

Chapter 14

Next Generation of the Web Will Engage Your Senses: Unleashing Interactive Web- Based XR Experiences

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ABSTRACT

This chapter explores the emerging trends in the web-based XR (Extended Reality) technology, which is expected to shape the next generation of the web. XR refers to the spectrum of technologies that extend the reality of the physical world by integrating virtual and augmented reality elements. The chapter discusses how web-based XR experiences can engage our senses by creating immersive and interactive environments that go beyond the traditional 2D screen. The authors argue that the current web technology stack is evolving to support more powerful and seamless XR experiences that can be accessed through standard web browsers. The chapter also examines the challenges and opportunities that arise from the integration of XR technology with the web, including issues related to privacy, security, and accessibility. Overall, this book chapter provides a comprehensive overview of the potential of web-based XR technology and its impact on the future of the web.

INTRODUCTION

Evolving Web Technologies

In the ever-changing digital landscape, the evolution of interactive technologies has been a driving force behind the transformative experiences we encounter on the internet. From the early days of static web pages to the dynamic and interactive web applications we have today, the continuous advancement of web technologies has not only shaped how we connect, communicate, and conduct business online but has also revolutionized the way we interact and engage with digital content using our senses (Sheridan et al., 2022).

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We are seeing many technological advancements, such as quantum computing, 3D-printing, flexible transparent screens and artificial intelligence. These innovations and advancements are changing how we use and interact with technologies online. Leading to new interaction paradigms, emotional data-driven design, and designs that employ ‘no interfaces’ that explore new human experiences. Experiences that transform our digital interactions into immersive and multisensory journeys (Kenwright, 2018).

One significant catalyst for change in recent years has been the advent of Web 3, a concept that represents the next phase in the evolution of the internet, emphasizing user-centric experiences and pushing the boundaries of sensory engagement. This has included decentralized crowdsourcing platforms for collecting and visualizing 3D models (Lin et al., 2023). Not to mention, the metaverse, which has gained a lot of attention recently (Kshetri, 2022; Purcarea et al., 2022). A particular area of interest, touched on by Jin and Parrott (Jin & Parrott, 2021) was content generation and distribution in the era of web 3 technologies, especially with the advancements of artificial intelligence and machine learning models (Guzdial et al., 2022; Ravichandran & Ilango, 2023).

Today’s current Web 2 evolved out of the rise of social media, e-commerce, and cloud-based applications, while Web 3 introduces a paradigm shift that promises to redefine the internet as we know it, placing **emphasis on the integration of multisensory experiences to create truly immersive and engaging digital worlds.**

So, what exactly is Web 3, and how will it reinvent the internet in terms of interaction and user experience? Web 3 can be understood as a decentralized and user-centric standard for the web, built on emerging technologies such as blockchain, decentralized networks, and cryptocurrencies. Unlike Web 2, which primarily focused on information sharing and limited user interaction, Web 3 envisions a future where our digital experiences will engage multiple senses, blurring the boundaries between the physical and virtual worlds (Yu et al., 2022; Aria et al., 2023).

As we explore the distinctions between Web 2 and Web 3, we will delve into the key principles and architectural concepts that underpin the new standard, emphasizing how they contribute to **enhanced interactivity, intuitive user-interfaces, and sensory stimulation.** We will examine the decentralized nature of Web 3 and its potential to foster a more personalized, engaging, and immersive online environment, where users can interact with digital content through touch, sight, sound, and beyond.

The Rise of Extended Reality (XR)

XR, or extended reality, is a game-changing technology that holds immense potential to reshape how we interact with the digital world. Blending the physical and virtual realms, XR transcends the limitations of traditional interfaces, offering immersive and interactive experiences that engage our senses and push the boundaries of what is possible. Whether it’s virtual reality (VR), augmented reality (AR), or mixed reality (MR), XR opens up a realm of endless possibilities across industries, from education and healthcare to entertainment and beyond (Figure 2). It enables us to explore new frontiers, connect with others in unprecedented ways, and unlock innovative solutions to real-world challenges. XR has the power to revolutionize how we learn, work, play, and experience the world, bringing us closer to a future where the digital and physical seamlessly coexist, enhancing our lives and expanding the realms of human imagination. As XR continues to evolve and gain momentum, the integration of Web 3 and its associated APIs becomes increasingly important, unlocking new possibilities and enhancing the capabilities of XR experiences (Kenwright, 2020a, 2019).

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