Demonstrating Tickle Trunk: A Plug-and-Play Toolkit for Exploring Haptic and Tangible Interaction

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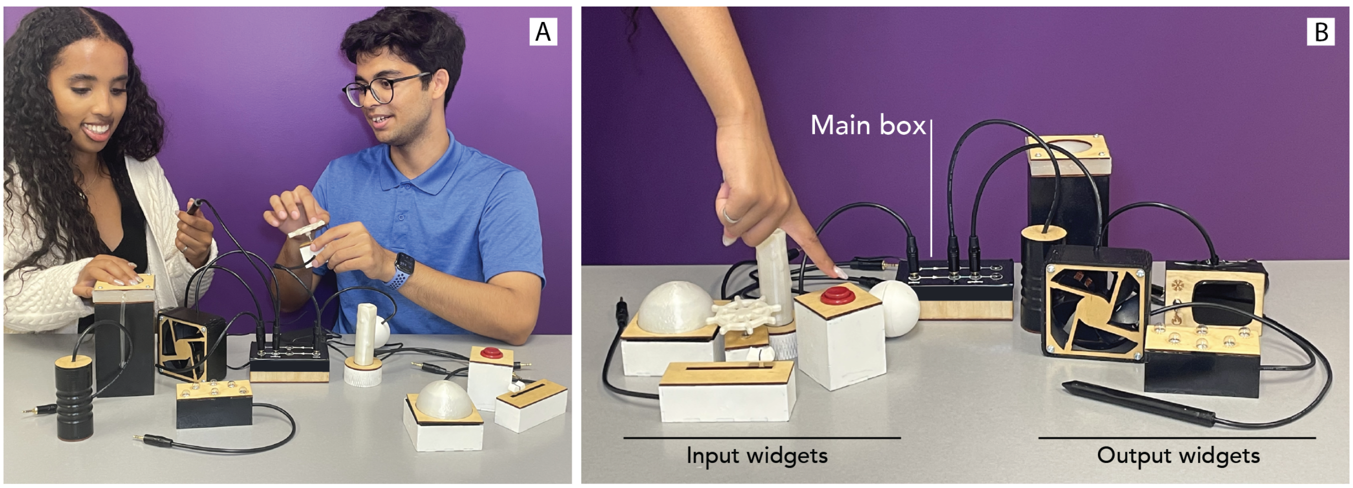

Figure 1: The Tickle Trunk enables exploration across a wide range of physical interaction modalities. By connecting different input and output widgets, designers and collaborators can rapidly explore haptic and tangible experiences without programming.

ABSTRACT

As haptics and tangible interaction are increasingly adopted, designers and collaborators face challenges in developing a shared understanding of physical modalities, materiality, and interaction possibilities. We present the Tickle Trunk, an open-source, hardware-only toolkit for rapid, playful exploration of haptic and tangible interactions. The toolkit consists of plug-and-play input and output widgets that can be combined in seconds without programming. Through modalities such as vibration, wind, pressure, temperature, light, and force feedback, the Tickle Trunk supports early-stage exploration, mutual learning, and brainstorming for mixed-expertise teams. This demo invites attendees to experience the toolkit first-hand, combine widgets, and imagine how diverse physical interactions could support applications in virtual reality, storytelling, accessibility, rehabilitation, education, and creative design.

KEYWORDS

haptics, brainstorming, open-source, hardware sketching

1 INTRODUCTION

Haptics and tangible interaction are increasingly used to enrich experiences with technology, including applications in education, gaming, safety training, medicine, and virtual reality [2, 5, 6, 10]. However, designing haptic experiences remains difficult in mixed-expertise teams because many interaction qualities, such as intensity, texture, pressure, temperature, and force, are difficult to communicate through words alone [8, 9].

This challenge is especially important during early-stage design, where collaborators need to explore what a technology can do before committing to a specific interaction approach. Prior work in haptic sketching and hardware sketching emphasizes the value of low-fidelity physical artifacts for quickly testing, communicating, and refining interaction ideas [3, 7]. The Tickle Trunk builds on this approach by providing a hardware-only, plug-and-play toolkit for rapid exploration of diverse haptic and tangible modalities.

2 DEMO OVERVIEW

This demo presents the Tickle Trunk as a hands-on platform for playful haptic and tangible brainstorming. Attendees will be invited to connect input and output widgets, test physical interaction combinations, and discuss how different modalities could support design goals. The purpose of the demo is not to create polished prototypes, but to support rapid embodied exploration of possible physical interactions.

The demo will use short prompts to guide exploration. For example, attendees may be asked to design a warning cue for a virtual safety training environment, a tactile cue for an accessible storytelling experience, or a calming multimodal interaction for a therapeutic context. These prompts encourage attendees to move from feeling individual modalities to imagining how those modalities could be used in specific interaction scenarios.

3 SYSTEM DESCRIPTION

The Tickle Trunk consists of a main hub and a set of modular widgets. Input widgets control activation or intensity, while output widgets produce physical feedback. Because the system is hardware-only, no software setup, programming, or calibration is required during use. Users can connect and swap widgets in seconds, making the system suitable for fast-paced brainstorming and mutual learning.

The input widgets include push buttons, sliders, shake sensors, flame sensors, proximity sensors, and turning dials. The output widgets include fan-based wind feedback, vibration handles, vibration pens, shape-changing pressure feedback, thermal feedback, lights, and force feedback. This range of widgets supports exploration across multiple haptic and tangible modalities.

4 AUDIENCE EXPERIENCE

The demo is designed to be approachable for both technical and non-technical attendees. A presenter will first introduce the toolkit and demonstrate a simple input-output connection. Attendees will then be invited to try individual modalities, combine multiple widgets, and discuss possible applications.

The intended experience follows three stages: feeling the available modalities, playing with combinations, and imagining possible interaction scenarios. This structure reflects the toolkit's role as a boundary object: a shared physical platform that helps people with different expertise develop a common understanding of what haptic and tangible technologies can do [11].

5 CONTRIBUTION

This demo contributes a low-barrier example of hardware sketching for haptic and tangible interaction. Existing prototyping tools often require programming, specialized technical expertise, or a predefined feedback modality. In contrast, the Tickle Trunk prioritizes speed of iteration, expressive diversity, and open-ended exploration. This makes it useful for researchers, designers, educators, artists, and practitioners working with mixed-expertise teams.

The demo also connects to broader work on embodied interaction and tangible interaction, where physical engagement is central to how people reason about, communicate, and develop interaction ideas [1, 4]. By allowing attendees to directly experience and combine haptic modalities, the Tickle Trunk supports early-stage ideation through felt, material engagement rather than abstract description alone.

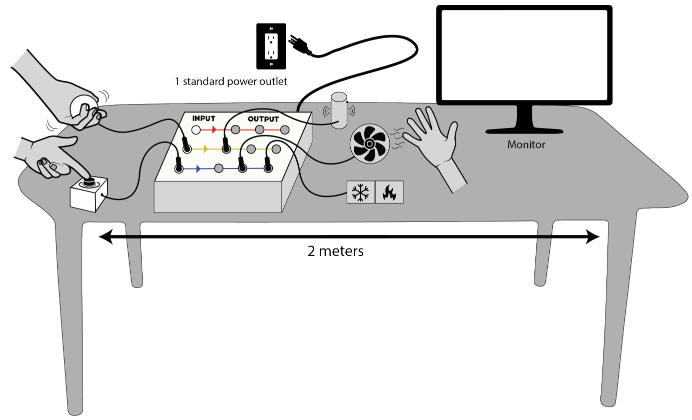

Figure 2: Proposed demo setup requiring a 6 ft / 2 m table, one standard outlet for low-voltage power adapters, and front-facing attendee access to the input and output widgets.

DEMO SETUP AND INFRASTRUCTURE REQUIREMENTS

We will bring the Tickle Trunk main hub, input widgets, output widgets, cables, power adapters, and printed quick-start instructions. We will also provide access to the project website, which includes a sample demo and an instruction video. The demo requires one standard table, one electrical outlet, and internet access. A monitor is not required, although it would be useful if available for showing the overview video.

The demo, as depicted in Figure 2, uses low-voltage electronics and handheld widgets. Thermal feedback will be monitored by the presenter and used only within safe temperature ranges. Attendees may choose which modalities they wish to experience and may opt out of any sensation. The demo can be experienced while seated or standing.

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