
Tongueduino: Hackable, High-bandwidth Sensory Augmentation

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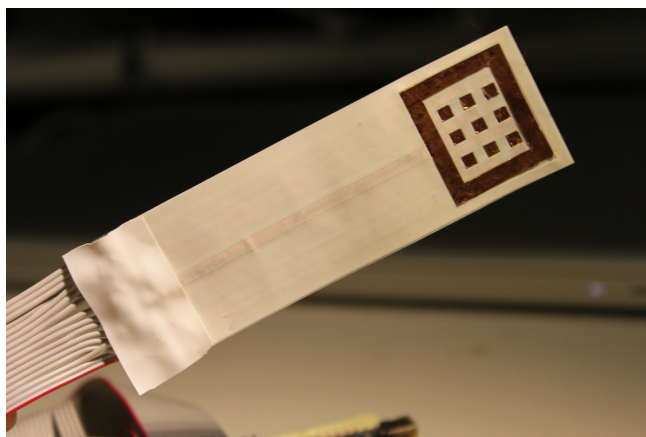


Figure 1: Tongueduino: a low-cost, adaptable tongue display designed to augment the senses of its wearer by interfacing to almost any sensing modality.

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Abstract

The tongue is known to have an extremely dense sensing resolution, as well as an extraordinary degree of neuroplasticity, the ability to adapt to and internalize new input. Research has shown that electro-tactile tongue displays paired with cameras can be used as vision prosthetics for the blind or visually impaired; users quickly learn to read and navigate through natural environments, and many describe the signals as an innate sense. However, existing displays are expensive and difficult to adapt. Tongueduino is an inexpensive, vinyl-cut tongue display designed to interface with many types of sensors besides cameras. Connected to a magnetometer, for example, the system provides a user with an internal sense of direction, like a migratory bird. Piezo whiskers allow a user to sense orientation, wind, and the lightest touch. Through tongueduino, we hope to bring electro-tactile sensory substitution beyond the discourse of vision replacement, towards open-ended sensory *augmentation* that anyone can access.

Author Keywords

tongue display; sensory augmentation; sensory substitution; haptic display

ACM Classification Keywords

H.5.2 [User Interfaces]: Haptic I/O;