Scribbl

Sketching With Haptics: Authoring Multimodal Soft-Haptic Cues Without Explicit Parameters

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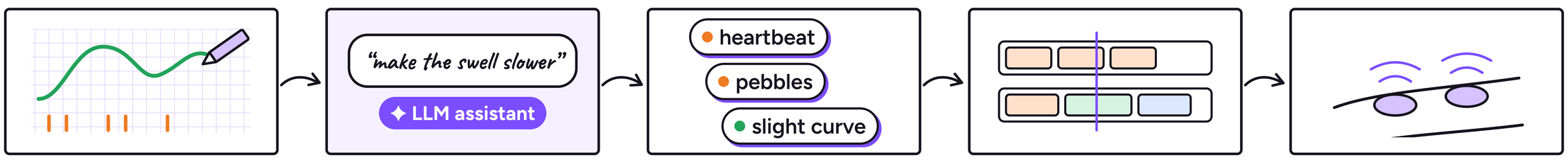
Introduction

Haptic feedback is usually authored by setting low-level parameters, and newer tools generate it from text prompts [1–4]. But a sensation is often felt before it can be named [5], and words are too coarse for its shape and timing. Designers who treat haptics as an expressive material, as in soma design, work by iterating, not toward a known target [6, 7].

We introduce *Scribbl*, a haptic authoring tool built around sketching.

A drawn stroke is already a time series: its rises, falls, and rhythms map onto how a sensation unfolds. Designers sketch across an actuator's modes, refine in words with an LLM assistant, and compose patterns across body-worn actuators, without entering parameters or wiring logic.

How *Scribbl* works



Sketch a moment: draw a curve or tap a rhythm.

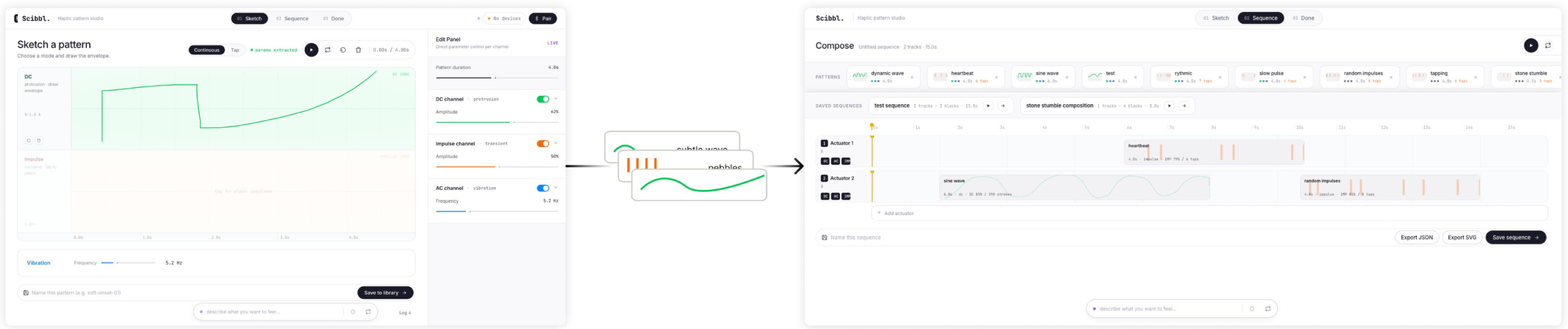
Refine in words; the LLM edits the sketch.

Save it to the pattern library.

Compose patterns on per-actuator tracks.

Feel the sequence on the body, then revise.

draw, describe, play, revise: one continuous loop



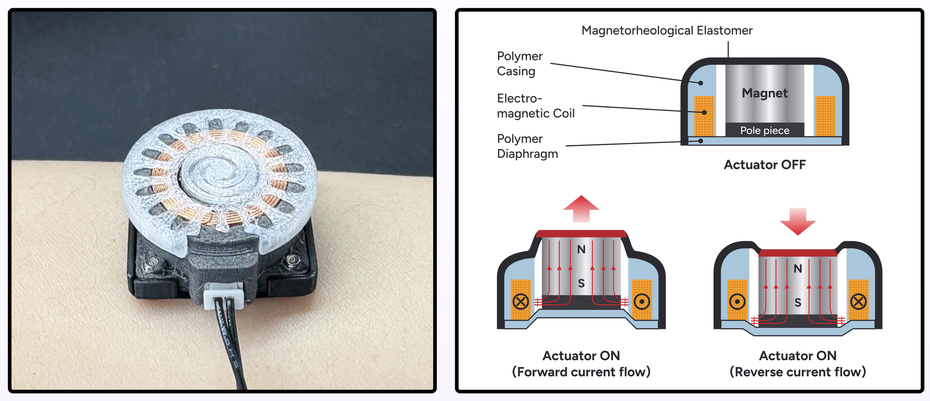
What a sketch drives

A **stroke** sets protrusion: rise, hold, recede (≤ 1 mm).

A **slider** adds square-wave vibration on top.

Taps place impulses, each a nominal 80 ms pulse.

Soft Tactile Electromagnetic Actuator



STEM [8]: a moving magnet held in a coil by a compliant magnetic cap. One actuator renders **protrusion**, **vibration**, and **impulse**.

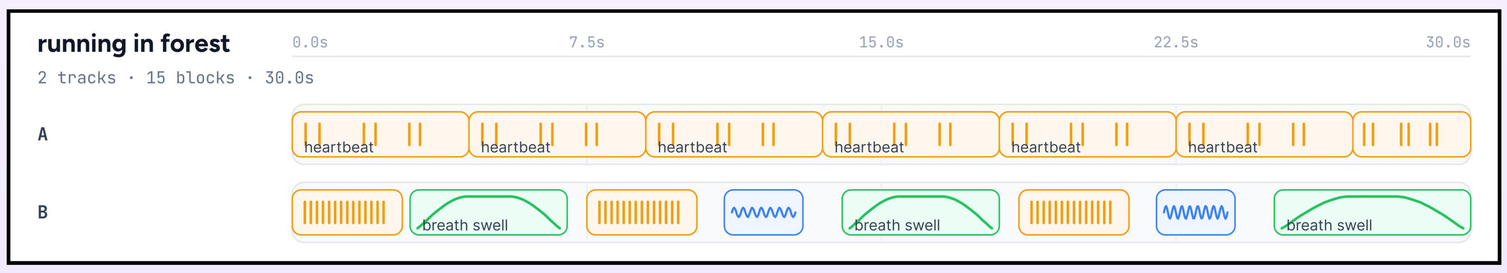
- Ø 22.5 × 10 mm
- 3–7 V
- ≤ 1 mm protrusion
- ESP32-C6 · BLE

System pipeline

- **Web app + bridge:** WebSocket to a Python bridge for BLE control and model requests.
- **LLM edits:** Claude Sonnet 4.6 returns JSON edits; Scribbl validates and applies them.
- **Drive:** a LiPo-powered CodeCell C6 (ESP32-C6) per actuator updates the signal at 1 kHz.

What participants made

From an exploratory session with **20 participants** in a soma-haptic workshop.



- **Rhythmic taps:** heartbeat, pebbles, random impulse.
- **Drawn envelopes:** slight curve, intricate pulsation.
- **Sequences:** *running in forest* layers a steady heartbeat on one actuator with pebbles, a breath swell, and vibration bursts on the other.

Key Idea : Instead of setting parameters, ***sketch*** out the touch you want and feel it on the body right away. Adjust it by redrawing or by describing the change in words, then combine patterns across the body.

Supported by NRF Korea, grant RS-2024-00436931.

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[4] Hu et al. HapticCap, arXiv 2025
[5] Gendlin. Focusing, 1981
[6] Höök. Designing with the Body, 2018
[7] Dourish. Where the Action Is, 2001
[8] Mun et al. STEM, RA-L 2025

AsiaHaptics 2026