Dream Brush: Generative Painting with Chinese Calligraphy

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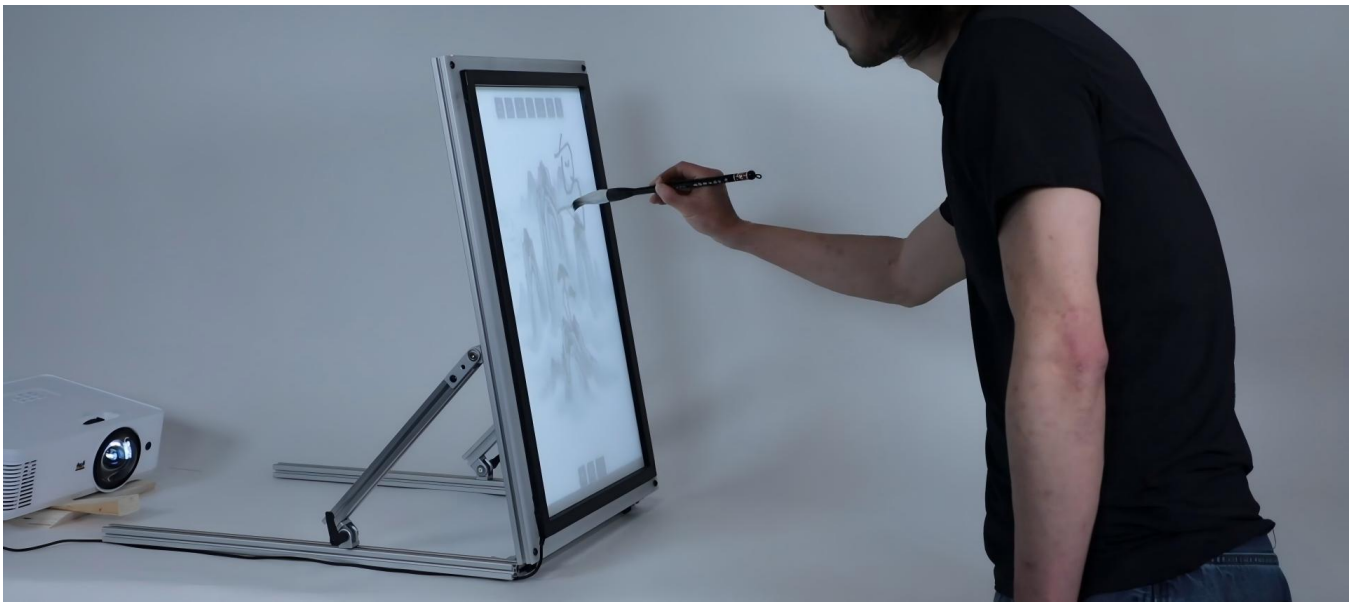

Figure 1: Dream Brush is a tangible AI-driven system that turns Chinese calligraphy writing into a Chinese painting.

Abstract

Dream Brush is an interactivity demo that explores how embodied writing can guide generative image-making. As generative tools move creative practice toward detached prompting, we ask how a brush, a body, and a Chinese character can keep meaning and gesture in one mark. We built a physical installation where participants write Chinese characters with water on a canvas and watch the system transform each mark into Chinese painting motifs with sound. Informal use suggests the approach makes spatial intent and composition legible while inviting shared improvisational making. The system still has limitations in targeting irregular regions and in rendering the ink metaphor with smooth transitions. In the near term, Dream Brush can support public demos that surface how generative systems mediate cultural practices of writing and painting. In the long term, it offers a model for interactivity that frames creative systems as encounters with layered cultural and technical relations.

Keywords

Generative AI; Tangible Interaction; Embodied Interaction; Chinese Calligraphy; Human-AI Co-creation; Interactive Installation

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1 Introduction

What happens when a brushstroke is a word and that word becomes the compositional gesture that brings an image into being? Dream Brush is a generative AI painting experience where people use a real brush with water to write Chinese characters on a physical canvas mounted on an easel. The semi-translucent canvas back-projects the live trace, then lets it fade as if drying. In response, the system transforms the written marks into Chinese painting motifs in real time. Participants steer what emerges through what they write and how they write it, including the content, placement, orientation, and scale of each inscription.

We submit Dream Brush as a DIS Interactivity artifact that makes the creative act legible as an encounter between embodied craft and generative systems. Chinese characters are a productive substrate because their marks can carry meaning while remaining gestural and pictorial. Historical accounts of Chinese painting describe writing and painting as different names of the same body, with shared origins in marking practices that express both meaning and form [1]. Dream Brush uses that continuity to shift generative media away from detached prompting and toward situated mark-making that emphasizes the layered cultural and technical relations at stake in interactivity.

This paper makes the following contributions:

(1) An interactivity demo that links Chinese character inscription to incremental image and sound generation in a public installation.
(2) An interaction design that treats writing as a spatial control for composition and temporal unfolding.
(3) Reflections from informal use that highlight social co-creation, improvisation, and current limitations.

2 Related Work

Dream Brush builds on work that treats brush-based interaction as a bridge between embodied making and computation. Ryokai et al. introduce I/O Brush, a physical brush that samples color, texture, and movement as ink for drawing [2]. Dream Brush similarly insists on the brush and the environment as part of the creative loop, but uses Chinese character inscription as the sampled substance, a stroke that is both gesture and concept. This emphasis draws from historical accounts in which writing and painting are intertwined practices rather than separate input modes [1]. The system also aligns with critiques of making as the execution of a fixed plan. Ingold argues that skilled practice follows materials and flows, with form emerging through responsive, ongoing adjustment rather than the imposition of preconceived form [3]. Dream Brush operationalizes this stance through fading traces and incremental repainting that invite forward, improvisational making with a generative partner.

3 Dream Brush

3.1 Experience and interaction

A participant wets a calligraphy brush with water and writes Chinese characters on a physical canvas mounted on an easel. The canvas shows a back-projected trace of the brushstroke that visibly dries over a few seconds. With the first inscription, a full-frame Chinese painting appears along with a related sound. The system may suggest related concepts to write next.

As the participant continues, each new inscription becomes an intervention into an already unfolding scene. Participants can write at chosen locations, sizes, and orientations, including multiple characters arranged horizontally or vertically. The system interprets each inscription through coupled constraints. Size influences how much of the image is repainted. Location controls where the change occurs. Context mediates replacement, modification, or addition. Semantics can trigger literal depiction or broader stylistic shifts such as weather or time of day.

3.2 System and implementation

Dream Brush couples a physical demo setup with a multimodal generation pipeline. On each stroke, the handwritten character is captured as an image and recognized with a vision model. The recognized text becomes the concept prompt for image generation. To support incremental composition, the system marks the stroke location with a bounding region and provides that region as visual context, instructing the image model to paint the prompted concept inside the region while keeping the rest of the image stable.

In parallel, the recognized text is sent to a text-to-sound model to produce an accompanying sound effect or short melody. When both the updated image and audio are ready, the system replaces the projected canvas image and plays the sound.

The hardware consists of a metal easel and semi-translucent matte canvas for back-projection, an infrared sensing setup surrounding the canvas for brush detection, a calligraphy brush and cup of water to preserve the feel of brushing without pigment, a speaker for sound, and a computer that coordinates sensing, recognition, generation, and output.

3.3 Design rationale

Dream Brush is designed to stage interactivity as an encounter with layered relations rather than a clean input-output loop. Chinese character inscription keeps meaning and gesture in the same mark, making the continuity between writing and painting available to participants as an experience [1]. Localized repainting makes causality spatial: where you write is where the world changes. It also foregrounds how cultural writing practices can guide technical systems, rather than being reduced to prompts.

The artifact makes latency part of the encounter. Image generation takes about ten seconds, which could collapse the interaction into waiting. Dream Brush addresses this by showing the live stroke immediately and running a short drying animation while generation completes. This visible temporality sustains attention and frames the delay as an unfolding process, supporting a forward-reading rhythm of mark, fade, and response rather than a single prompt and output [3].

4 Reflections

Our reflections come from informal testing and observation of Dream Brush as a live demo.

First, Chinese characters can be more ergonomic than prompting. Participants can write directly in the desired area rather than describe spatial intent in text. A single gesture bundles what is

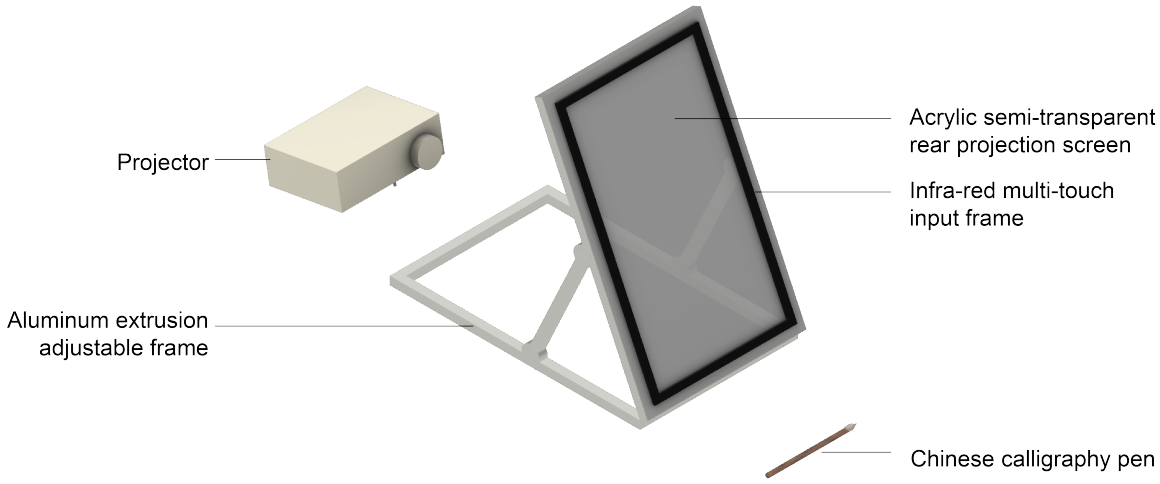

Figure 2: Dream Brush installation with projector, easel, canvas, and brush.

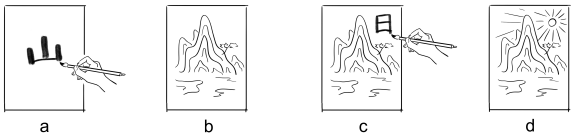

Figure 3: Example of a session with multiple inscriptions and evolving composition. The user writes "山" (mountain) first, causing a full sized mountain to appear as the main subject, then writes a smaller "日" (sun) at a corner, resulting in the sun to appear in the corresponding size and location.

otherwise separated into tool selection, prompt phrasing, and parameter adjustment. Location, size, and semantics are specified together through the inscription. The modular, near-square form of many Chinese characters also supports compositional control, since users can reshape the target area by changing orientation, scale, or by combining multiple characters.

Second, the system becomes social. In early sessions with two groups of high school students, participants built consensus around what to paint next. When the system produced unexpected results, the group discussed strategies and iterated together, treating failure as a shared puzzle. The fade-and-reveal cycle introduced drama. When an update landed well, people cheered. When it failed, the mismatch between intention, recognition, and generation became a source of humor that supported social bonding. We also saw participants test the boundaries of the system, for example by introducing anachronisms such as "airplane" or "train", or by trying negations such as "nothing" or "cancellation".

Third, these observations suggest concrete directions for improvement. The current rectangular bounding region limits the ability to target irregular areas. A future version could shrink the region to the written shape. The image update can still feel abrupt compared to the ink-drying metaphor. A future version could make changes appear as if ink is bleeding into the painting. Beyond object-level depiction, we also want to explore a more poetic variant in which participants write short prose or poetry and the system produces more abstract responses. In the longer term, the same interaction approach could be extended to other writing systems and languages.

5 Conclusion

Dream Brush demonstrates how interactivity can be staged as an encounter between embodied writing and generative systems. The demo keeps meaning and gesture in the same mark, turns spatial inscription into compositional control, and invites social improvisation around a shared canvas. We see this as a contribution to interactivity work that makes visible the layered cultural and technical relations within creative systems, while offering a concrete artifact that can be experienced in person at DIS.

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