Editorial: Metaverse in co-virtual city design

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Editorial on the Research Topic
[Metaverse in co-virtual city design]

The Metaverse is a concept that has gained significant popularity in recent years, particularly in the field of technology and design. It is not just a mere Research Topic of virtual environments but a shared space where individuals can engage in various activities, such as socialising, gaming, and commerce. The rise of improved Virtual- and Augmented Reality technologies has reopened research avenues in the broader digital co-design realm. One of the critical areas of research in this field is the design of co-virtual cities, where users can interact with each other in a virtual environment.

We have been researching this area for quite some time. Hence this Research Topic of 'Frontiers in Virtual Reality' brings together colleagues who share the same research interests. We now present a carefully selected set of undertakings that delve into the various aspects of co-virtual city design and how this realm can be leveraged to create new and innovative experiences.

Co-design refers to designing a product or service with the active participation of the users who will ultimately use it. Akin to our own research approaches, co-design has been widely adopted in urban planning, architecture, and product design. However, we realised that Research Topic of 'co-design of virtual cities in the Metaverse' is still in its infancy.

The unique nature of the Metaverse presents several opportunities and challenges for the co-design of virtual cities. One of the benefits of co-designing virtual cities in the Metaverse is increased user engagement: by involving users in the design process, they become more invested in the outcome and more likely to participate in the virtual environment. The process can lead to a more vibrant and active community, as users feel a sense of ownership and belonging to "their" virtual city. The engagement of users gathers valuable insights into user preferences and requirements and designers can gain a deeper understanding of their needs, desires, and limitations. This information can then create virtual cities that better meet the users' needs, leading to increased satisfaction and engagement. It also has the potential for increased creativity and innovation. By involving a diverse group of users in the design process, designers can tap into a wealth of ideas and perspectives they may not have considered otherwise. It can create unique and innovative virtual cities that offer users a new and exciting experience.

However, co-designing virtual cities in the Metaverse also presents significant challenges. One of the biggest challenges is ensuring the participation of a diverse group of users. It is essential to involve a broad range of users with different backgrounds, experiences, and

perspectives to achieve effective co-design. Ensuring all users have equal opportunities to participate and contribute can be challenging, especially in the virtual environment.

This Research Topic of "Frontiers in Virtual Reality" explores co-virtual city design from six unique standpoints, including art installation, digital twin simulation, gamification, digital commons, indicator evaluation, and teleportation. Each article offers a different perspective on the challenges and opportunities of co-designing virtual cities in the Metaverse. Together, they provide valuable insights that can help shape the future of this exciting field.

The first article, "*Entering hyper-reality: Resonance-In-Sight, a mixed-reality art installation,*" explores how mixed reality can be used to create immersive art experiences in the Metaverse. Crolla and Goepel describe creating a mixed-reality art installation that allows visitors to enter a hyper-real world where they can interact with virtual objects and environments in real time. The article showcases the potential of mixed-reality technology to create new and innovative art experiences that push the boundaries of traditional art forms.

The second article, "*Leveraging Digital Twin and Game-Engine for Traffic Simulations and Visualizations,*" discusses using digital twin and game-engine technologies to simulate and visualise traffic patterns in Co-Virtual cities. Here, Rundel and De Amicis describe how these technologies can create virtual simulations of real-world cities, allowing planners and designers to test and evaluate different traffic scenarios and designs in a safe and controlled environment.

Next, in the third article of this Research Topic, Chassin and Ingensand focus on the role of digital gamification in participatory design. The article "*E-guerrilla 3D participation: Approach, implementation, and usability study,*" describes a new approach to public participation in urban design, where users are engaged in a gamified process that encourages them to explore and participate in creating high-density housing estates. The Chassin and Ingensand evaluate the effectiveness of this approach and discuss the potential benefits and limitations.

The fourth article by Ng et al. is titled "*Digital common(s): the role of digital gamification in participatory design for the planning of high-density housing estates.*" The team explored the role of digital gamification in participatory design processes and discuss the potential of gamification to create a more engaging and interactive design process and to increase public participation in urban design. The article describes the implementation of a gamified design process and evaluates the results of this approach.

The fifth article, "*Public Participation in Urban Design with Augmented Reality Technology Based on Indicator Evaluation,*" focuses on using augmented reality technology for public participation in urban design. Wang and Lin describe a novel approach to public involvement that uses augmented reality technology to create interactive and immersive experiences that allow users to explore and participate in the design process. Wang and Lin evaluate the effectiveness of this approach and discuss the potential benefits and limitations.

Finally, in the sixth article of this Research Topic, Badr and De Amicis present their research titled "*An empirical evaluation of enhanced teleportation for navigating large urban immersive virtual environments.*" They discuss the use of teleportation technology to navigate large urban immersive virtual environments. Bad and De Amicis describe a novel approach to teleportation that allows users to move quickly and easily through large virtual environments. The article discusses potential benefits, limitations, and applications in co-virtual city design applications.

The six articles presented here provide a comprehensive overview of the current state of the art in Metaverse and co-virtual city design. They showcase how VR and AR technologies are used to encourage public participation, artistic expression, and visualisation, and demonstrate their potential to revolutionise urban planning and public engagement. Overall, we believe that this Research Topic's Research Topic is a vital area of investigation that is shaping the present and future of urban co-design processes. The articles offer impactful insights and a roadmap for further research in this exciting and rapidly-evolving field.

Editors, "*Metaverse in Co-Virtual City Design*": Chowdhury et al.

Author contributions

The author confirms being the sole contributor of this work and has approved it for publication.

Conflict of interest

Publisher's note