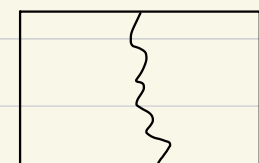


image retargeting

- resizing
- reshuffling
- recompositing
- inpainting

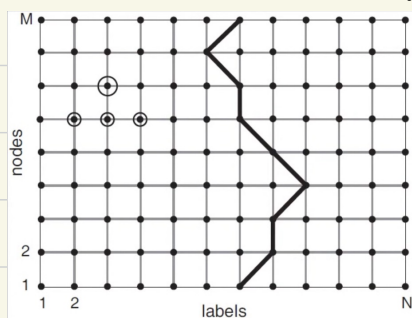
seam carving:

what makes a good seam? (removing it should be imperceptible)



seam energy for seam S

$$E(s) = \sum_{(x,y) \in s} \left| \frac{\partial I}{\partial x}(x,y) \right| + \left| \frac{\partial I}{\partial y}(x,y) \right|$$



for reducing size:

remove seams

for increasing size:

add new pixels at lowest-cost seams

seam carving for inpainting

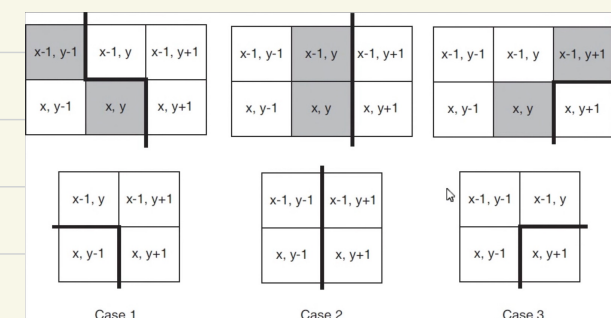
remove k seams that are forced to go through object

add k seams so get back original size

To protect a region, give it ∞ cost

original seam carving looked backward;

better: look forward: what new edges would be introduced if we removed this seam



even better: bidirectional similarity

original image I, retargeted image I'

principles: I' should be completed

i.e should contain as much visual info from I as possible

- I' should be coherent, no new visual info that wasn't in I

cost function: best match in I' best match in I

$$D(I, I') = \frac{1}{N} \sum_{\psi \in I} \min_{\psi' \in I'} d(\psi, \psi') + \frac{1}{N'} \sum_{\psi' \in I'} \min_{\psi \in I} d(\psi, \psi')$$

N: patches in I completeness coherence

patches: blocks of pixels at multiple scales(sizes)

how does pixel j in I' contribute to this cost function?

it will be a member of w^2 $w \times w$ patches in I'

contribution:

$$\sum_{k=1}^{w^2} \|I(i_k) - I'(j)\|^2$$

optimize over this

The other way(completeness) is less certain