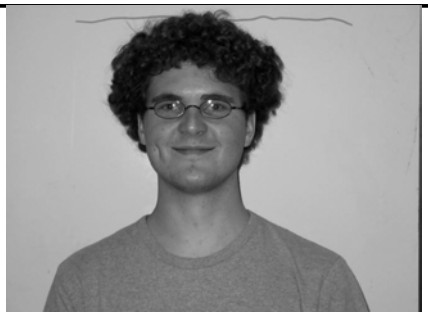
cs155 – z sweedyk

digital image processing

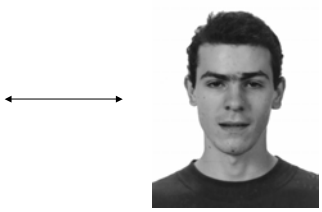
types of techniques

- simple pixel modification
- interpolation/extrapolation
- compositing
- convolution
- dithering
- warping
- **morphing**
- misc. effects

morphing



Morphing

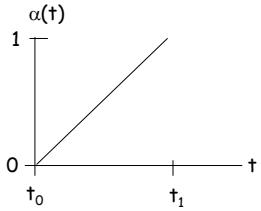


fabio

young fabio

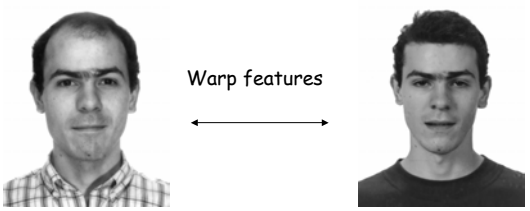
blending across time

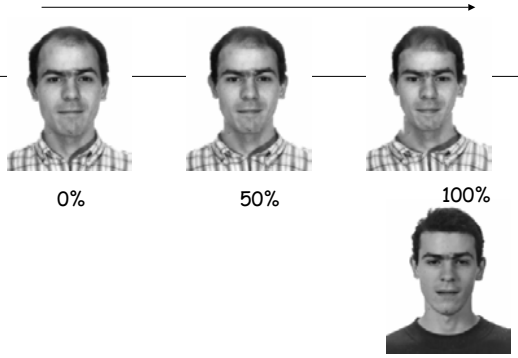
$\alpha(t)I_0+(1-\alpha(t))I_1$

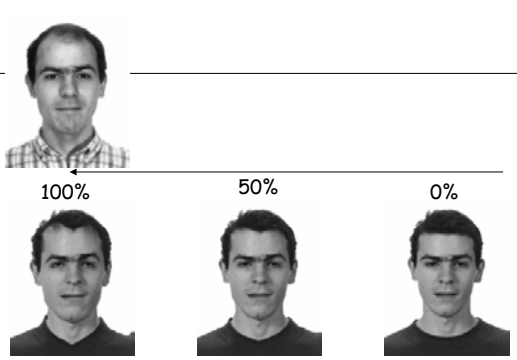


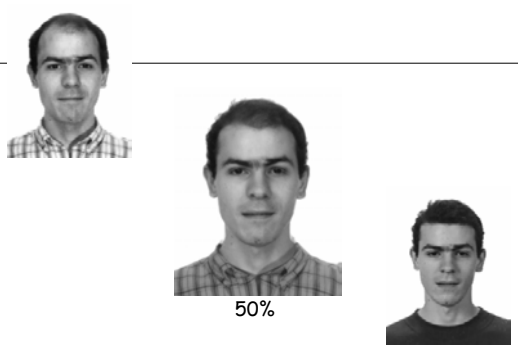
Blending

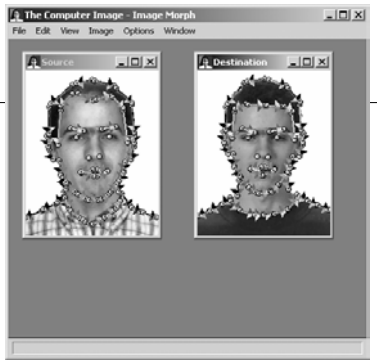

Blend
Morph=Warp+Blend


Warp features


warps
0%
50%
100%

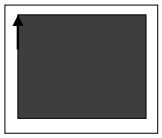

warps
100%
50%
0%


50%


The Computer Image - Image Morph
File Edit View Image Options Window
Source
Destination

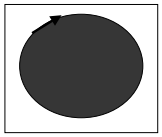
specifying the warp: one feature

image 1

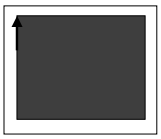


specify pair of directed lines segments that relate "feature" in two images

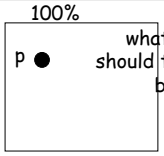
image 2



Computing the warp: one feature

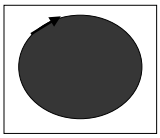


100%

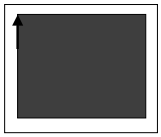


p

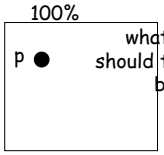
what color should this pixel be?



Computing the warp: one feature



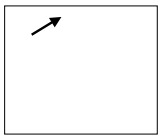
100%



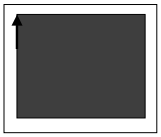
p

what color should this pixel be?

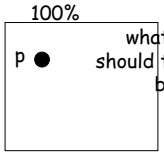
All that matters in destination is position of feature.



Computing the warp: one feature



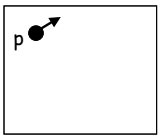
100%



p

what color should this pixel be?

Where is p relative to destination feature?

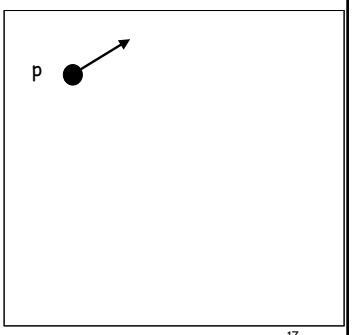


p

Computing the warp: one feature

Where is p relative to destination feature?

Ans: exactly at the tail

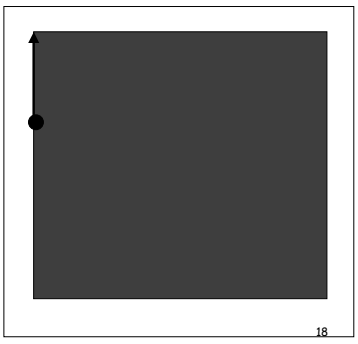


p

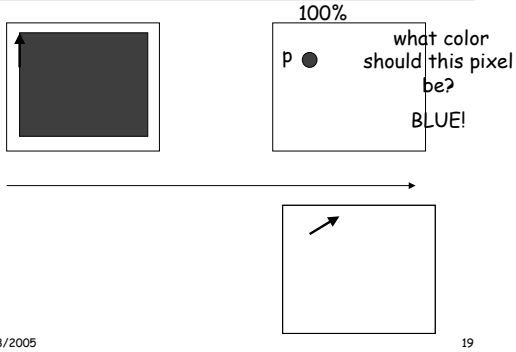
Computing the warp: one feature

what color is corresponding point in source image?

Ans: blue

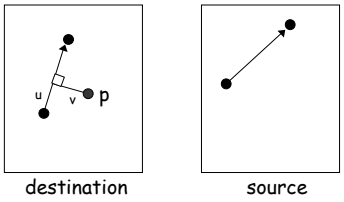


Computing the warp: one feature



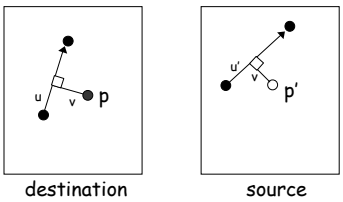
Computing the warp: one feature

u is fraction along line, v is distance to line

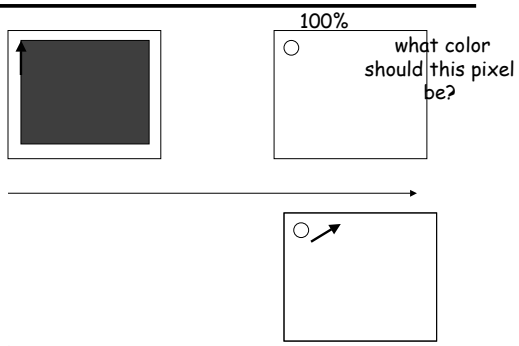


Computing the warp: one feature

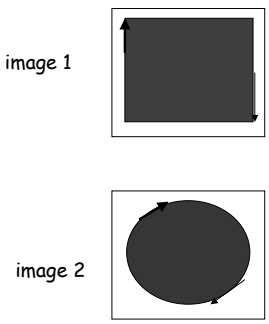
u is fraction along line, v is distance to line



Computing the warp: one feature

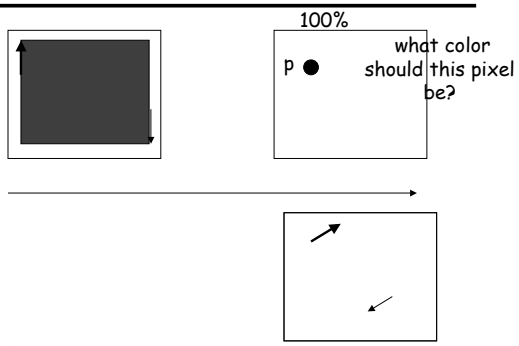


specifying the warp: Multiple features



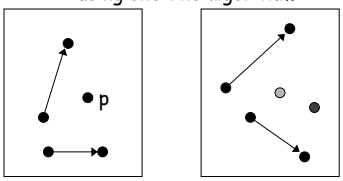
specify pairs of directed lines segments that relate "feature" in two images

Computing the warp: one feature

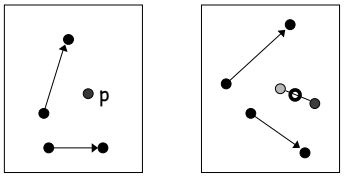


Computing the warp: multiple features

compute source for each pair of lines
using one-line algorithm



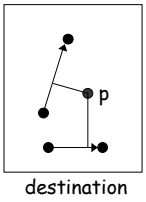
Computing the warp: multiple features



compute
weighted
average of
all points

weights

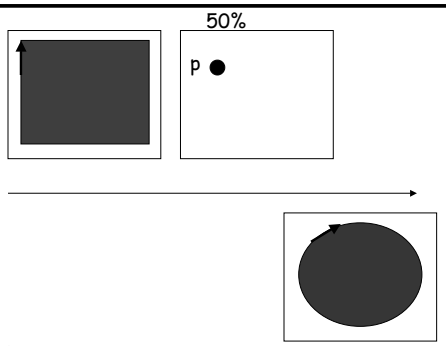
weight for line depends on relative distance to pixel p



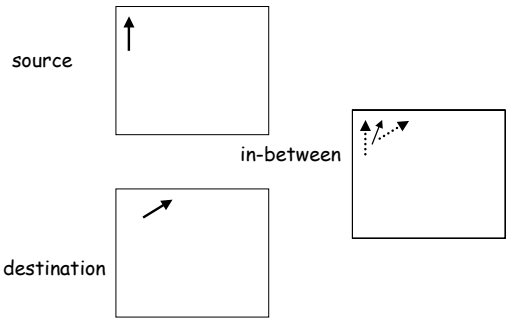
$w = (L^c/(a+d))^b$

where L is the length of the line segment,
d is the distance from p to the line segment,
a, b, and c are parameters to control the effect

Computing the warp: in between

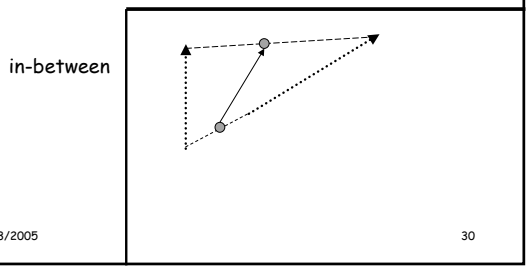


compute half-way in between line

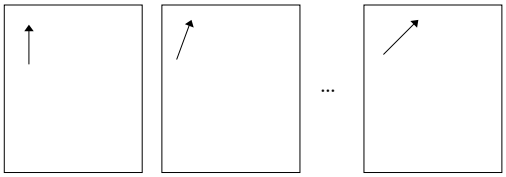


compute half-way in between line

interpolate end points



each line moves in time



do it yourself