VSS Pre-Data Collection Poster

Title: Tactile substitution of visual information for guiding locomotion

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Abstract (max 250 words):

People with low or impaired vision often rely on assistive devices to help guide locomotion and avoid obstacles and dropoffs. While common aids such as the long cane are useful over a short range (2-3 steps), effective aids for intermediate ranges are lacking. There is a need for assistive devices that provide intuitive information for locomotor guidance, such as the direction of goals, obstacles, and clear pathways. Our research aims to compare different methods for coding spatial information in a simple vibro-tactile belt. The belt is equipped with 16 motors evenly-spaced around the waist, 22.5 degrees apart. Preliminary experiments will determine the accuracy and precision of directional perception from vibrating motors. Participants will receive tactile vibration and click on a computer display to indicate the perceived direction in space corresponding to the source of stimulation. To investigate the spatial resolution of perceived direction, and the hypothesis of tactile ‘hyperacuity’, the vibration pattern will be manipulated: (a) one motor vibrating at a fixed frequency and intensity, (b) 3 to 5 vibrating motors with a Gaussian distribution of intensity resulting in different spatial intervals between motors, (c) variation in the sigma of the Gaussian, i.e. the number and intensities of adjacent vibrating motors. Each stimulus will be repeated ten times, randomized within blocks. This will enable us to estimate the spatial resolution of perceived direction, depending on the direction and type of vibration. The results will be used to design intuitive methods of coding spatial information in a vibro-tactile belt.