

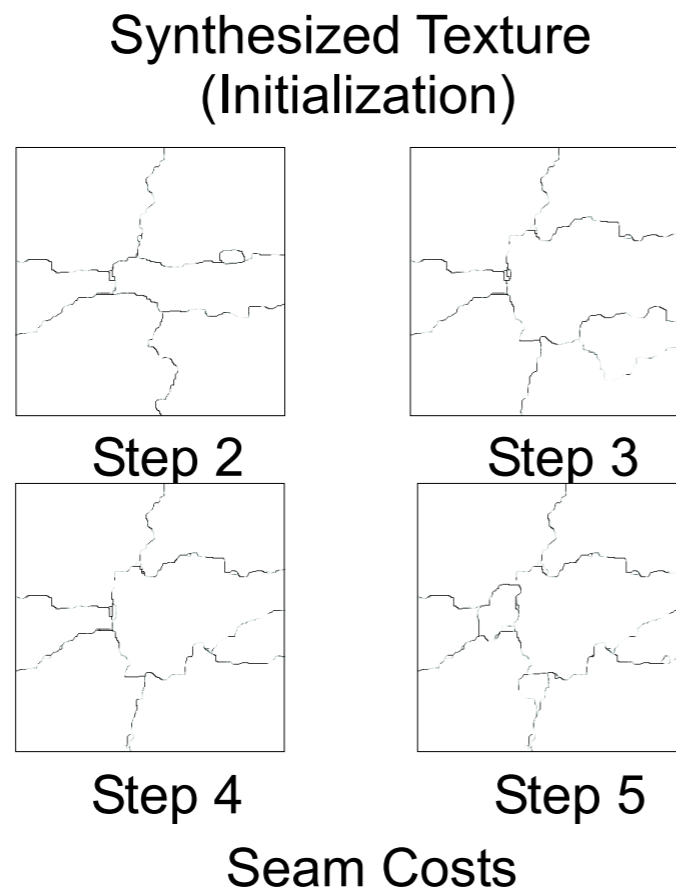
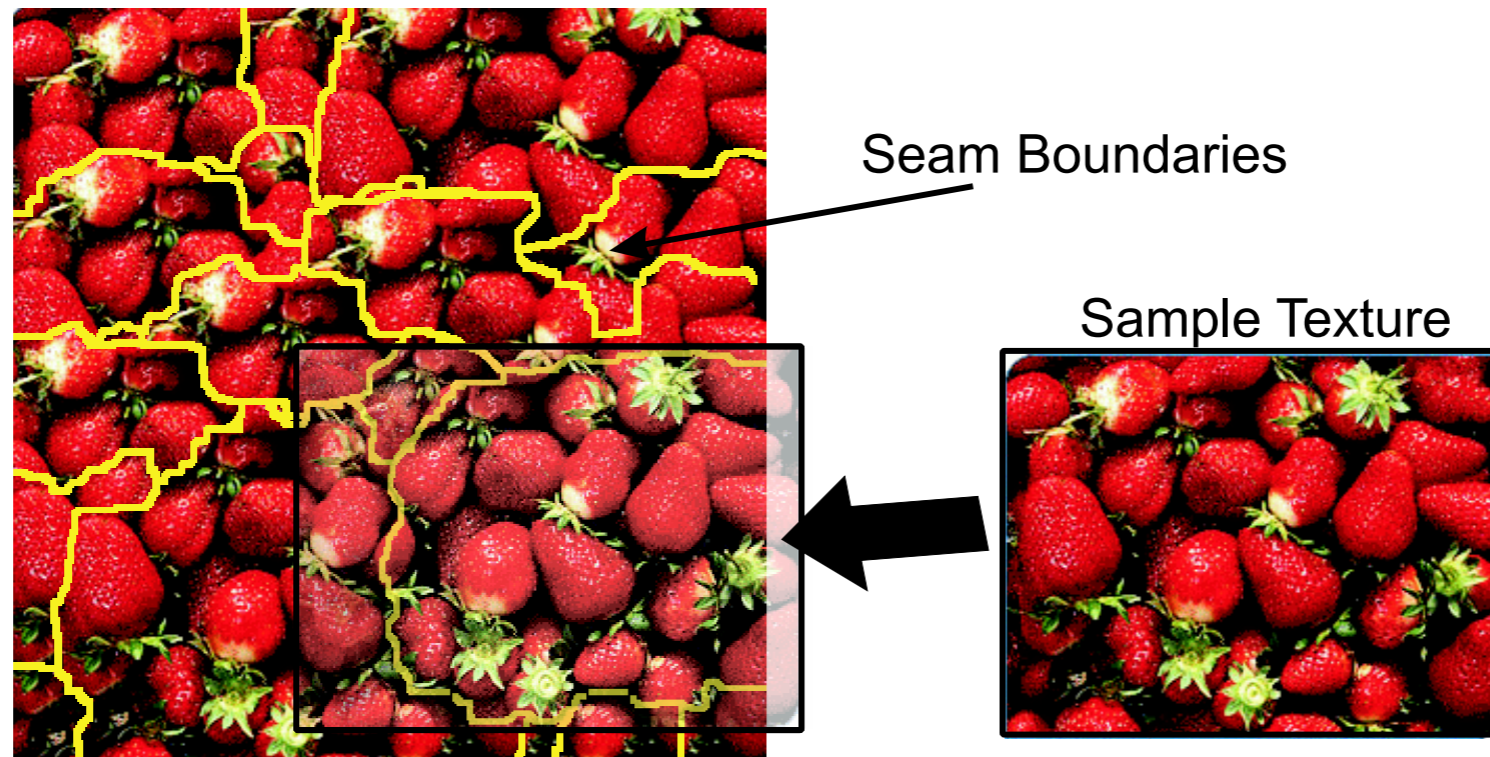
CS6640 Computational Photography

13. Graph Cut Optimization

Stitching a wide-angle view

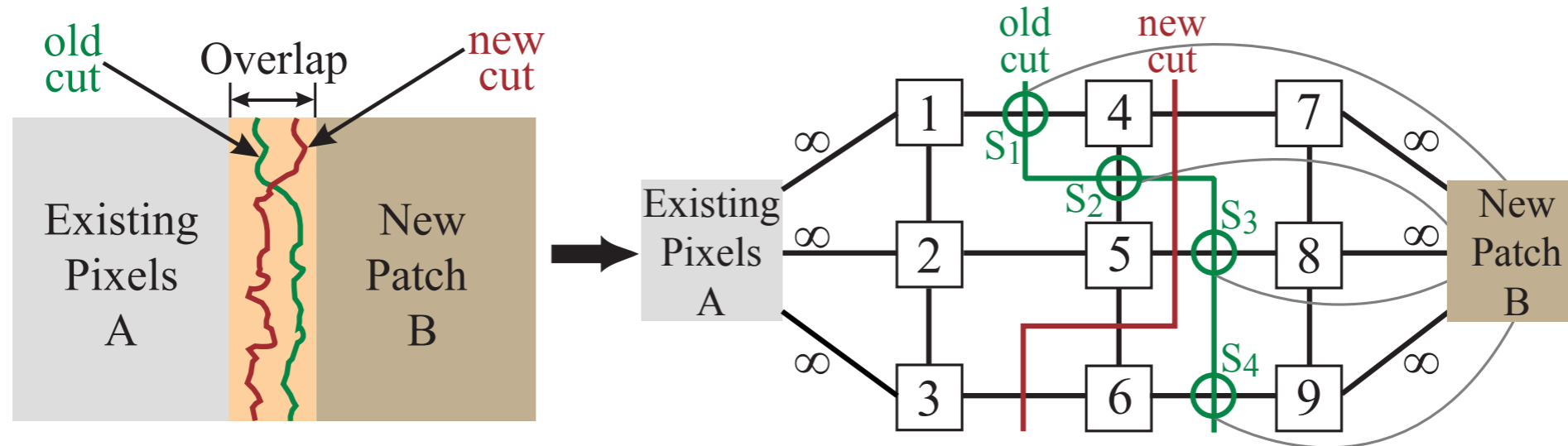
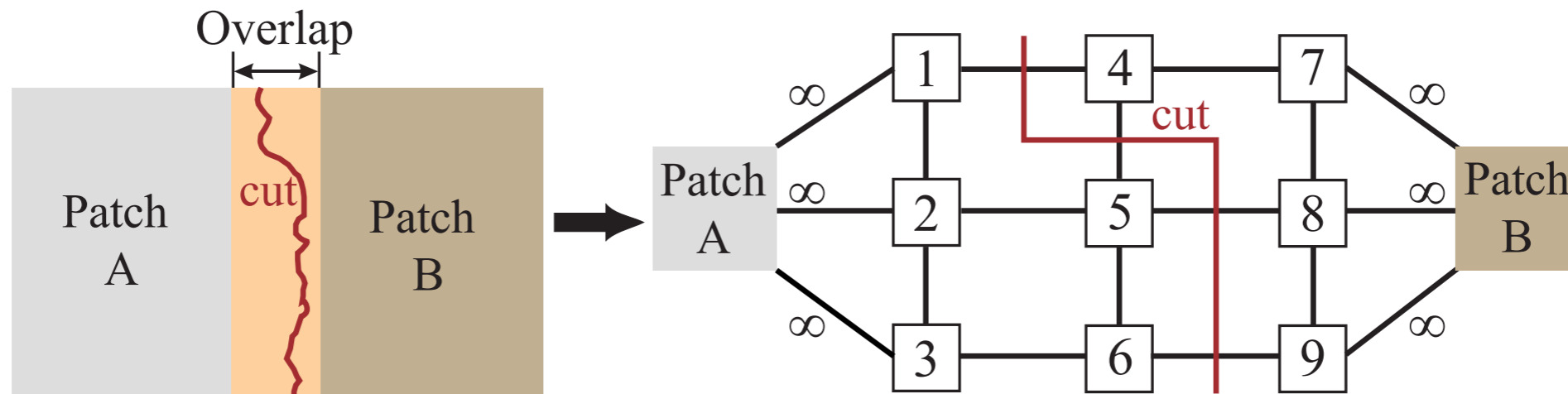


Texture synthesis with graph cuts



[Kwatra et al. 2005]

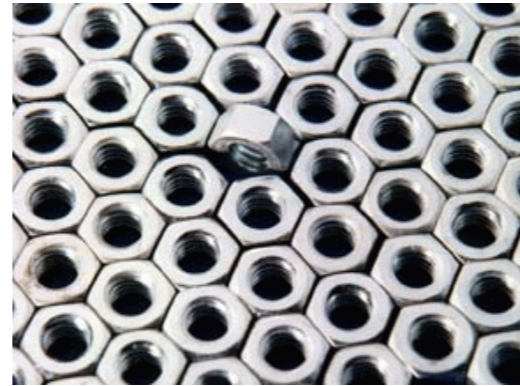
Accounting for existing seams



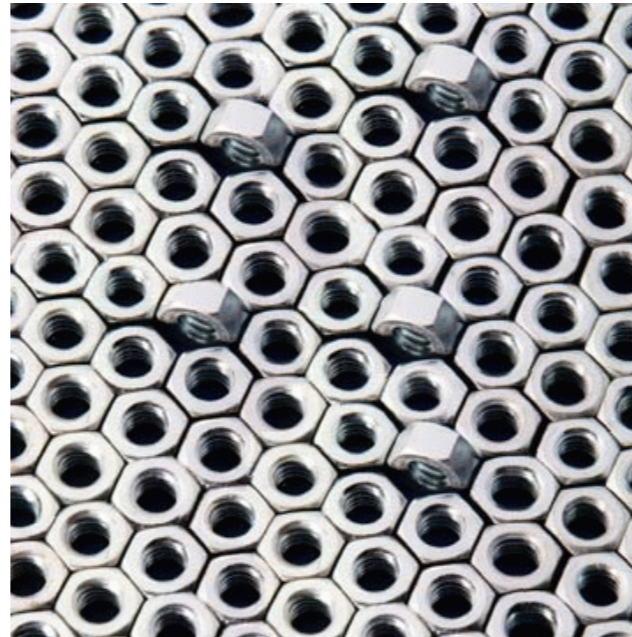
[Kwatra et al. 2005]

Graph cut texture results

... of a visual cortical neuron—the m...
... describing the response of that neuro...
... ht as a function of position—is perhap...
... functional description of that neuron...
... seek a single conceptual and mathem...
... scribe the wealth of simple-cell recep...
... id neurophysiologically¹⁻³ and inferred...
... especially if such a framework has the...
... it helps us to understand the functio...
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... ussians (DOG), difference of offset C...
... rivative of a Gaussian, higher derivati...
... function, and so on—can be expect...
... mple-cell receptive field, we noneth...

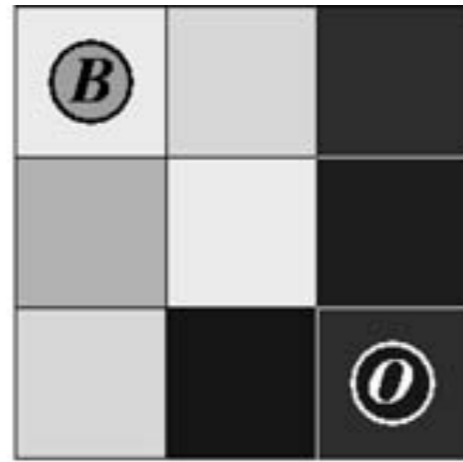


... of a visual cortical neuron—the the wealth of simple-c...
... describing the response of that neurophysiologically¹⁻³ and...
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[Kwatra et al. 2005]

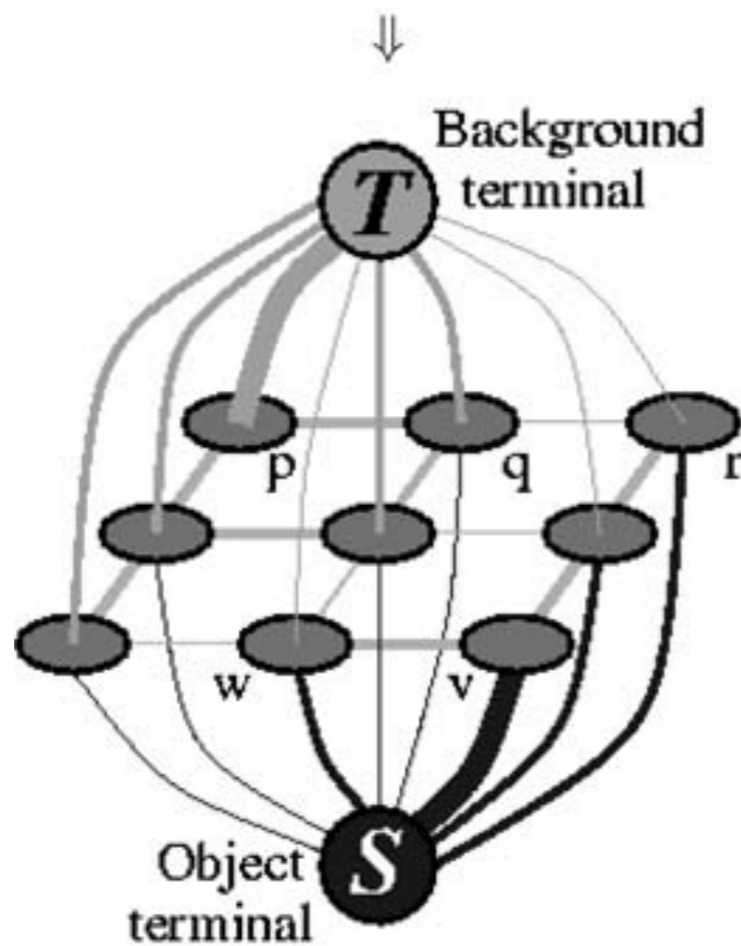
Segmentation with graph cuts



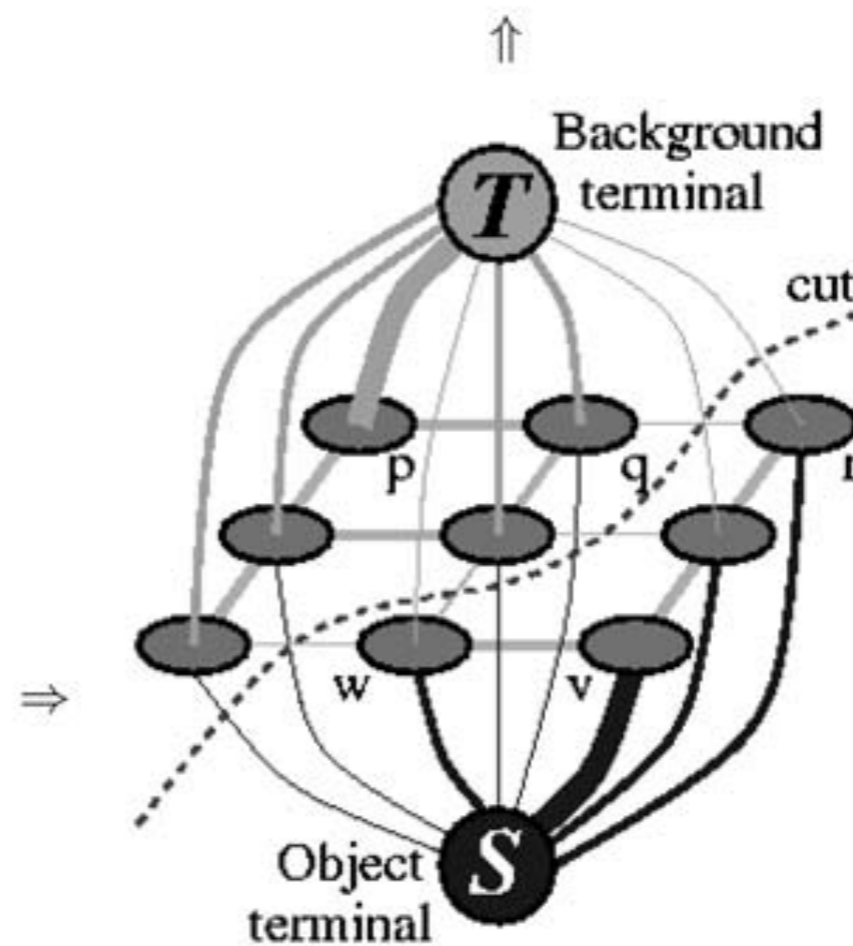
(a) Image with seeds.



(d) Segmentation results.



(b) Graph.



(c) Cut.

[Boykov & Funka-Lea 2006]

α -Expansion



[Boykov et al. 2001]

α -Expansion algorithm

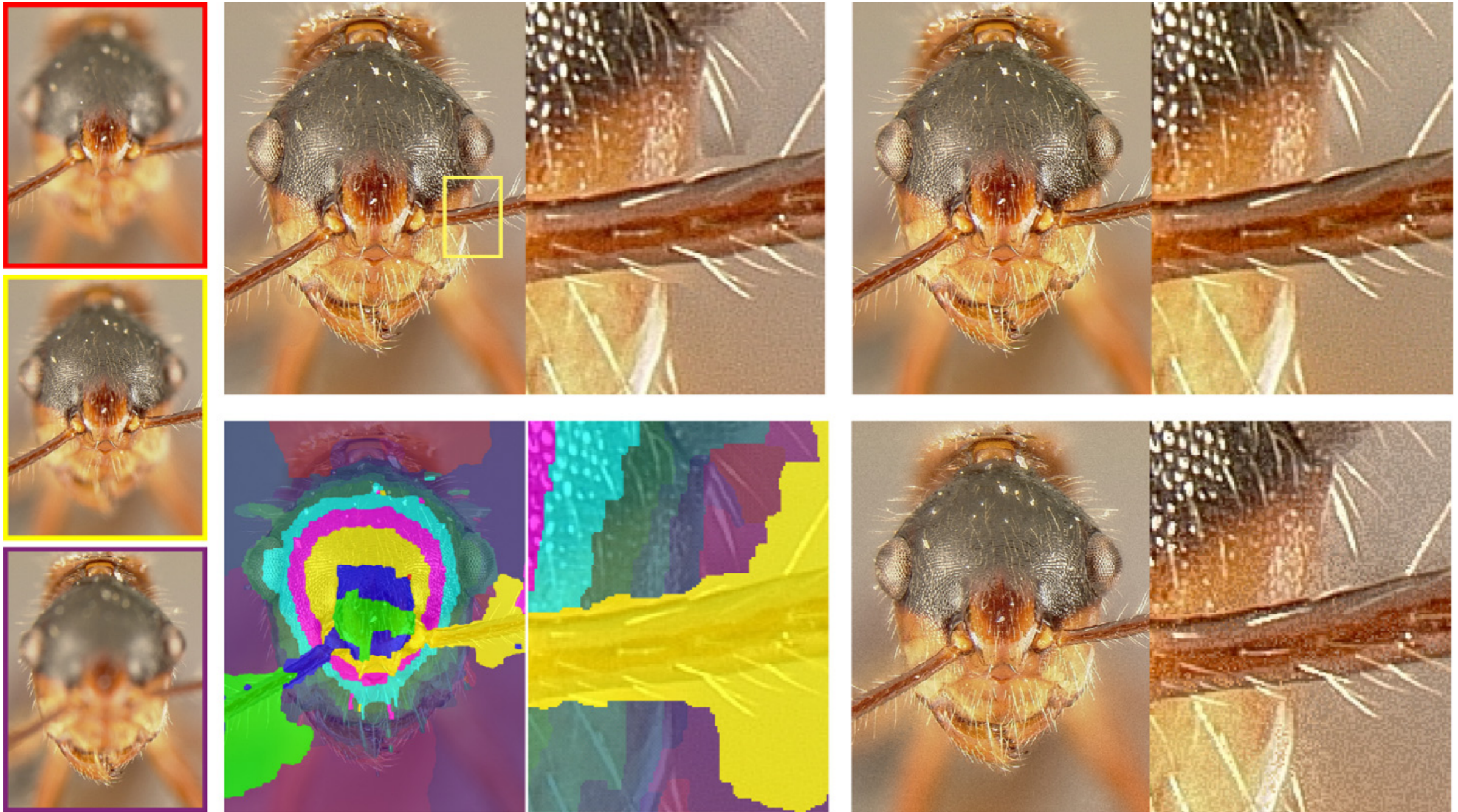
1. Start with an arbitrary labeling f
2. Set `success := 0`
3. For each label $\alpha \in \mathcal{L}$
 - 3.1. Find $\hat{f} = \operatorname{argmin} E(f')$ among f' within one α -expansion of f
 - 3.2. If $E(\hat{f}) < E(f)$, set $f := \hat{f}$ and `success := 1`
4. If `success = 1` goto 2
5. Return f

Multi-way cuts: Photomontage



Figure 1 From a set of five source images (of which four are shown on the left), we quickly create a composite family portrait in which everyone is smiling and looking at the camera (right). We simply flip through the stack and coarsely draw strokes using the *designated source* image objective over the people we wish to add to the composite. The user-applied strokes and computed regions are color-coded by the borders of the source images on the left (middle).

Multi-way cuts: Photomontage



[Agarwala et al. 2004]