**2025 IEEE World Haptics Conference (WHC)**
Suwon Convention Center, Suwon, Korea
July 8 ~ 11, 2025

# SketchTactile: A Web-Based Interface for Interactive Vibrothermal Feedback Design

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***Abstract*—Designing haptic feedback typically requires programming skills and iterative design. To ease haptic prototyping, we present a web-based sketching interface that allows users to draw vibrotactile and thermal signals directly on a graphical canvas. With our design tool, users can sketch freeform multimodal patterns for the amplitude and frequency of vibrations, as well as temperature. The system interprets these drawings as time-based control signals and sends them for playback to connected vibrotactile and thermal wearable devices.**

***Index Terms*—Haptic feedback, Sketch-based interface**

## I. Introduction

Designing haptic feedback often requires technical skills and iterative signal revision and testing, which limits accessibility for those new to the field. To lower this barrier, prior haptic design tools such as Macaron [1] explored intuitive approaches to vibrotactile design, and provided example-based editing features using keyframes, with support for haptic signal visualization and playback. Another design tool, Vireo [2], enabled sketch-based input but did not allow editing of the sketched patterns. We demonstrate SketchTactile, a haptic sketching interface for both vibrotactile and thermal feedback. Users can freely draw and revise amplitude, frequency, and temperature canvases using freeform strokes. The drawings are converted into vibrothermal haptic signals and rendered on a wearable multimodal device, where users can iteratively design the patterns.

## II. System Overview

SketchTactile is a web-based design tool built with Flask, featuring 2D graphical canvases where users sketch to define changes in vibration amplitude, frequency, and temperature over time. Vibration is delivered using the voice-coil actuator(Tactilelabs, HapCoil-One; $11.5 \times 12 \times 37.7$ mm), which is controlled via a National Instruments DAQ. For the vibration signal, the amplitude and frequency canvases are normalized from 0 to 1 and 1 to 10, which correspond to 0–4 G and 50–500 Hz, respectively. In the canvases, y-axis is drawn in a logarithmic scale to align with the perceived magnitude. Thermal feedback is generated by a Peltier actuator (Tegway, ThermoReal; $30 \times 40 \times 2.3$ mm) which is controlled by

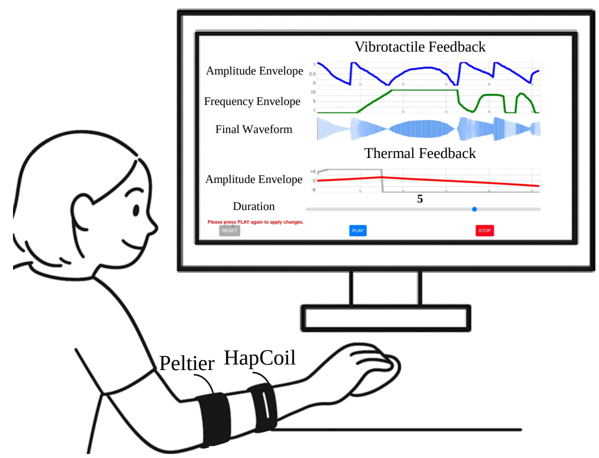


Fig. 1. Users draw amplitude, frequency, temperature curves, and control duration

an Arduino Mega and monitored via a thermistor. Thermal signal's amplitude ranges from –6°C to +6°C with a 32.5°C baseline [3].

## III. Conclusion and Future Work

SketchTactile enables users to intuitively design vibrotactile and thermal patterns by sketching on a web-based graphical canvas and experience the sensation on their hand and arm. By supporting interactive sketch-based design of amplitude, frequency, and temperature patterns, SketchTactile facilitates rapid prototyping and lowers the entry barrier for non-experts in haptic design.

SketchTactile contributes a flexible and accessible platform for multimodal feedback authoring, with immediate applications in perception studies and interaction prototyping. Future work will expand support for multi-actuator coordination, integration of pre-designed templates and example libraries, and evaluation of the perceptual qualities and creative workflows enabled by this system through user studies.

## References

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