

Compositing & Matting

Topics in Image-Based Modeling and Rendering

CSE291 J00

Lecture 10

CS348, Fall 2001

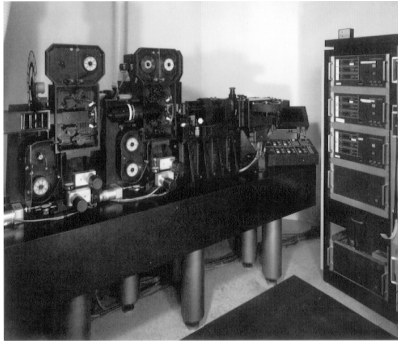
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- J. F. Blinn, Jim Blinn's Corner: Compositing, Part 1: Theory, IEEE Computer Graphics and Application, 14(5), Sept. 1994, pp 83-87
- D. Zonker, D.M. Werner, B. Curles and D.H. Salesin Environment Matting and Compositing , SIGGRAPH 1999, pp. 205-214
- Environment matting extensions: towards higher accuracy and real-time capture Yung-Yu Chuang, Douglas E. Zongker, Joel Hindorff, Brian Curless, David H. Salesin, Richard Szeliski , SIGGRAPH 2000, pp. 121 - 130
- Video matting of complex scenes Yung-Yu Chuang, Aseem Agarwala, Brian Curless, David H. Salesin, Richard Szeliski
- M. Koudelka, S. Magda, P. Belhumeur, D. Kriegman, "Image-based Modeling and Rendering of Surfaces with Arbitrary BRDFs," IEEE CVPR, 2001, pp.568-575 (primarily Section 3.3)

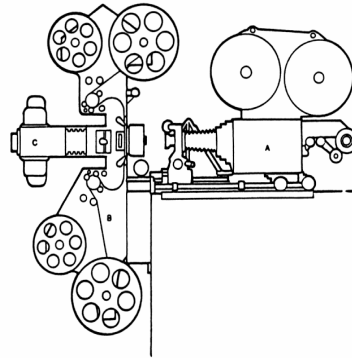
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Optical Printing



From: "Industrial Light and Magic,"
Thomas Smith (p. 181)



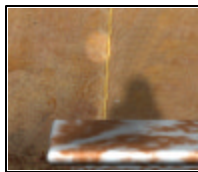
From: "Special Optical Effects,"
Zoran Perisic

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From Pat Hanrahan's slides

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Composing Two Elements



Background



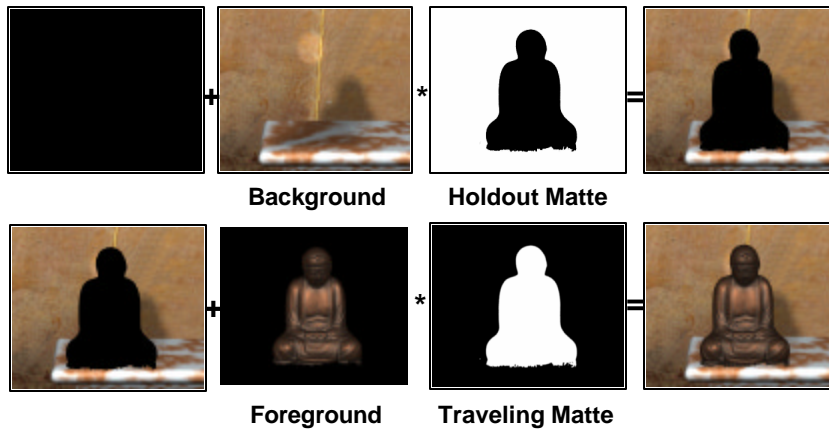
Foreground

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“Pulling a Matte” - Matte Creation

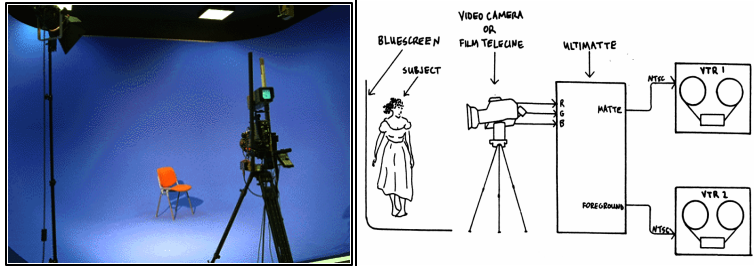
- From digitized images
 - Blue-screen matting (Petro Vlahos)
 - Separate blue background from foreground image
 - Video or chroma-keying
 - Range of chromaticities marked transparent
 - Image processing
 - Set of colors marked transparent, region growing ...

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Blue Screen



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More examples

Weather Reports

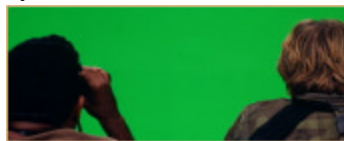
Done electronically using
blue channel



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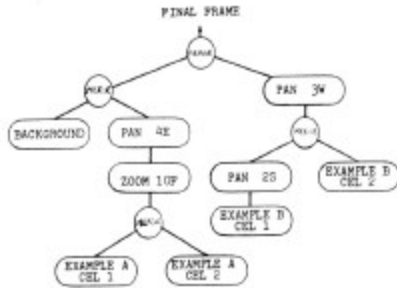
Cinema Special Effects

Of course, nothing
special about blue



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Compositing trees



(Bruce Wallace, Siggraph 1981)

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Digital Matting Equation: For each pixel

$$C = \alpha F + (1 - \alpha)B$$

C: Rendered Color

F: Foreground color

B: Background color

α : Amount of light passing through the foreground – called the Alpha-Channel

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Challenges to Matting & Compositing

1. How do you extract the Matte (alpha channel) from natural scenes?
2. How do you handle the occluding contour?
3. What happens if foreground has color of background?
4. What about refracted and reflected light between layers?

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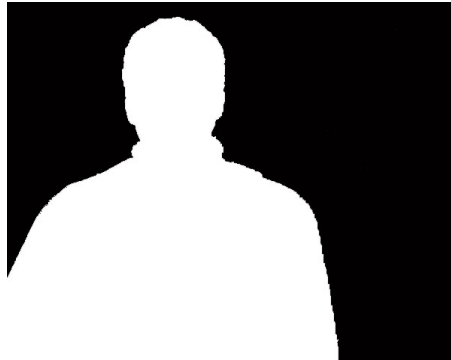
Problems?



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Matte Image



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Problems?



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Determining Alpha α boundary

The problem:

Given a measured color (r,g,b),
determine F, G, and α

Under constrained, many solutions
proposed.

Using two backdrops

When color of foreground object has same color as backdrop,
then matte won't be computed accurately.

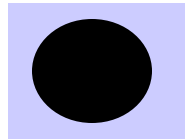
Alternative: Use two backdrops of two colors



Using two backdrops

When color of foreground object has same color as backdrop,
then matte won't be computed accurately.

Alternative: Use two backdrops of two colors



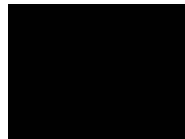
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Using two backdrops

When color of foreground object has same color as backdrop,
then matte won't be computed accurately.

Alternative: Use two backdrops of two colors



**For each pixel, if color is different from background in
one image, background is occluded.**

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