Accessible interactive digital signage for visually impaired

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ABSTRACT

In this workshop we discuss the potential of cross-modal haptic-auditory feedback for empowering visually impaired people to experience Interactive Digital Signage.

CCS CONCEPTS

• **Human-centered computing** → **Haptic devices**; **Accessibility technologies**; *Sound-based input / output*.

KEYWORDS

Haptic feedback, auditory feedback, vision impairment, interactive audio

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https://doi.org/-

[1]http://aumapp.com

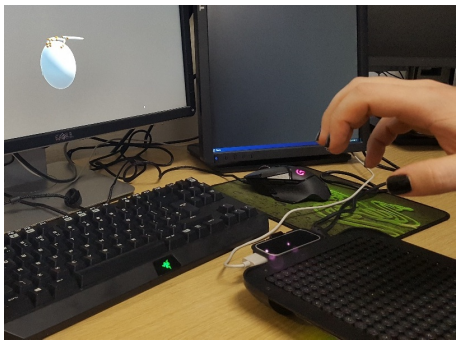

Figure 1: User grabbing the crumpled paper

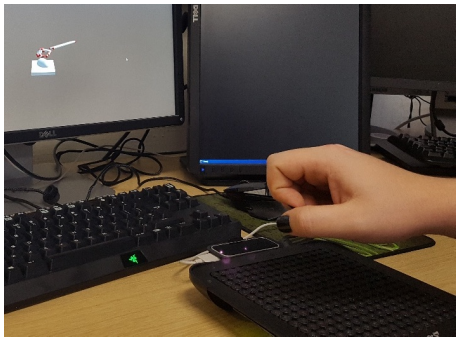

Figure 2: User squeezing the crumpled paper

[2]https://www.unity3d.com

[3]https://www.ultrahaptics.com/products-programs/stratos-explore-development-kit/

[4]https://vimeo.com/128395577

INTRODUCTION

Interactive Digital Signage (IDS) is an emergent and on-going field in marketing and consumer-business interaction. However, visually impaired people are deprived of experiencing them. On extending GraVVITAS capabilities, a system for presenting 2D graphics to people with vision impairment, [1] uses Ultrahaptics to deliver mid-air haptic feedback. Similarly, [3] applied mid-air haptic feedback to AUMI[1], a camera-based Digital Musical Instrument (DMI), to enhance the spatial awareness of movement and control of the virtual instrument. We believe that coupling haptic with auditory feedback has the potential of improving IDS experience for visually impaired.

AIM

In this workshop, we will discuss the potential of enhancing the experience of interactive digital signage for people with vision impairment. Specifically, we propose the adoption of cross-modal haptic-auditory feedback to imbue pleasant experiences to visually impaired of the IDS content.

CASE STUDY

A prototype was developed in Unity[2] using the Ultrahaptics STRATOS device[3]. Our system prototype is based on earlier work focused interaction with a virtual piece of paper through mid-air hand metaphoric hand gestures captured using electrocardiography (EMG) based technology[4]. A crumpling paper sound was generated through the interaction with the virtual paper through a crumpling paper gesture. Work by [2] demonstrates the use of mid-air tactile interaction with a virtual piano by emulating naturally opposing forces of the real instrument. Similarly, here we explore ways of interacting with the crumpled paper through auditory-mid-air haptic feedback. Our prototype renders a crumpled paper as a sphere, with diameter and density changing when grabbed and squeezed through gestural interaction (Fig. 1 and 2), contemporary, the sound of the crumpled paper is produced.

In addition, we aim to discuss the potential benefit of using cross-modal audio-haptics interaction for digital signage in real-world scenarios. For example, in advertising, users can unscrew the cup of a jar and interact with the content on screen through auditory and haptic feedback.

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