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PalmTouch: A Haptic Wrist Rest for Enhancing Interaction Sensations via Remote Vibrotactile Feedback

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***Abstract*—We present a haptic wrist rest that adds tactile feedback to standard desktop setups without modifying existing peripherals. By stimulating the palm, specifically the sensitive thenar and hypothenar regions, using voice coil actuators driven by the computer's audio output, the device delivers real-time vibrotactile cues synchronized with user input. Implemented with both software- and microcontroller-based control, this active wrist rest offers perceptual augmentation of keyboard and mouse interactions while maintaining ergonomic comfort.**

***Index Terms*—Haptics, Palm stimulation, Human-computer interaction, Tactile feedback**

I. Introduction

While haptic feedback is now standard in handheld devices such as smartphones and game controllers, it remains largely absent in personal computer (PC) environments. To help close this gap, we introduce a device that brings real-time tactile feedback to desktop computing through a familiar and passive accessory: the wrist rest. Our system connects via the PC's audio output and requires no modification to existing input devices.

The haptic wirst rest, shown in figure 1, consists of a two-part structure: a grounded base plate supporting a sliding mechanism, and a decoupled top plate that houses voice coil actuators. This design ensures vibrations are isolated to the contact surface, preventing transmission to the surrounding area. By delivering localized vibrotactile feedback to the palm, an area with high tactile sensitivity [1], the device enables perceptual augmentation of keyboard input, mouse movement, and additional interface events.

II. Demonstration

To showcase the capabilities of the proposed device, we developed two types of control implementations: one software-based and one microcontroller-based.

The **software-based implementation** enables real-time haptic feedback through the PC's audio output. It demonstrates several use cases, including: *Key augmentation during typing*, where different keystrokes produce distinct tactile responses. *Avatar control and surface simulation*, allowing users to feel virtual surface textures and motion cues. *Mouse interaction enhancement*, where feedback is provided when interacting with UI elements on a website, enriching the sense of control and responsiveness.

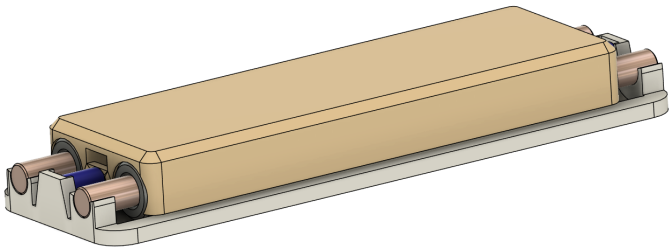

Fig. 1. CAD model of the wrist rest. The top plate (light yellow) is mounted on linear bearings, allowing it to slide over guide shafts fixed to the ground plate (light grey). This separation minimizes vibration transfer to the surrounding surface.

The **microcontroller-based implementation** focuses on ultra-low-latency feedback for key augmentation. It detects keystrokes and immediately triggers haptic responses, enabling fine-tuned changes in key feel and supporting rapid interaction without perceptible delay.

Together, these demonstrations highlight the versatility of the system for both application-driven and latency-critical scenarios.

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