Metaverse: The Vision for the Future

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In recent years, the notion of the Metaverse has become the focus of a growing body of work in the industry. However, there is no consensus on the conceptualization in academia. To date, much of this attention has revolved around technological challenges. However, what is notably missing from these discussions is a consideration of the human factors and social aspects that are considered more critical challenges within HCI. The aims of this SIG are as follows: Firstly, to provide a platform for researchers and practitioners to engage with the various definitions and the ways in which the Metaverse is developing. Secondly, to discuss the opportunities, challenges, and future possibilities in the context of HCI. This will lay the foundations to build a network for academics interested in the field for future multidisciplinary research relating to the Metaverse.

1 INTRODUCTION

Metaverse was first coined by Neal Stephenson in a science fiction novel named Snow Crash in 1992 [12]. The word "metaverse" is a combination of the prefix "meta" (implying beyond) and the stem of the term "universe." Stephenson described the metaverse as a parallel virtual world to the physical world in which users interact with each other and applications through avatars. Since then, the metaverse has been conceptualized in diverse ways [2–4, 6] without a consistent definition. Besides being a popular subject of numerous science fiction novels and films (e.g., Ready Player One [11]), many technology companies have recently focused on the metaverse. On October 2021, Facebook announced

its new corporate name: Meta, short for "metaverse" [7], bringing the metaverse to the forefront of discussion in social computing.

Technology companies created many computer-mediated hybrid spaces which brought users different degrees of digital transformation, for example, AR applications (e.g., Pokemon Go by Niantic), 3D virtual-world games (e.g., Second Life by Linden Lab), VR experiences (e.g., Horizon by Facebook), etc. However, without involving "shared, open, and perpetual virtual worlds" [8], these applications could only be defined as "proto-metaverse" [6] rather than attaining full metaverse designations. A metaverse would be a collective platform of separate hybrid spaces with a consistent design language and a promising better user experience.

Before achieving a metaverse, there still exists a mass of technological and computational challenges to be overcome [8], e.g., small objects detection, authentication in Blockchain, network congestion, and to name but a few. At the same time, social challenges would be more difficult barriers than technological and computational challenges [5]. Users' behaviors would be a key concern, as to how to protect users' privacy and safety, prevent cyber-bullying and users addiction, as well as keep user diversity and fairness in the metaverse are all substantially under-discussed [8]. In addition, moving users from existing hybrid spaces to an integrated metaverse platform would be a challenge. Unfortunately, there is currently a dearth of research on user aspects in the scope of the metaverse. Though there is no real-life metaverse application at this time, technology companies are trying to create a metaverse with different approaches: Facebook is promoting an immersive VR experience, while Niantic claims that the metaverse should enhance users' interaction with the real world rather than cut them out of it [9]; As a game company, Epic Games, will start with building connected social and entertainment experiences to players [1], while Microsoft Teams is trying to create a mix-reality based collaborative and shared holographic experiences for online offices [10]. Nevertheless, we believe that the metaverse is not owned by any technology company but owned by humans. And the essence of the metaverse is the interaction of humans and a computer-mediated virtual platform. Thus, worth discussing among HCI researchers how to build the metaverse in a proper direction. By discussing the topics above, designers and researchers can gain an increased understanding of the metaverse in domains considered pivotal in HCI: persuasive computing, virtual and augmented reality, and inclusive design.

2 MOTIVATION

As a revival topic in 2021, the metaverse showed its continuity in the long term. Different from the era when the term was first coined, the related technologies are developing to be mature in the foreseeable future [8]. The industry is getting ready to build a metaverse: Big technology companies worldwide (e.g., Niantic, Facebook, Tencent, Microsoft, etc.) set the metaverse as their future development strategy.

The outcomes of this SIG and follow-on SIGs can enrich the number of research on metaverse and guide the development of the metaverse. Furthermore, this SIG and follow-on SIGs can contribute to subsequent conferences, for instance, user studies based on the metaverse.

This SIG is essential mainly for two reasons. First, we have seen a rising number of discussions on metaverse in the industry recently, but without a consensus on the direction of development. In the literature, however, there is insufficient research on metaverse, which is a significant gap between the industry and academia. Also, as noted above, human factors and social aspects are pivotal topics in the metaverse but are far from being thoroughly discussed. Thus, the authoritative definition of the metaverse and the discussion on the future agenda are required in the HCI community.

Second, the metaverse needs to be discussed in a diversified agora. As mentioned, the metaverse covers multiple domains in HCI (e.g., VR, AR, persuasive computing, etc) and requires a good understanding of the complicated social aspects surrounding these domains. We believe that discussion among researchers from different domains and cultural backgrounds can effectively improve and expand the understanding of the metaverse, as well as stimulate the discussion of multidisciplinary research opportunities.

3   OBJECTIVES

The overarching principle of this SIG is to build an international community for practitioners from different backgrounds to be exposed to existing discussions and challenges of the metaverse in an HCI context.

These participants are further expected to explore multidisciplinary research and application opportunities.

Our main objectives are as follows: First, to provide a platform for researchers and practitioners to engage with various definitions and directions of development of the metaverse.

Second, to discuss three topics around the metaverse: opportunities, challenges, and future possibilities in an HCI context. Under the opportunities topic, we aim to raise discussions about the existing applications of the metaverse (proto-metaverses cases); and under the challenges' topic, we will stimulate discussions on barriers while creating the metaverse, making an emphasis on the social and human aspect in an HCI context; as well, we aim to solicit involvement from multiple disciplines on the discussion of future possibilities, including but not limited to the research opportunities for shaping the future of the metaverse.

Third, to build a network for academics interested in the field for future multidisciplinary research on this agenda.

4   SIG STRUCTURE

4.1   Pre-SIG Activities

We will make use of discord to build an online platform: 1) for attendees to introduce each other. 2) for organizers to collect basic information about the participants and understand their expertise. Then, we can better prepare materials that matter within the boundaries of the topics of SIG.

4.2   The Main Event

This SIG will be held online, accessible for attendees in different physical locations to join. The first part of the SIG will be a 10-minute opening from the session host, explaining the objectives and structure of the SIG, followed by voluntary self-introductions from attendees.

In the next 10 minutes, organizers will present the various definitions and directions of the metaverse development, exposing the attendees to existing discussions of the SIG theme.

Next, organizers will create three breakout meeting rooms for the topics: opportunities, challenges, and future possibilities in an HCI context. The discussion will last half an hour, and participants will choose one of three topic rooms to join and contribute to the discussion. Each topic room will have one organizer to observe and support the discussion.

After the 30-minutes discussion, all participants will return to the main session room and present the primary outcomes, highlighting insights from their discussion (5 minutes each topic).

In the end, organizers will raise a free discussion across topics around the metaverse and make conclusions for the SIG.

Table 1. schedule for the main event

Duration	Activities
10 minutes	Opening and instruction
10 minutes	Presentation by the organizer (the various definitions and directions of development of the metaverse)
30 minutes	Breakout room discussion
15 minutes (5 minutes per group)	Presentations by attendees
10 minutes	Free discussion and conclusions

4.3 Post SIG Activities

After the SIG, we will:

- Summarize the outcomes in a white paper and share it with all presented materials on our website.
- Submit a research paper distilling research-specific content from the workshop in a journal or conference.
- Invite the participants to collaborate on a special journal issue on the topic of the SIG in an HCI journal.

We will also use this SIG as a touching point for the HCI community that is interested in the metaverse. Much of this work is interdisciplinary by nature and will require much translation, planning, and coordination. In order to facilitate those processes, we are currently planning to do the following:

- Continue to grow our website with examples from the work of the participants and by continually adding resources (designs, etc.).
- Continue our discussion and communication with the SIG participants through our discord server.
- Use the insights gained from this SIG to inform the design of other activities (e.g. panel, Dagstuhl type seminar, etc.) at other venues and conferences to foster further collaboration, enlarge the community, and progress the topic of the metaverse.

But this list is by no means exhaustive. Should new potential avenues of post-SIG activities manifest during the SIG, all efforts will be made to pursue those opportunities.

ACKNOWLEDGMENTS

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