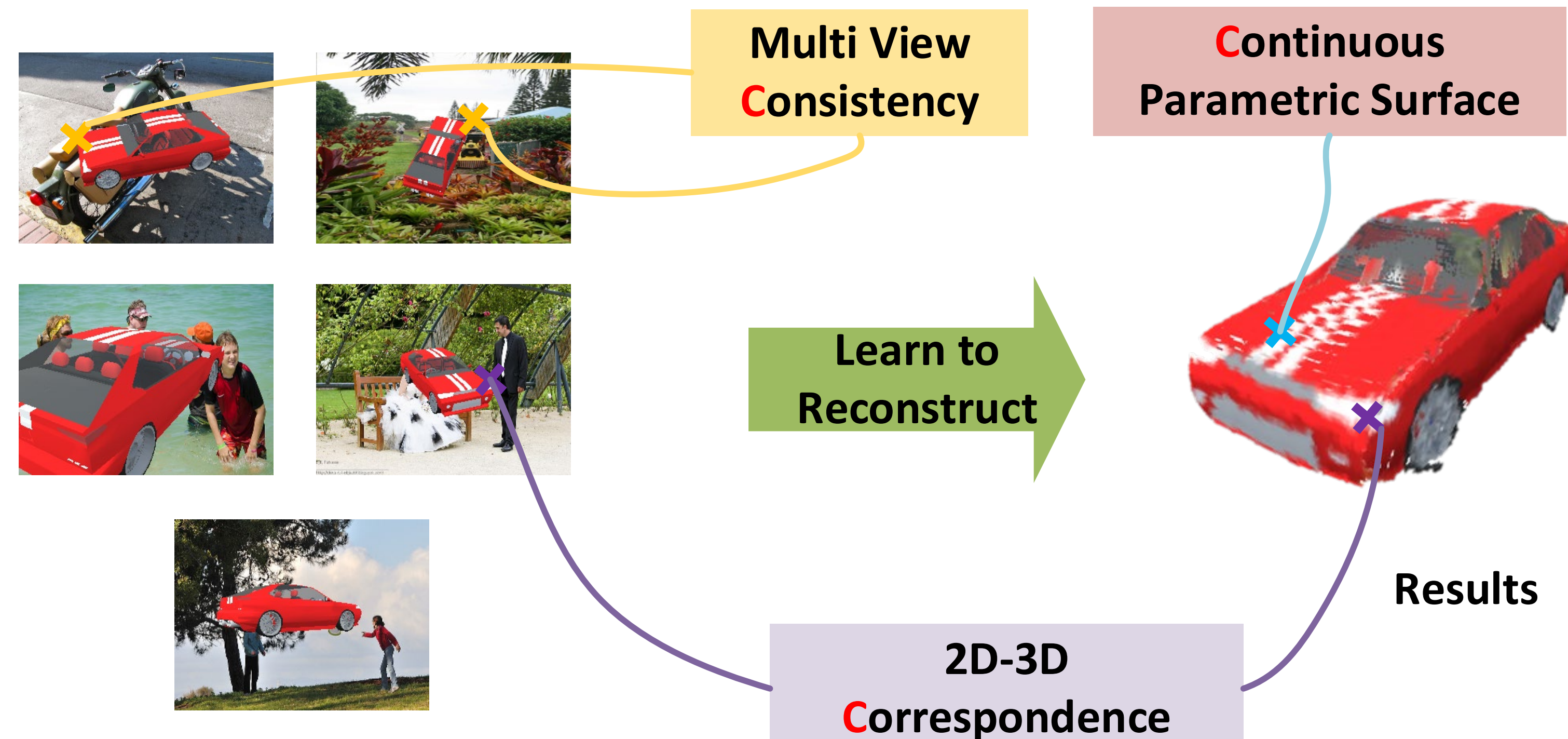


Parametric Continuous Surface has several advantages over voxel, point cloud or mesh.

Representations



3C Properties



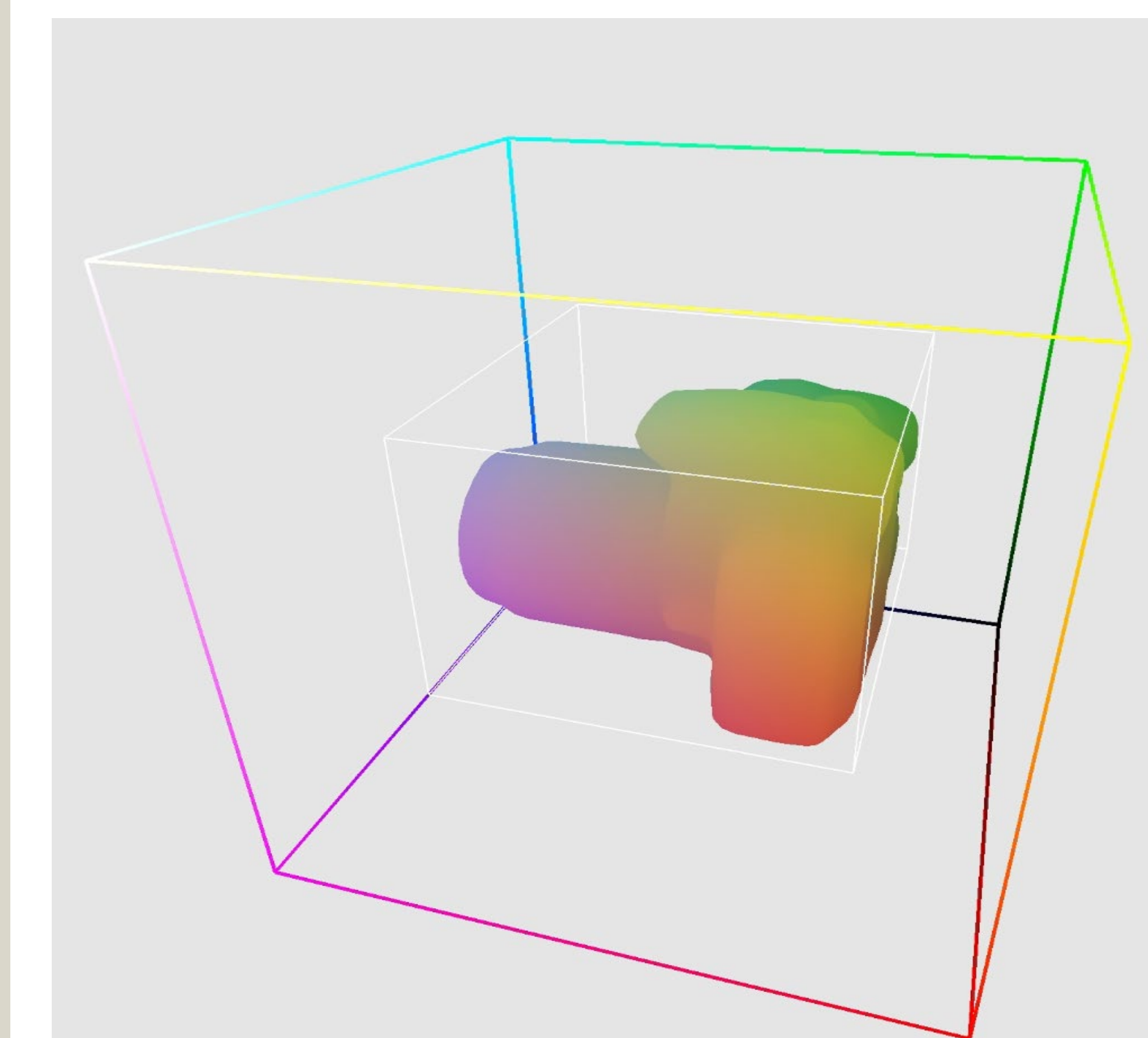
N input RGB images
 We aim to learn to predict the visible 3D parametric surfaces of objects from one or more images.

Method	Continuity	2D-3D Correspondence	Cross View Consistency	No camera input
AtlasNet	✓	✗	✗	✓
NOCS	✗	✓	✗	✓
X-NOCS	✗	✓	✓	✓
Pixel2Mesh	✓	✓	✗	✗
Pixel2Mesh++	✓	✓	✓	✗
DeepSDF	✓	✗	✗	✓
PiFu	✓	✓	✓	✗
Pix2Surf(Ours)	✓	✓	✓	✓

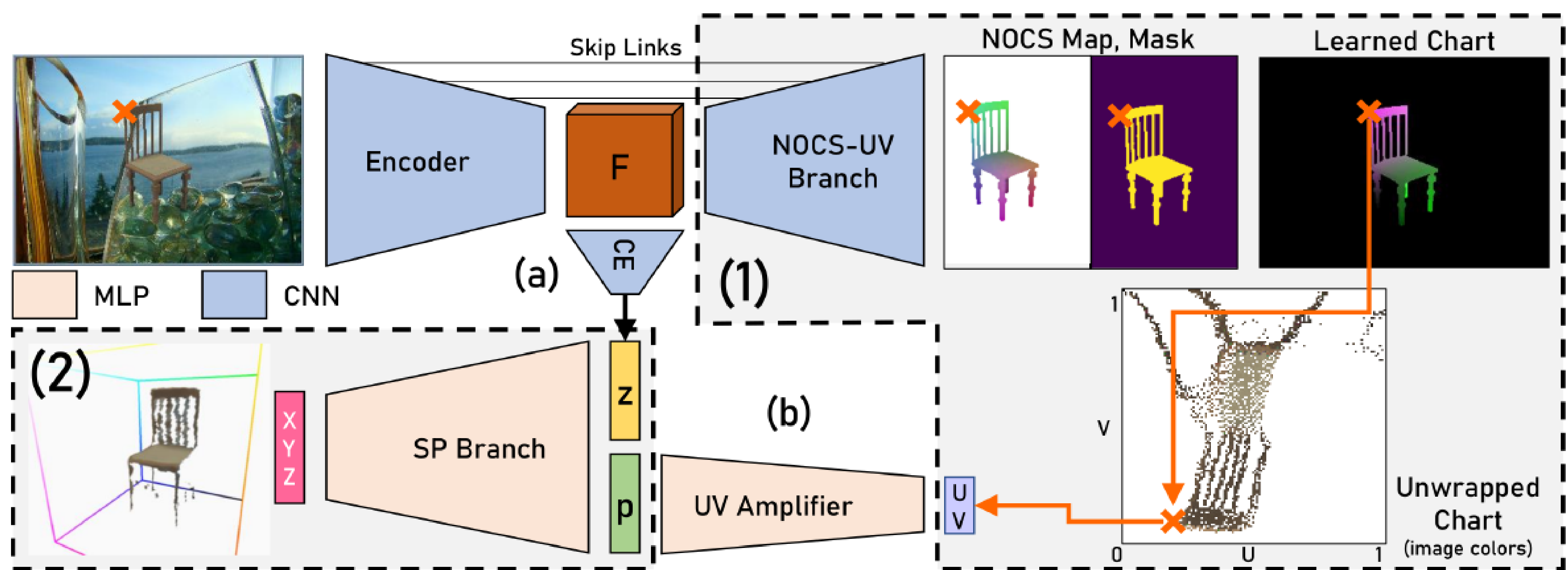
Pix2Surf simultaneously has 3C properties without knowing camera parameters

Normalized Object Coordinate Space (NOCS)

Wang et al. CVPR 2019



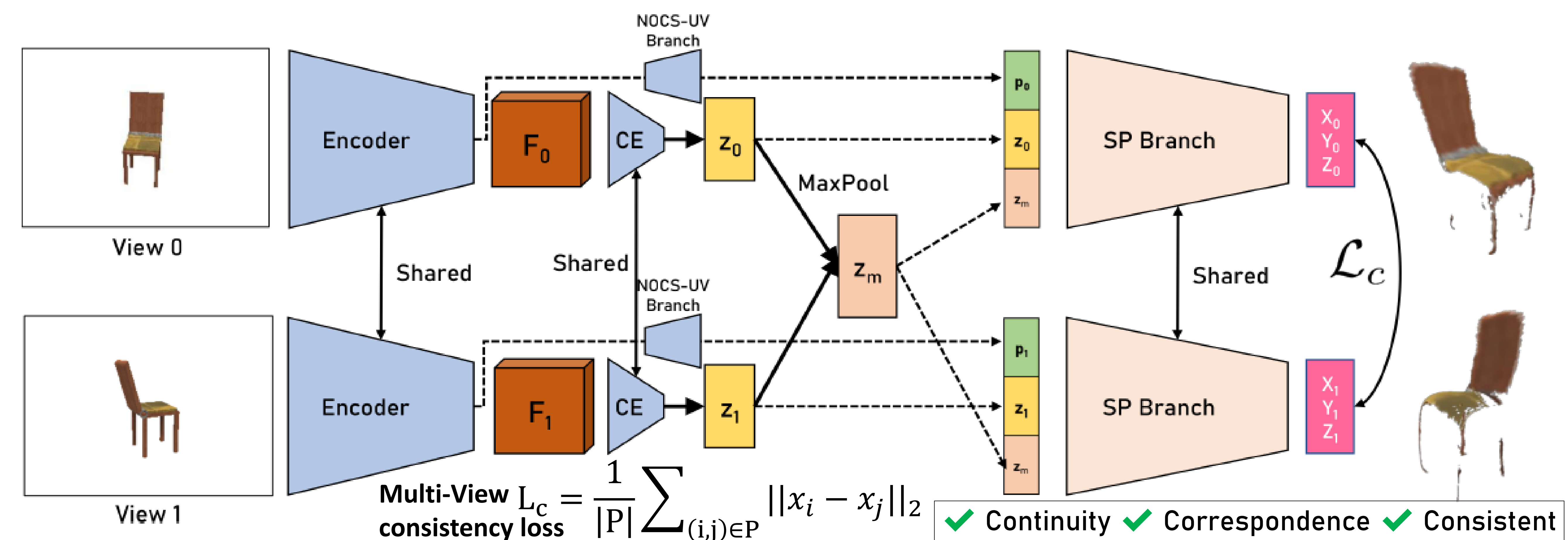
Single View Single Chart Pix2Surf



$$L_I = w_1(w_n L_n + w_m L_m) + w_2 L_s \quad L_s = \frac{1}{K} \sum_{i=1}^K \|x_i - \hat{x}_i\|_2$$

✓ Continuity ✓ Correspondence ✗ Consistent

Multi-View Atlas Pix2Surf



Emergence of unsupervised Learned Chart



Visual Results

