

## types of techniques

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

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## dissolve

- film/video technique to fade from one shot to another

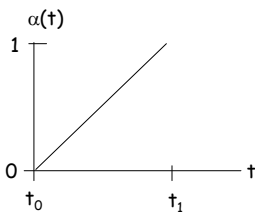
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## blending across time

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

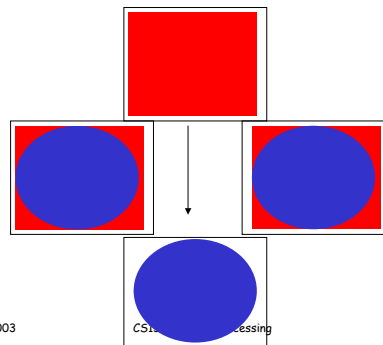


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## blending example

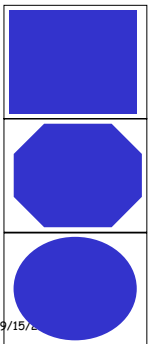


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## morphing = **warping** + blending

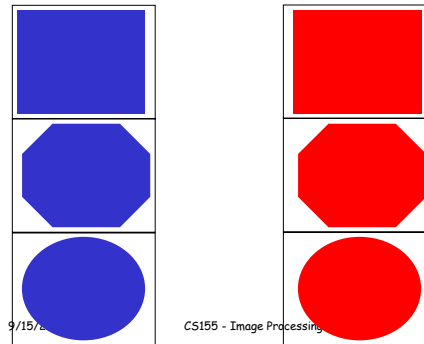


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## morphing = **warping** + blending

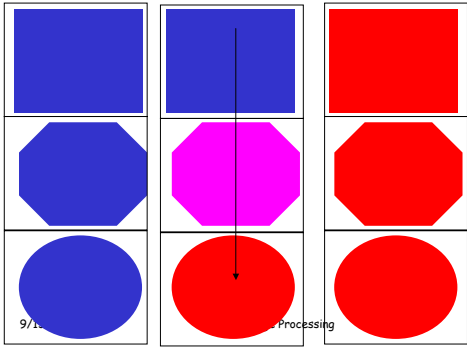


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## morphing = warping + blending



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## morphing how to

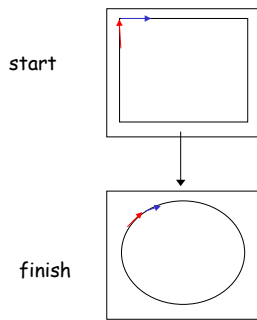


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## specifying the warp

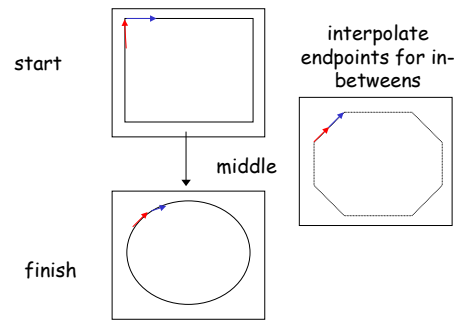


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## specifying the warp

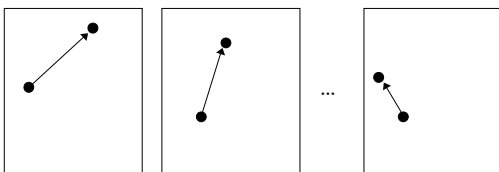


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## each line moves in time

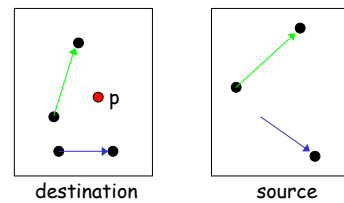


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## computing the warp between adjacent images

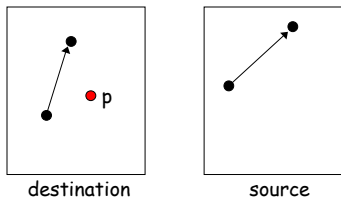


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## computing the warp between adjacent images-single line



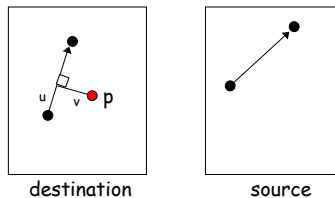
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## warp - single line

u is fraction along line, v is distance to line



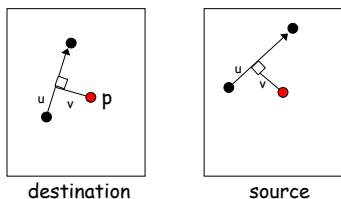
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## warp - single line

u is fraction along line, v is distance to line



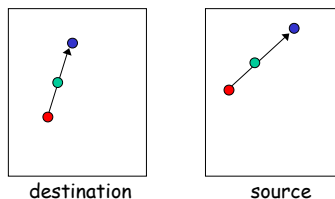
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## warp - single line

consider some special cases



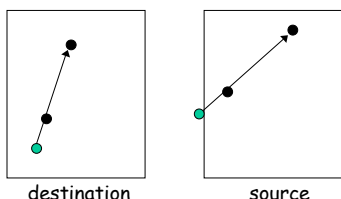
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## warp - single line

consider some special cases

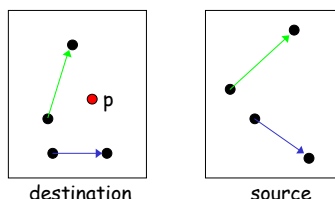


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## warp - multiple lines



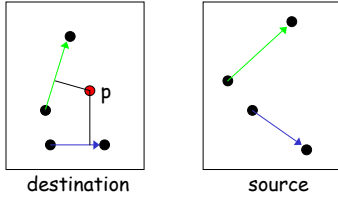
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## warp - multiple lines

compute weight for each line pair based on distance to p in destination

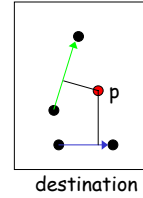


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## weight



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

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

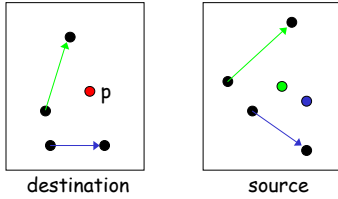
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## warp - multiple lines

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



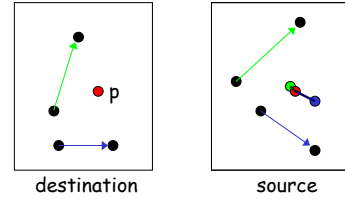
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## warp - multiple lines

compute displacement from p to each source point



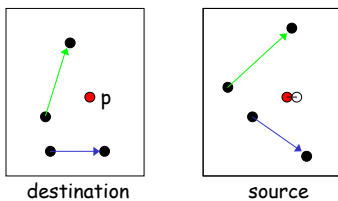
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## warp - multiple lines

compute weighted displacement from p in source



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## demo

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## do it yourself

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