Demonstrating Dark Haptics Scenarios for Future XR Advertising

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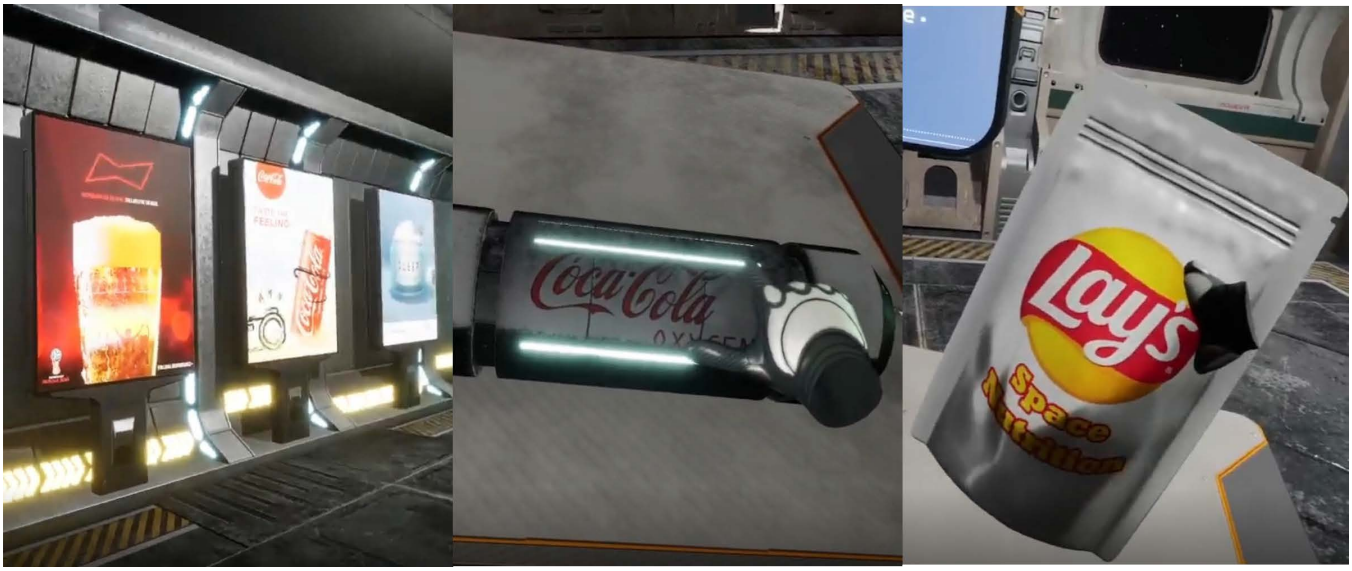

Figure 1: Three Dark haptics interactions

Abstract

We demonstrate the manipulative potential of haptics ('Dark Haptics') for the future of advertising in eXtended Reality (XR). Our demonstration showcases two haptic and one pseudo-haptic interactions as a XR-based advertising strategy that can subtly manipulate user actions in this dark future of advertising work. Developed in Unreal Engine 5.5 for the Meta Quest 3, this single-user Virtual Reality experience presents an initial exploration of the manipulative qualities of haptics design that can be exploited within immersive environments. By highlighting these dark design patterns, our demonstration aims to raise awareness and initiate discussion around the ethical implications of haptic feedback for the future of work in immersive environments, particularly within advertising. Our work lays the groundwork for future research and development of tools to mitigate the potential harms and risks of dark haptics as immersive technologies become more integrated into professional and commercial environments.

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CCS Concepts

• **Human-centered computing** → **Human computer interaction (HCI)**; **Virtual reality**.

Keywords

dark haptics, XR, advertising, demonstration

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1 Introduction

Manipulative design patterns commonly referred to as 'Dark Patterns' are rampant in digital interfaces [12]. Particularly present in the advertising and e-commerce sectors. These patterns, are most often visual in nature [10]. Gray et al. [4] recently developed a comprehensive classification of 65 dark pattern defining dark patterns as "design choices [that] subvert, impair, or distort the ability of a user to make autonomous and informed choices in relation to digital systems regardless of the designer's intent" [4, p.1]. Dark pattern research has largely focused on visual design patterns [11], leaving dark design patterns in other sensory modalities such as audition, and touch less explored[9]. With increased immersion and presence in XR, digital experiences can access cognitive, emotional, and perceptual dimensions through haptics [7]. This provides a large space for deception and sensory manipulation [8, 17], especially given increased immersion and the capacity for deceptive design [6]. Research on affective haptics has shown that even simple tactile feedback can influence pro-social behavior in users [5] or evoke targeted emotional responses [3]. Examples within immersive contexts show how unpleasant haptic cues can bias user decisions, such as nudging users towards particular menu choices in AR or VR environments [18], reinforcing emotional associations towards certain type of news items[14], or how presenting proxemic thermal and vibrotactile feedback influences interactions with virtual agents [15]. Recently Tang et al. [16] presented the concept of Dark Haptics in mobile user interfaces, and showed the potential for haptics to manipulate user responses. These findings underscore a growing vulnerability of manipulation through haptics aligned with commercial objectives or a service provider. Its important to recognize the complex economic motivations that drive companies to maximize profits. Developers and designers, especially those within fast-paced, target driven advertising companies, are often caught between ethical considerations and business . Under pressure from higher management or clients to may be asked implicitly or explicitly to implement deceptive techniques to maximize user retention or conversion rates. In this context our demonstration (see attached demo video as supplementary material) explores the concept or Dark Haptics (cf., [16]) within manipulative XR advertising environments (cf., [13]), using haptic and pseudo-haptic feedback as subtle manipulation tools for immersive advertising scenarios. By investigating these possibilities, we aim to raise awareness, initiate critical dialogue that can further lay the groundwork for ethical guidelines in the future of advertising work within immersive, virtual experiences.

2 Dark Haptics XR advertising experience

To explore this potential in the context of immersive XR advertising [1], we build on earlier work that highlighted possibilities of manipulative XR advertising [13]. We developed a speculative VR experience that demonstrates dark advertising haptics with a set of three manipulative interactions that subtly nudge users towards branded or advertised content. The experience was designed in Unreal Engine 5.5 for the Meta Quest 3 headset, the three distinct interactions each showcasing a different strategy of haptic or pseudo-haptic feedback.

2.1 Interaction Scenarios

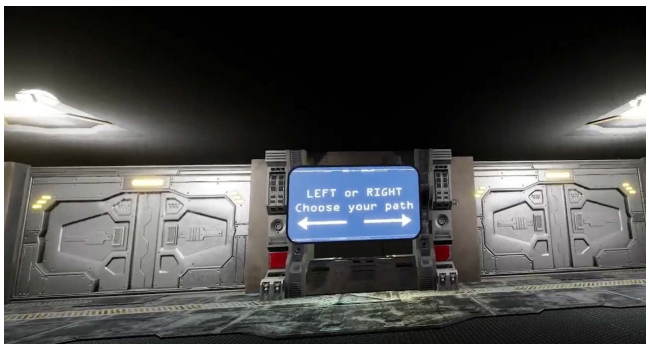
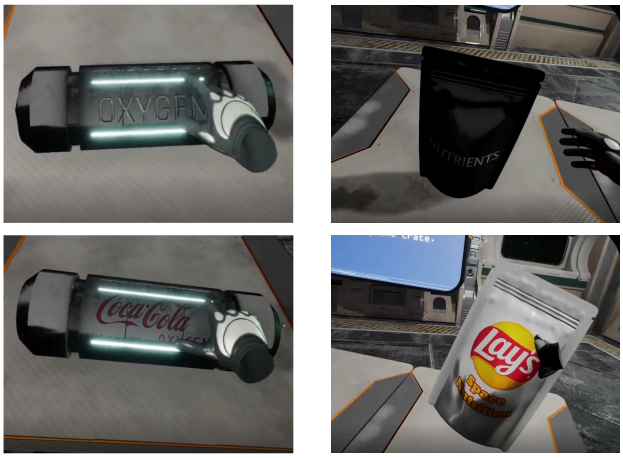


Figure 2: User point of view for the first interaction "Path of least resistance"



(a) Vibration forcefield interaction (b) Pseudo-haptic resistance interaction

Figure 3: User point of view of the non-branded (top) and branded (bottom) object for the last two dark haptic interactions

2.1.1 Path of least resistance. In this interaction, the user is presented two paths (see Figure 2) that both lead to the same destination. The right hand path is lined with advertising billboards, while the left hand path is visually identical but free of advertisements. As the user decides, a constant unpleasant haptic feedback is emitted from both controllers. However, when the user's gaze intersects with the entrance to the right hand (advertised) path the

unpleasant haptic feedback stops. Shifting the gaze away from this path reactivates the haptic feedback is triggered again. This setup subtly encourages users to choose the path with advertisements as the "path of least resistance", reinforcing exposure through relief based interaction.

2.1.2 Vibration force field. This interaction centers on object manipulation. The user is prompted to choose one of two objects to complete a pick and place task, one branded, the other is non-branded (see Figure 3(a)). The branded object delivers a distinct haptic confirmation upon being grasped. In contrast, the non-branded object is surrounded by a "vibration forcefield", an unpleasant haptic feedback that intensifies as the user's hand moves closer. This contrast makes the branded object feel more approachable and rewarding, increasing the likelihood of selection and thereby increasing brand exposure.

2.1.3 Pseudo-haptic resistance. This interaction also involves choosing between a branded and a non-branded object (see Figure 3(b)). While the branded object provides the same clear haptic confirmation as before, the non-branded object introduces a "pseudo-haptic resistance" where the users hand movement is spatially distorted when approaching it. This distortion creates a sense of annoyance, discouraging interaction. The branded object, by contrast, feels easier to reach and more responsive, again biasing the user choice towards brand exposure through tactile and spatial manipulation.

3 Conclusion

Our demonstration presents an early exploration of dark haptics within XR-based advertising, where haptic and pseudo haptic feedback is used to subtly manipulate user behavior within these immersive environments. Our demo specifically highlights how haptics may be leveraged to manipulate users and guide their attention and actions. Ultimately, our work aims to spark discussion around the implications of such future work practices, further underscoring the need to better safeguard against the psychological and behavioral effects of dark haptics. In so doing, this would help ensure user (consumer) agency is preserved during such immersive virtual experiences, be they within e-commerce shopping contexts (cf., [2]) or otherwise.

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