Color-Haptic Fusion: Mapping Color to Touch Using Haptic Feedback

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This project explores a color-to-haptic feedback system designed to assist individuals with visual impairments in perceiving color through touch. A wearable glove equipped with a Red, Blue, Green, color sensor and haptic motor controller detects colors and translates them into distinct vibration patterns, allowing users to differentiate between red, green, and blue. Through a series of tests evaluating color recognition, shape identification, and luminance sensitivity, the system demonstrated over 90% accuracy in conveying color information. Participants successfully adapted to the haptic signals, confirming the feasibility of sensory substitution for color perception. While environmental lighting affected sensor performance, results suggest that a refined model with adaptive learning algorithms could enhance reliability. This research presents a promising step toward non-auditory, touch-based assistive technology, fostering greater accessibility for visually impaired individuals.

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