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ENHANCING THE SENSE OF ORIENTATION AND DIRECTION USING SATELLITE NAVIGATION DATA AND HAPTIC TECHNOLOGY

Abstract

Navigation systems are useful for orientation purposes and wayfinding to a specific destination. The majority of available end-consumer navigations systems use visual information on a screen or audio instructions to indicate the path from a chosen starting point to a pre-defined destination. Alternatively several haptic devices and concepts to enhance the sense of orientation and direction have been proposed.

A haptic device uses mechanical vibration to stimulate the touch receptors in the skin. It can give navigation information by activating the vibration motors indicating the direction of the destination. The direct input from such a device potentially allows a faster response time than watching and interpreting a screen or listening to the information. By not distracting other senses, this approach helps the user to focus on other simultaneous tasks which require senses like vision and hearing. Hence individuals with impaired vision or hearing can benefit from this approach. Another application of the device is the usage as an additional help for orientation that is indicating cardinal direction or the direction to a specified location, like someone's home. New environments to the wearer can be explored more intuitively by using this extra sense of orientation. The system can be integrated in wearable electronics e.g. into a belt or an arm wrist.

This paper reports on the state-of-the-art of haptic devices by presenting a review of literature currently available on this topic and discusses the development of prototypes and the implementation of the system. Further possible applications to explore the potential of such systems are discussed, reaching from civil to military implementations. Promising is the usage for individuals with impaired vision or hearing as the haptic device becomes like a "6th sense" allowing to compensate for sensory impairments.