



DAB: Interactive Haptic Painting with 3D Virtual Brushes

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Motivation

Recent advances in computer graphics have made progress with reproducing the look of painting. This project explores the benefits of recreating the “sight, touch, action and feeling” of the artistic process itself.

Our system, DAB, provides the user with the traditional tools of a painter. This setting, conceptually equivalent to a real world painting environment, allows anyone to control a virtual brush as he or she would a real brush.

To achieve this, we have designed a physically based, deformable, 3D brush model and bi-directional, two-layer, paint model. These allow the user to produce complex brush strokes intuitively. The haptic feedback enhances the sense of realism and provides tactile cues that enable the user to better manipulate the paint brush.



A canvas and palette are provided

Brush Model

We model the brush head as a subdivision surface mesh wrapped around a spring-mass particle system skeleton. The particle system reproduces the basic motion and behavior of a brush head, while the deformable mesh skinned around this skeleton represents the actual shape of the head.

Highlights

- Interactive use of a physically based paint brush and paint model with haptic feedback
- Natural interface via simulation of traditional artists’ tools rather than complex user interface



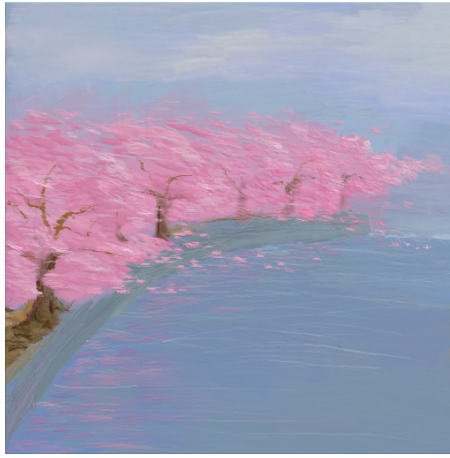
Haptic painting system setup.

Paint Model

Complementing our expressive brushes, we present a paint model capable of capturing complex effects interactively. Our paint model incorporates variable wetness and opacity, conservation of volume, and a hardware-accelerated bi-directional paint transfer algorithm. It supports the following operations and techniques expected from acrylic or oil painting: blending, bi-directional transfer, complex brush loading, variable dryness, glazing, and impasto.

Type	Examples	Model	Structure	Surface	Example Strokes	
Round						
Flat/Bright						
Filbert						

Examples of real brushes, our model for each, and example strokes.



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Selected Publications

Baxter, W., V. Scheib, M. Lin, and D. Manocha. "DAB: Interactive Haptic Painting with 3D Virtual Brushes," Computer Graphics, Proc. ACM SIGGRAPH 2001.

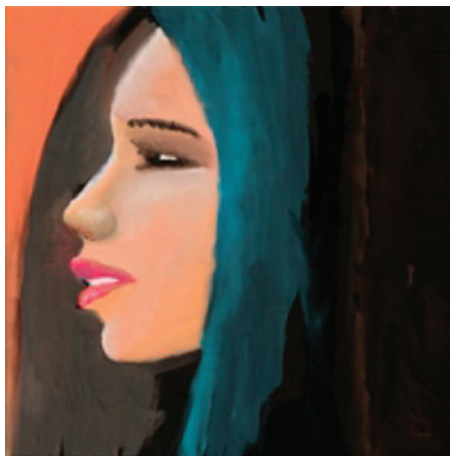
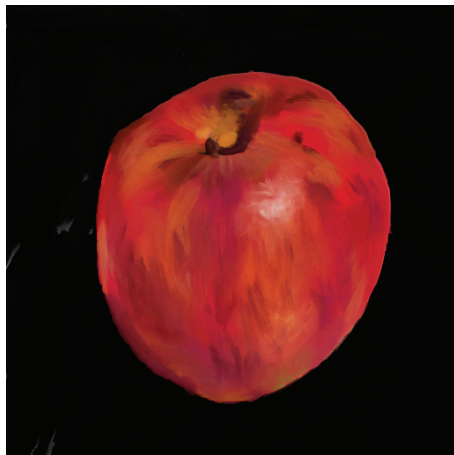
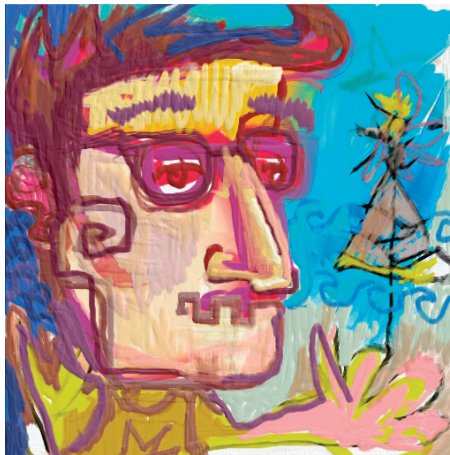
Baxter, W., V. Scheib, M. Lin, and D. Manocha. "DAB: Interactive Haptic Painting with 3D Virtual Brushes" (video), ACM SIGGRAPH 2001 Electronic Art & Animation Catalog.

Key Words

Haptics; human-computer interaction; painting systems; applications

For More Information

www.cs.unc.edu/~geom/DAB/



Paintings created with DAB by:

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