Alpha Matting extension to scissors

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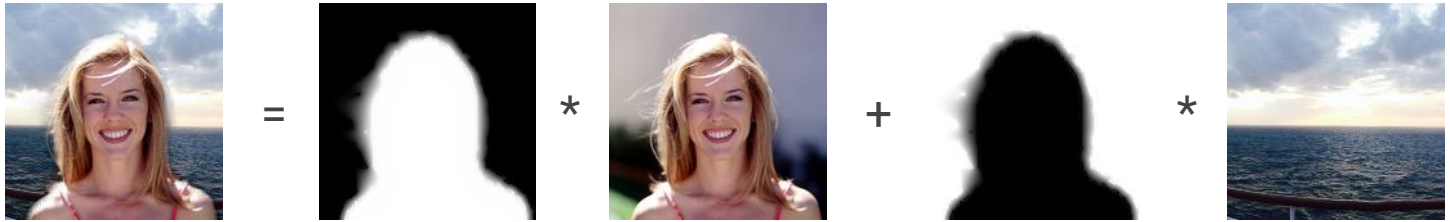
Alpha Matting

$$I_i = \alpha_i * F_i + (1-\alpha_i) * B_i$$



Intelligent scissors

Scissoring allows a user to cut an object out of an image through the use of a live wire that automatically wraps around the object of interest.

This creates a high quality outline of the image to produce an alpha mask that can then be used to add images together

However, the alpha mask does not contain a mix of alpha values.

If the cut is imperfect or if it contains a mixture of foreground and background colors , then this hard cut will be noticeable to the viewer.

A Closed Form Solution to Natural Image Matting

$$I_i = \alpha_i * F_i + (1-\alpha_i) * B_i$$

$$\alpha_i = a * I_i + b \quad \forall i \in w$$

$$a = 1/F-B \qquad b = -B/F-B$$

$$J(\alpha, a, b) = \sum_{j \in I} \left(\sum_{i \in w_j} (\alpha_i - a_j I_i - b_j)^2 + \varepsilon a_j^2 \right), \quad (3)$$

$$J(\alpha) = \alpha^T L \alpha$$

$$\sum_{k|(i,j)\in w_k} \left(\delta_{ij} - \frac{1}{|w_k|} \left(1 + (I_i - \mu_k)\left(\Sigma_k + \frac{\varepsilon}{|w_k|} I_3\right)^{-1} (I_j - \mu_k)\right)\right)$$

$$E(\alpha) = \alpha^{\mathrm{T}} \mathrm{L} \alpha + \lambda (\alpha - \beta)^{\mathrm{T}} \mathrm{D} (\alpha - \beta),$$

$$(\mathrm{L} + \lambda \mathrm{D})\alpha = \lambda \mathrm{D} \beta.$$