

Exploring Dark Patterns in XR

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ABSTRACT

Dark patterns are known as manipulative design decisions in user interfaces and rigorously researched in the context of e-commerce and privacy for traditional media. However, due to the novelty of augmented and virtual reality (XR) and the respective lack of adoption in mass media, the knowledge about dark patterns in XR is scarce. This statement provides an initial overview of my approach to identify (potential) dark patterns based on diegetic prototypes from popculture and existing XR applications with the goal of establishing ethical design guidelines for creators and enabling media literacy for users.

CCS CONCEPTS

• **Human-centered computing** → **Interaction design; Mixed / augmented reality**; • **Security and privacy** → Human and societal aspects of security and privacy.

KEYWORDS

dark patterns, interaction design, XR, augmented reality, virtual reality

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1 MOTIVATION

XR is a medium that blurs the boundaries between reality and virtuality and might more subtly influence user perception and interaction, as compared to 2D interface. Following the growing interest in and awareness about intentionally manipulative design that leads users to perform actions contradicting their interests (dark patterns), this is a debated topic in classical user interface design [15]. In XR, however, this topic is not yet actively debated due to the medium's novelty and a corresponding lack of sample applications and mass adoption for this aspects to surface. Nevertheless, early investigations of potential manifestations and effects of manipulative interfaces in XR might strengthen the agency and media literacy of users and society from the beginning. Furthermore, respective guidelines for designers bear the potential to prevent (un-)intentional bad design.

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Other than smartphone apps or applications run on a spatially limited display or screen area, XR apps surround their users in all three dimensions and therefore create more immersive experiences. As showcased in the South Korean documentary “Meeting You” [9] broadcasted in 2020, VR could be used to revisit deceased relatives or friends as if they were still alive. I can see that the increased potential of immersion may have more serious side effects on a user's self-concept of reality and intentions compared to classical user interfaces. In fact, former Facebook, now Meta, already experimented with VR advertising in their Oculus platform in 2021 [21] even though the full potential of their impact on users is unclear [19], also for designers. Given the growing interest in XR from companies that have been publicly criticized for manipulative design practices to, e.g., collect user data, a more thoughtful analysis of XR as a design space is needed.

With my research, I aim to inform current and future design practice and help establish ethical design frameworks highlighting contingent pitfalls of the medium. So far, existing applications and professional design approaches mainly focus on the creative potential of this technology [1, 13, 14] and the XR domain is lacking a critical reflection regarding its impact on society and the individual. Consequently, I am researching the potential manipulative character of specific design decisions and how they might manifest. My overall goal is to inform research and practice about prospective pitfalls and differences between XR and classical user interfaces to enable the creation of a research agenda targeting ethical aspects as well as end-user literacy. Hereby, I focus on interaction design related aspects, namely dark patterns.

2 DARK PATTERNS IN XR

With the rise of social media and online shopping, interest in dark patterns and their research increased over the years [15, 20]. Dark patterns as such are known as “tricks used in websites and apps that make you do things that you didn't mean to, like buying or signing up for something” [2]. Recent work has predominantly focused on privacy and shopping related issues [17] when approaching dark patterns. However, the interdisciplinarity of XR requires a broader view on dark patterns to foster understanding and therefore needs to incorporate research insights from related fields that also address the spatial characteristics of interfaces in other contexts, such as architecture, ubiquitous computing, and computer games [6, 8, 25]. Furthermore, I think that dark patterns might also surface from design decisions with no manipulative intent that evolve to dark patterns through usage. Therefore, a mixed approach to identify such design manifestations in existing applications in use and, due to the mutual influence of science and fiction [12, 22], media depicting XR is needed.

Prior work specifically addressing dark patterns in XR is still scarce. In 2018, Phil Wolff published nine dark patterns in augmented reality on the website *Medium* [24]: real world injury, advertising, interaction hacking, deception, eavesdropping, forgetting, balkanization, abusive power, and opacity. Also, Mhaidli and Schaub [19] investigate manipulative advertisement techniques in XR through scenario deconstruction and identify several research challenges, such as privacy risks, XR ad literacy, and immersivity. Other work focuses on the potential impact of XR technology on society, individuals, and legal aspects (e.g. [3–5, 7, 10, 11, 16, 23]).

My current research focuses on analyzing described and depicted applications as diegetic prototypes [12] in pop culture media (e.g. Keiichi Matsuda's work on critical design [18]) to identify how dark patterns in XR might manifest. This marks the beginning of a larger study aiming to inform both design ethics as well as user agency and literacy in XR.

3 CONTRIBUTION TO THE WORKSHOP

As a participant in the workshop, I hope to share my insights and ideas related to dark patterns in XR. I would like to gain a broader understanding of the challenges and research approaches related to privacy, security, and safety through discussions with other participants.

4 AUTHOR'S BACKGROUND

I work as a research assistant at the *Institut für Verbraucherinformatik* (Institute for Digital Consumption), a joint institution of the University of Applied Sciences Bonn-Rhein-Sieg and the University of Siegen. My research as a PhD candidate at the University of Siegen focuses on XR user experience design and tool usage in practice. As a postdoc, I want to focus on ethical aspects of XR design from both, a designer's and a user's perspective.

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