$$\mathcal{L} = \sum_{p \in \mathcal{P}} \ell_p$$

a

$$\mathcal{L}_{ ext{scribble}} = \sum_{p \in \mathcal{P}} w_p \, \ell_p \quad ext{where,} \quad w_p = egin{cases} 1, & ext{if } p \in \mathcal{S} \\ 0, & ext{else.} \end{cases}$$

a

$$oldsymbol{M^*} = rg \max_{oldsymbol{M}} oldsymbol{p}(oldsymbol{M}) oldsymbol{p}(oldsymbol{I} | oldsymbol{M})$$

$$E(\mathbf{M}) = -\log(\mathbf{p}(\mathbf{I}, \mathbf{M})) = -\log(\mathbf{p}(\mathbf{I}|\mathbf{M})) - \log(\mathbf{p}(\mathbf{M}))$$
  
=  $E_d(\mathbf{I}, \mathbf{M}) + E_r(\mathbf{M})$   
=  $\langle C(\mathbf{P}), \mathbf{M} \rangle + \lambda \ TV(\mathbf{M}) + \iota_{[0,1]}(\mathbf{M})$ 

$$C(\widehat{\boldsymbol{P}}(x_p)) = \begin{cases} 0, & \text{if } x_p \in \mathcal{S} \\ -\log \frac{\widehat{\boldsymbol{P}}(x_p)}{1 - \widehat{\boldsymbol{P}}(x_p)}, & \text{else} \end{cases}$$

$$E(\boldsymbol{M}) = \langle \mathcal{C}(\boldsymbol{P}), \boldsymbol{M} \rangle + \lambda \ TV(\boldsymbol{M}) + \iota_{[0,1]}(\boldsymbol{M}) + \iota_{\mathrm{FG}}(\boldsymbol{M}) + \iota_{\mathrm{BG}}(\boldsymbol{M})$$