learn 3-D construction from data

voxel.

points

meshs

implicit 分类：内部/外部的点

$f_\theta : \mathbb{R}^3 \times \mathcal{X} \to [0,1]$

signed distance. | occupancy field.

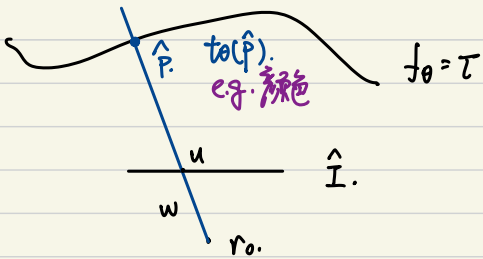
m|p. cost function

$$\mathcal{L}(\theta;\psi) = \sum_{j=1}^{K} \underbrace{BCE(f_\theta(p_{ij}, z_i), o_{ij})}_{\text{交叉熵}} + KL[q_\psi(z|(p_{ij}, o_{ij})_{j=1:K}) \| p_\theta(z)]$$

$$L_{SCLF}(p, v, l) : \mathbb{R}^3 \times \mathbb{R}^3 \times \mathbb{R}^M \to \mathbb{R}^3$$

motion.

用向量场表示 V



$$\mathcal{L}(\hat{I}, I) = \sum_u \| \hat{I}_u - I_u \|$$

$$\frac{\partial \mathcal{L}}{\partial \theta} = \sum_u \frac{\partial L}{\partial \hat{I}_u} \frac{\partial \hat{I}_u}{\partial \theta}$$

$$\frac{\partial \hat{I}_u}{\partial \theta} = \frac{\partial t_\theta(\hat{p})}{\partial \theta} + \frac{\partial t_\theta(\hat{p})}{\partial \hat{p}} \frac{\partial \hat{p}}{\partial \theta}$$

$f_\theta(\hat{p}) = \tau$ (已知)

$$\frac{\partial \hat{p}}{\partial \theta} = -W \left(\frac{\partial f_\theta(\hat{p})}{\partial \hat{p}} \cdot W \right)^{-1} \frac{\partial f_\theta(\hat{p})}{\partial \theta}$$

$\hat{p} = r_0 + \hat{d} w$.

$f_\theta(\hat{p}) = \tau$

$$\frac{\partial f_\theta(\hat{p})}{\partial \theta} + \frac{\partial f_\theta(\hat{p})}{\partial \hat{p}} \frac{\partial \hat{p}}{\partial \theta} = 0$$

$W \frac{\partial \hat{d}}{\partial \theta}$

NeRF

$$C = \sum_{i=1}^{N} T_i \alpha_i c_i \qquad \alpha_i = 1 - e^{-\sigma_i \delta_i}$$

T_i: 权重. c_i: 颜色.

$$T_i = \prod_{j=1}^{i-1} (1 - \alpha_j)$$

$$\min_{\theta} \sum_{i} \| \text{render}(F_\theta) - I_i \|^2$$

Generative Radiance Fields