

# METAVERSO, AR, VR, MR

**L'evento con un punto  
di vista privilegiato  
sui progetti del futuro**

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# Alla ricerca DELLA definizione (di metaverso)

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S.-M. Park, Y.-G. Kim: Metaverse: Taxonomy, Components, Applications, and Open Challenges

TABLE I. Metaverse definition.

Vendor	Definition	Characteristics
Stephenson [12]	A world where humans as avatars interact with each other and with software agents in a three-dimensional space that reflects the real world.	Allowing users to create new entities to have a market value; Describing the tension between the request and ownership between the player and the operator.
Schroeder et al. [13]	A resident virtual world where the geography and physical characteristics of the real world are modeled in a networked digital space where the user is represented as an avatar.	Describing the connection between science fiction and cyberpunk culture comprising 'nonspace.'
Jaynes et al. [14]	A world where the real world and shared digital media network that removes the barriers of time and space by deceiving users' visual sense.	Visually immersive, self-organizing and monitoring, interactive, collaborative capabilities
Ondrejka [15]	The technical challenge of making something close to the complexity and realism depicted in Snow Crash	Potential to open large markets for capital and wealth by empowering users to their creations with dynamic complexity and the right to create content!
Kemp and Livingstone [4]	Access online systems as exclusive clients and interact with content and services.	Links to external web pages and Internet resources, tools for constructing 3D objects, scripting for interactive content
Goertzel [16]	An increasingly intelligent world where AGIs are integrated into interacting human social networks.	Artificial intelligence agents are an important part of Metaverse
Collins [17]	From business to entertainment, an interactive network with continuous, immersive 3D virtual environments accessible	Convergence of a virtual, augmented physical reality with a physically persistent virtual space
Wright et al. [18]	Extensive 3D network virtual world that can support many people at the same time for social interaction	Social interaction and collaboration, the interaction between real people and virtual environments, agents and agents, environments, and avatars
Schlemmer et al. [19]	Extension of the parallel space of the physical world within the virtual Internet space into cyberspace	Experience immersion through telepresence as an avatar; The technological incarnation of the old dreamland in which parallel worlds, collective memory, images, myths, and symbols chase humans.
Schaf et al. [20]	A world of enhancing the feeling of being in a classroom rather than being an incorporeal observer in a 2D virtual environment.	Using state-of-the-art technology to support collaboration, creativity, and sharing over the web
Prisco [21]	A complete video-cinematic medium based on virtual reality allows immersive interaction between participants.	Sustainable and accelerated using realistic consumer VR technology
Rymaszewski et al. [22]	An environment where you can create your personality, quickly visit different places, explore expansive buildings, and shop your way	
Messinger et al. [23]	A virtual world where thousands of people can interact simultaneously within the same simulated 3D space.	Business, education, social science, technical science, and social computing impact our society as a whole
Hazan [24]	A place where users log in all the time to interact with others in play, commerce, creativity, and exploration.	Fringe for the escapist a persistent world beyond the illusion
Papagiannidis et al. [25]	A continuous, continuous world designed to give users control over almost every aspect of the world by creating the game they want.	A vibrant, dynamic world with creative, self-expression, and exciting content that supports different types of applications based on their needs
Forte et al. [26]	A virtual place where an individual's cyber community can share social interactions without the constraints of the physical world.	Addressing availability, access levels, inter-agent communication, social roles and conventions shared by users, and economic activity; A virtual art museum of the Roman city of Internemia as a cultural metaverse
Cunningham [27]	A compound word of mete and universe, meaning beyond, a temporal-spatial aspect where the real world and the virtual world interact.	Computing everywhere means information everywhere, and all things are digitized through ubiquitous computing technology.
Owens et al. [28]	An immersive three-dimensional virtual world in which people interact with each other and their environment, using real-world metaphors but without physical limitations.	
Tonkis [29]	A world that reconstructs the meaning of the living world with the experience	Consequences of actions, decisions, or choices with aesthetic experience reflect temporally apparent consequences; Consequences connect the living into ontological aspects in the form of organizing and building knowledge.
Guo et al. [30]	A computer simulation that allows avatars to interact and communicate in relatively lifelike environments	
Connolly et al. [31]	Continuous online 3D world	A downloadable client program to access the system and interact with content and other residents through customizable avatars
Resmini et al. [32]	One of the variants of the Matrix movie with some good swordsmanship or some zero-gravity kung fu.	Interaction between the Internet and the real world via mobile phones, pads, public real-time displays, consumer electronics, and connected device
Müller [33]	A world like electronic memory and the Internet as a virtual reality where users log in every day.	An infrastructure for electronic memory in the context of the next-generation Internet; Cannot be in two places at once; Can only move at a limited speed, in restricted areas.
Xanthopoulos and Papagiannidis [34]	A three-dimensional extension of the traditional electronic space that typically hosts massively multiplayer online role-playing games (MMORPGs).	The avatar is the player's virtual persona.

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TABLE I. (Continued.) Metaverse definition.

Cameron [35]	Utopian and dystopian futures, where people live more in virtual worlds than in reality.	
Hughes [36]	An asymptotic environment that users connect to and an avatars-connected world that is a proxy for a digitally represented human being.	Moving in the environment gives the user a different view of the virtual world, which is visible to other people.
Kim et al. [37]	A collective online space created by combining some physical reality enhanced by a 3D virtual world and a physically permanent virtual space.	Includes all virtual worlds, augmented reality, and the Internet
Kanenatatu et al. [38]	A 3D virtual space where the avatar is activated on behalf of the user.	Second Life as an example
Kipper et al. [39]	Cyberspace where everyone is interconnected, similar to the Internet accessed through a medium called virtual reality.	Includes simulations, WWW, different types of interfaces, collaborative environments, and other kinds of worlds.
Kim et al. [40]	The virtual world which connects physical devices (e.g., blasters).	Use cases of physical exercise
Preda et al. [41]	Collective online shared space	Convergence of virtual, augmented reality, and physically permanent virtual space, including the sum of all generated VW, AR, and Internet
Luse et al. [42]	Virtual world technology that allows you to live your virtual life online	
Dionisio et al. [43]	An integrated network of 3D virtual worlds in a shared environment that is an alternative alternative realm for human sociocultural interaction.	Features realism, ubiquity, interoperability, and scalability
Ko and Jung [44]	An online virtual community that allows the use of simulations and objects to interact with other users through avatars.	Interactivity, physical persistence, online chatting, entertainment, and educational goals.
Dascalu et al. [45]	New environments and visualizations where physical and digital objects coexist and interact in real-time	Suitable for modern educational application, raising the efficiency of the learning process
González et al. [46]	Instantiation of a 3D virtual space where people interact with each other via avatars and clients.	Transforming education, learning, virtual project management, and conversation; Control the virtual world with the actions of your avatar, providing reality without the physical limitations of the real world
Amorim et al. [47]	An immersive environment that can simulate real-world features (e.g., sound and gravity).	
Yoon et al. [48]	An immersive world of information where anything you can imagine today is connected to the Internet and intensely stimulates the sensors.	Creating and disseminating information, seamlessly merging the virtual and physical worlds; Using AI and feedback systems to enhance human-machine interactions
Moldoveanu et al. [49]	Open 3D platform, consisting in a collection of customized 3D world	Providing 3D visual interface, which provides not only remote access to the Internet but also provides their users with education services but also provides their users with new interaction and communication
Kwanya et al. [50]	Online shared space created by the convergence	Providing an architecture that enables interoperable multimedia and multi-node communication
Barry et al. [51]	A virtual 3D world where the avatar does everything for you.	
Rehm et al. [52]	Virtually augmented physical reality and physically persistent virtual space	Taking into account technical, social, legal, economic, and other aspects and factors; A vehicle for change in cyber-physical evolution at various levels
Chen [53]	Innervative environments that reflect the real world and are co-created by residents using their imagination	
Zackery et al. [54]	A world that can exist in different temporality, politically, and culturally different forms through human-machine interactions enables the game's agents to solve present problems, redefine the past, and invent the future.	Interacting with the environment and users engage through games and socializing without thinking about existence; A virtual debate community of value-driven proxy seekers who communicate without boundaries between human and non-human elements
Choi and Kim [8]	A space created by the fusion of virtual reality and augmented reality as a compound word of abstract concepts meta and merge.	Four key elements: augmented reality, virtual world, lifelogging, and mirror world
Kanenatatu et al. [55]	Created world with four different factors: realism, ubiquity, interoperability, and extensibility.	Describing the technical challenges, economic and political barriers of real-world modeling objects in the virtual world
Nevelsteen [56]	An interactive human-computer mediated simulation of an artificial environment as a permanent, synthetic, 3D, non-game-centric space that separates games and social spaces.	Internet-like, mixed reality into a virtual world (video conferencing, live web cameras in cities, remote operations, projecting buildings from networks)
Ryskeldiev et al. [10]	A constantly updated world of mixed reality spaces mapped to different geospatial locations	Archiving, recycling, and sharing virtual spaces among various mixed reality applications; Reducing the computational cost of mobile mixed reality applications and expanding interactive space

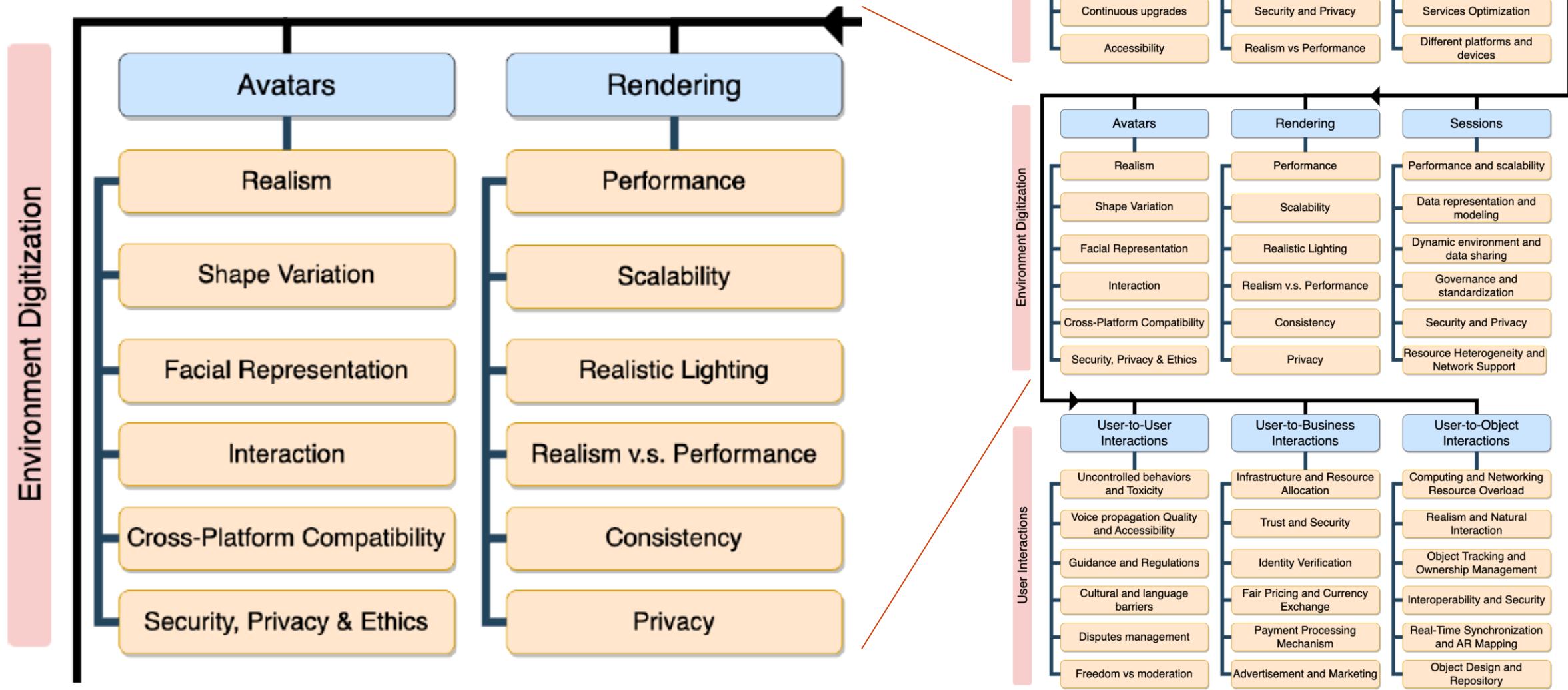
DA  
"Un mondo virtuale  
dove gli esseri  
umani esseri  
umani  
interagiscono  
mediante propri  
avatar"

A  
"Un ambiente  
misto di reale e  
virtuale"

# Gli elementi del metaverso

- Hardware and Equipment
- Frameworks, Libraries, and Platforms
- Avatars
- Object Modeling
- Environment Rendering
- Sessions and User Authentication
- Interactions (User to User, User to Business, User to Objects)

# Sfide aperte, non solo tecnologiche



# Un mondo vero o finto?



Fake

Real

