An (Incomplete) Overview of Computer Graphics

Steven Tanimoto

Adapted from materials by Brian Curless and Daniel Leventhal

CSE 457
Spring 2012

Welcome!

CSE 457 Teaching Staff:

Steve Tanimoto, Instructor

Molly Soliday, head TA

Joseph Buckley, TA

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Major areas in Computer Graphics

Image processing

Modeling

Rendering

Simulation

Animation

Visualization

Hardware

I/O

User interfaces

Image-based modeling and rendering

Major areas in Computer Graphics

Image processing

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Rendering

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User interfaces
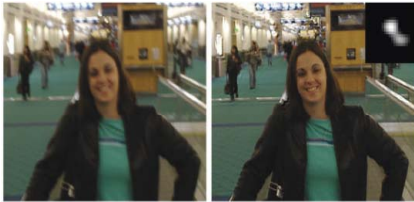
Image-based modeling and rendering

Impressionist

Matting and Compositing

Removing Camera-Shake Blur

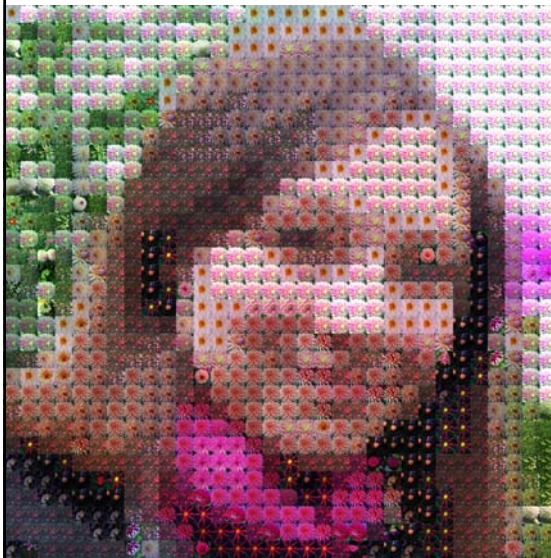## Video Completion

Video Completion

Digital Arts

photo credit: Bruce Hemingway.

photo processed by S. Tanimoto to identify pixels where Blue=0 as white and all others as black.
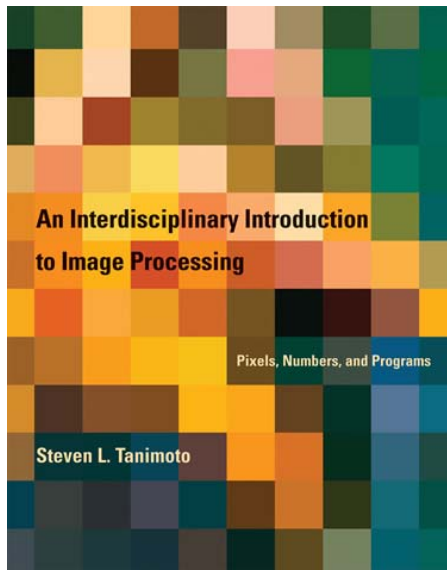
Photomosaics

Photomosaics

Database of flower images for photomosaicking. Taken at the Dahlia Society garden at Volunteer Park, Seattle. (S. Tanimoto, 2010).

Additional Reference on Image Processing

An Interdisciplinary Introduction to Image Processing

Pixels, Numbers, and Programs

Steven L. Tanimoto

Published by MIT Press, to appear May 2012.

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Major areas in Computer Graphics

Image processing	Visualization
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Animation	

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Modeling

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Modeling

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Rendering

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Rendering

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Ray tracing

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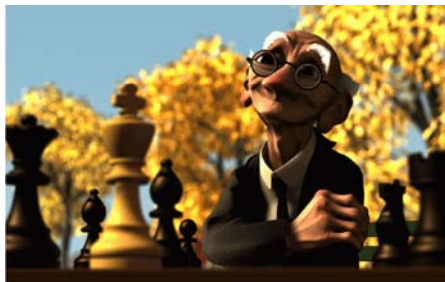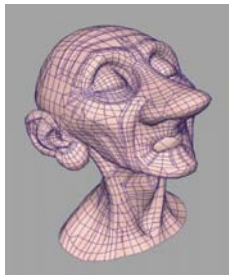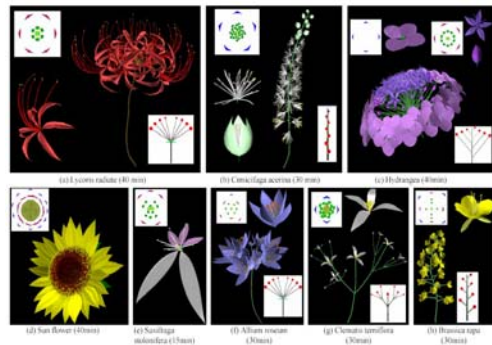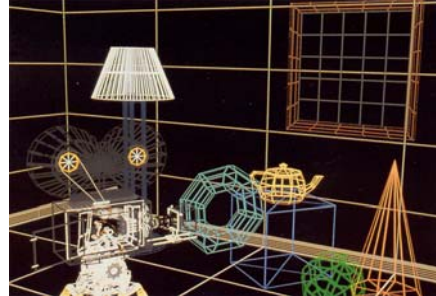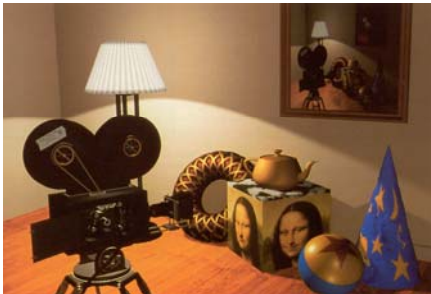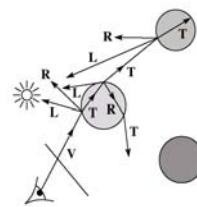
Rendering

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Major areas in Computer Graphics

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Animation

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Animation
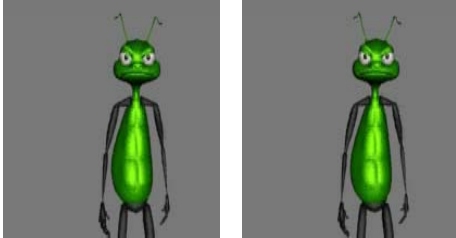
Animation

More broadly animation is about making "movies" and encompasses:

- ◆ **Story**
- ◆ **Art design**
- ◆ **Cinematography**
- ◆ **Modeling**
- ◆ **Motion**
- ◆ **Rendering**

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Scientific visualization

Visualization of an F3 Tornado
within a Supercell Thunderstorm Simulation

Computation and Visualizations
National Center for Supercomputing Applications
University of Illinois at Urbana–Champaign

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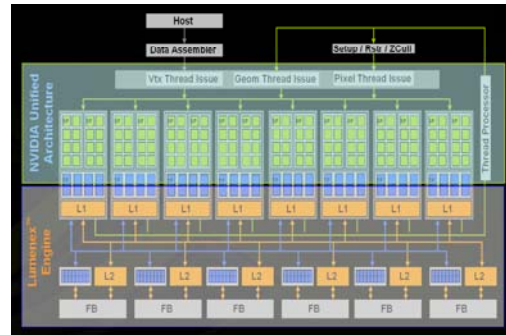
Hardware

Hardware

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User interfaces

User interfaces

Multimodal Input

Kinect: Depth, RGB, audio mic. array.

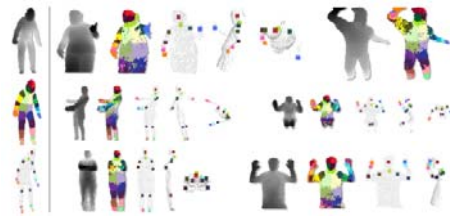Enables whole-body and multi-body interfaces.

credit:
Microsoft

Speckle pattern in Kinect depth sensing. Credit: Audrey Penven.

Multimodal Input: Human Pose Analysis

Pose recognition studies by Shotton et al, using learned features from Kinect data.

Multimodal Input: Human Pose Display

Standard skeleton display (in real time) from
PrimeSense, inventor of the Kinect.

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Image-based modeling and rendering
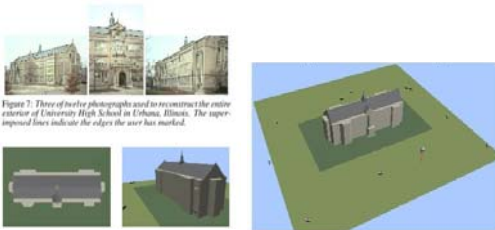
Image-based modeling and rendering

Figure 9: *A synthetic view of University High School. This is a frame from an animation of flying around the entire building.*

Reconstruction from Internet photos