



# MULTIVERSE

MULTIPLE UNIVERSES

• [www.volucer.it](http://www.volucer.it) 

The multiverse is a hypothetical group of multiple universes

# METAVERSE

• [www.volucer.it](http://www.volucer.it) 

The "metaverse" is a hypothetical iteration of the Internet as a single, universal, and immersive virtual world that is facilitated by the use of virtual reality (VR) and augmented reality (AR) headsets. (Source wikipedia)

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# METAVVERSE

The metaverse can be defined as a simulated digital environment that uses **augmented reality (AR)**, **virtual reality (VR)**, and blockchain to create spaces for rich user interaction (**NEUROSCIENCE**) mimicking the real world.

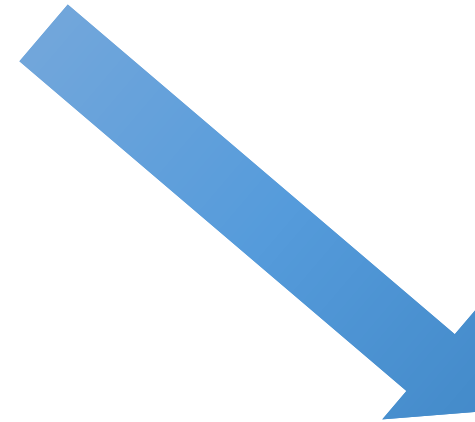


# METAVERSE

augmented reality (AR)

virtual reality (VR)

advances in neuroscience



METAVERSE

# AR (Augmented Reality)

is the real-time use of information in the form of text, graphics, audio and other virtual enhancements integrated with real-world objects. It is based on the concept of overlay (or superimposition)



**Marker-based AR**  
ARtags

**Non Marker-based AR**

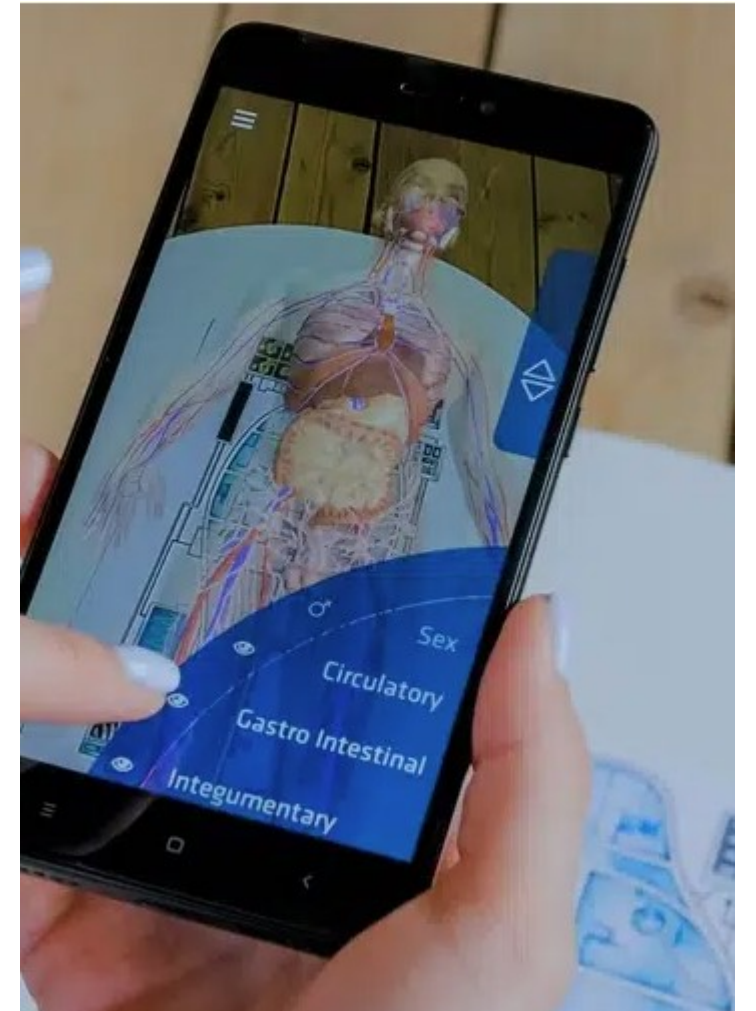


camera, GPS, digital compass, and accelerometer, to gather the necessary information that will allow the AR software to download data and information or insert virtual 3D objects into a real-world environment



# AR (Augmented Reality) instruments

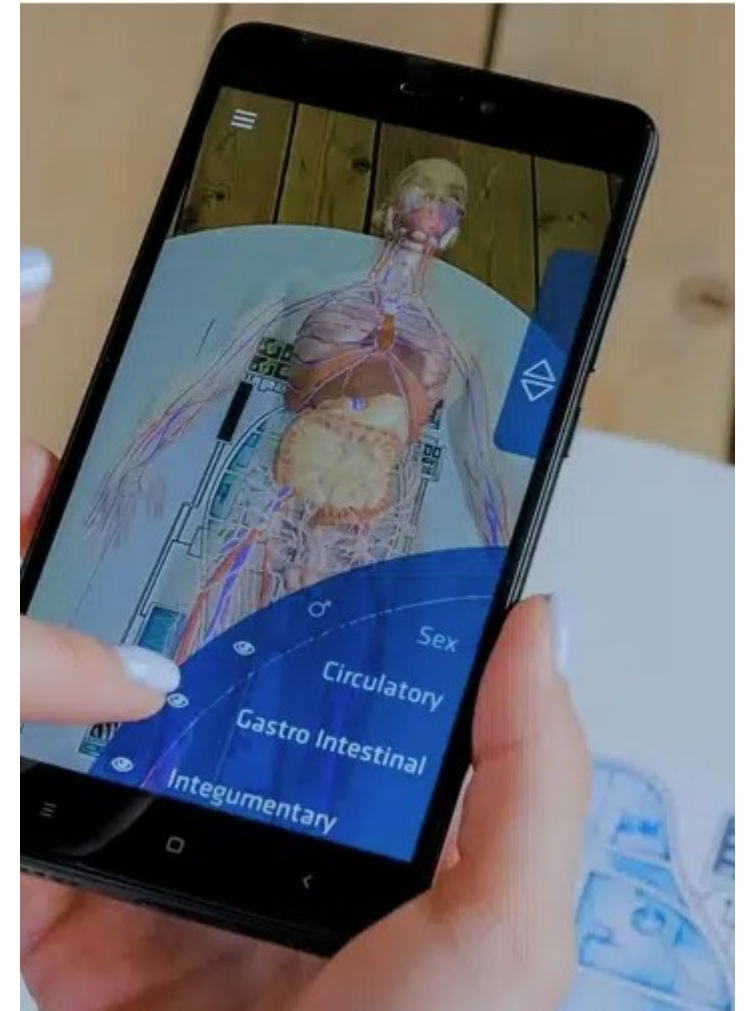
- smartphone screen,
- special glasses/visors,
- a mirror or glass



# AR (Augmented Reality) teaching and training

doctors can use augmented reality applications to study the human body in a more experiential way and see the organs in 3D

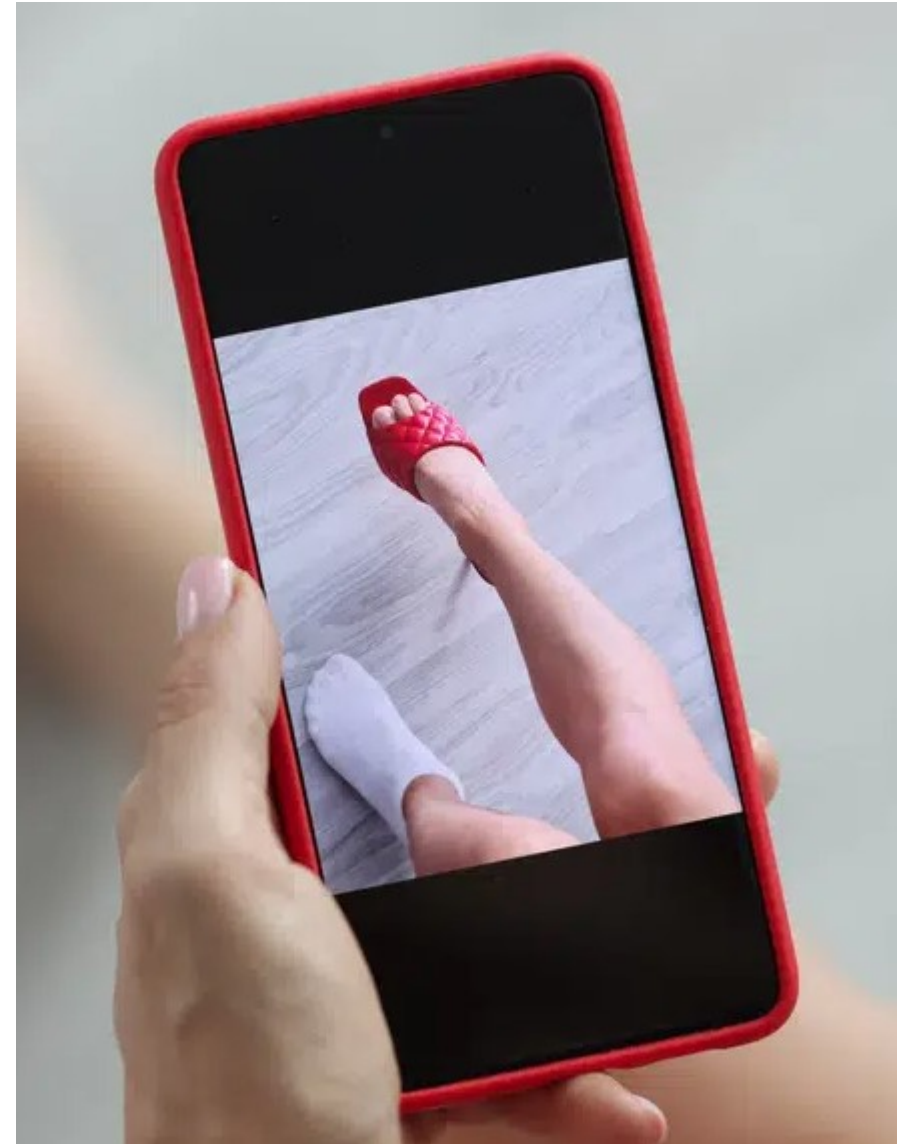
children can see first-hand how the solar system works through the tablet screen while the teacher explains





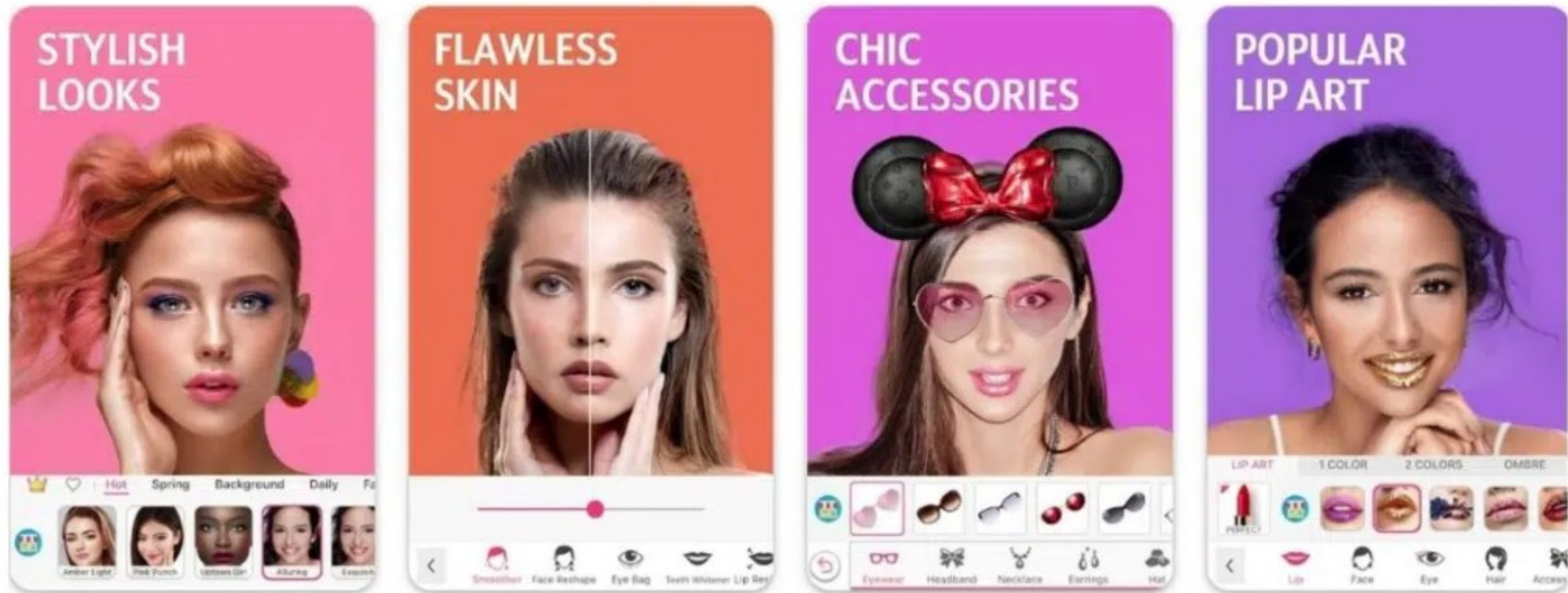
# AR (Augmented Reality) marketing

try and see the products in action before buying them with the virtual try on.



# AR (Augmented Reality) marketing

you can virtually try out entire kits of cosmetics, accessories and hair dyes.



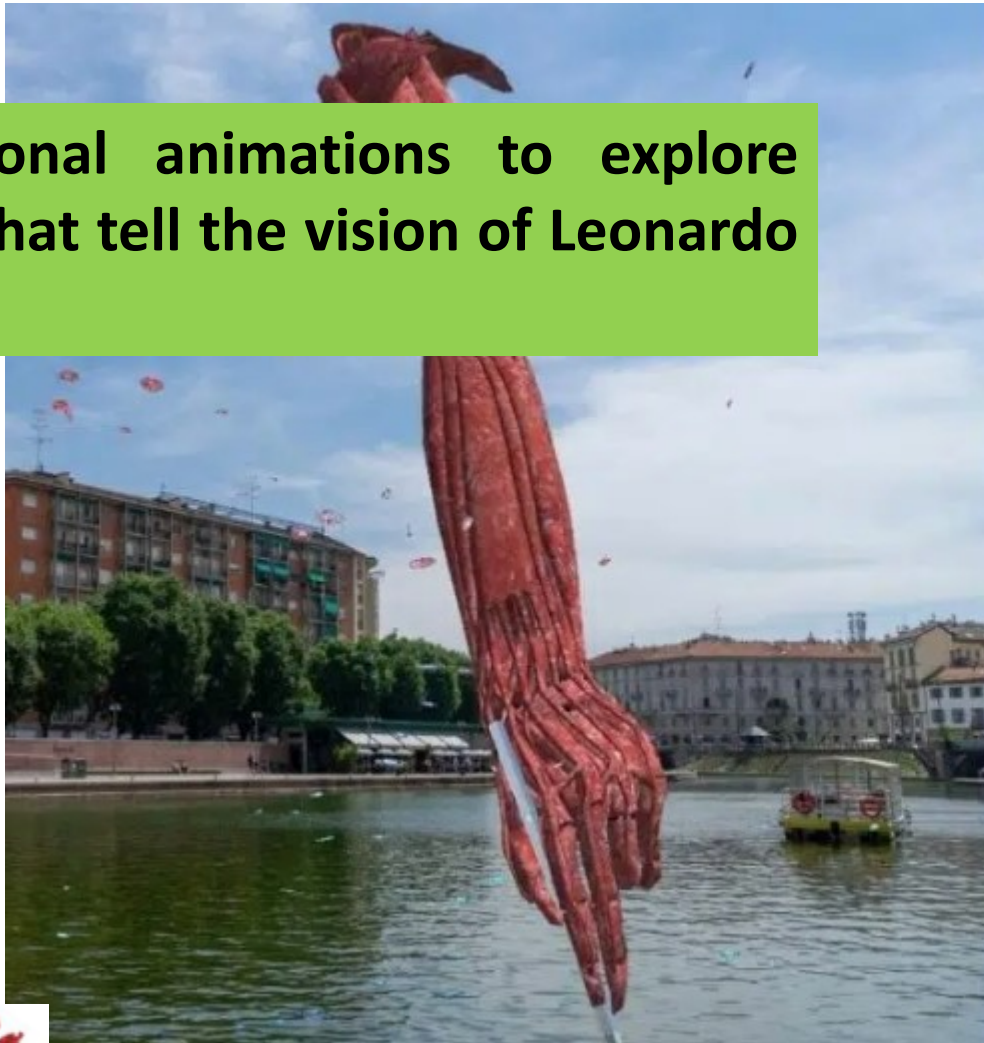
# AR (Augmented Reality) widespread exhibition

uses augmented reality for an innovative fruition of the works



# AR (Augmented Reality) widespread exhibition

three-dimensional animations to explore and listen to that tell the vision of Leonardo da Vinci



# VR (Virtual Reality)

Also, unlike augmented reality (AR), which people can access via smartphones and smart glasses, VR relies on larger Virtual Reality **headsets** and controllers to **interact with fully-immersive virtual worlds.**



# VR (Virtual Reality)

**VR**, we therefore speak of alternative virtual worlds separate from reality, which consist of three essential, integrated components:



# VR (Virtual Reality)



**CONTENT:** reproduction of real objects in the virtual world.

**GEOMETRY:** which concerns the physical extension of the environment, e.g. indoors (a building) or outdoors (a park).

**DYNAMICS:** i.e. the rules of interaction between all contents. For example, the rules of interaction between elements must or mustn't respect the laws of real-world physics.

# NEUROSCIENCE

During the COVID-19 homes are becoming our schools and our offices. The continuous use of these digital platforms (overuse of virtual videoconferencing) often generates **physical and psychological discomfort** like:

- Tiredness;
- Anxiety;
- Worry



called **ZOOM FATIGUE**.



**Why?**

When we are in videoconference, we are in multiple places:

1. Place one: on the computer screen
2. Place two: in the room where we move.

For our brain, videoconferencing systems are “**not places**”



# NEUROSCIENCE

Norwegian neuroscientists in 2014 discovered that our autobiographical memory is connected with a number of specific neurons:

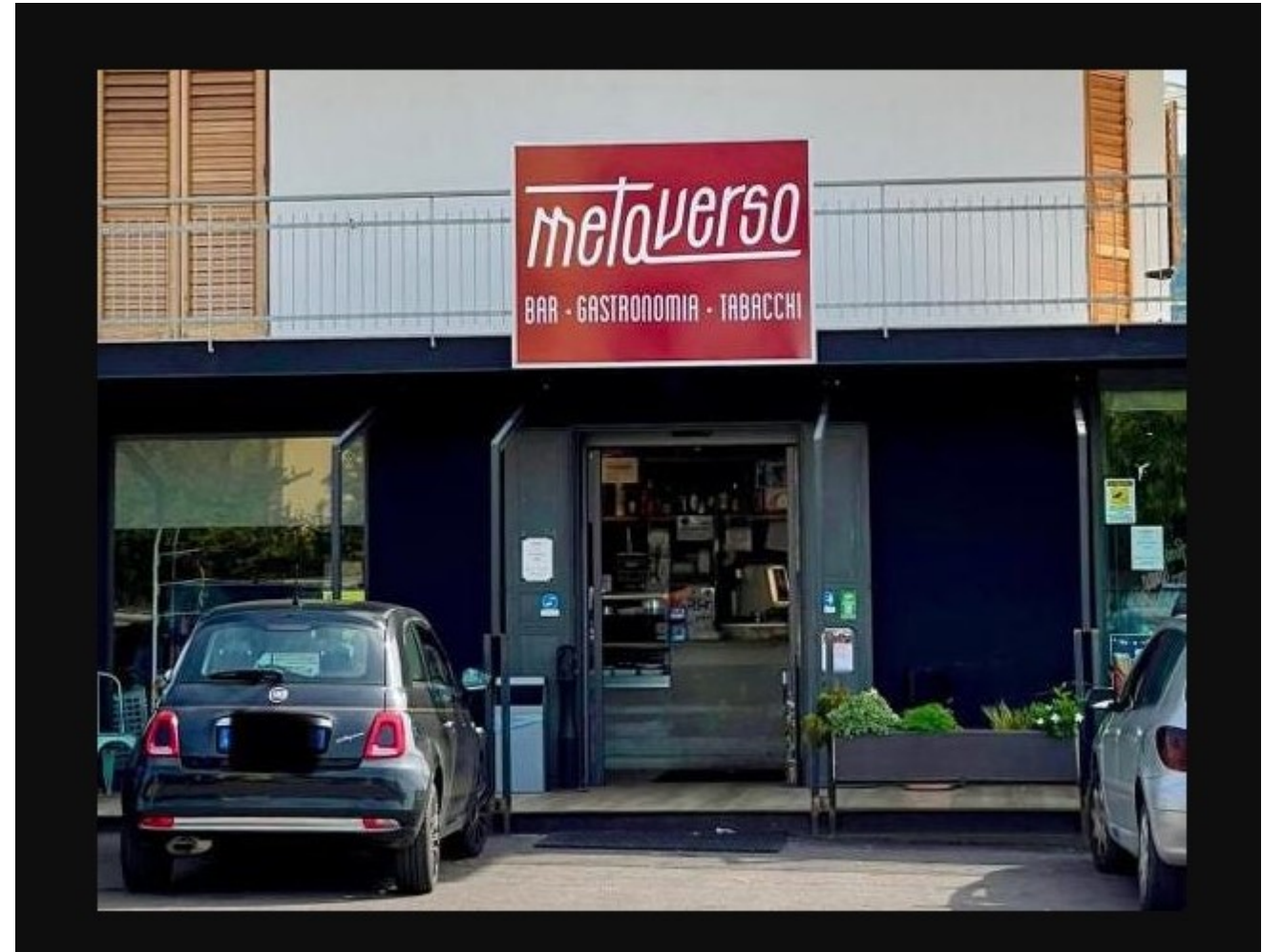
- PLACE CELL;
- BORDER CELL also called GPS neurons



GPS neurons are activated when we occupy a position in the environment, allowing us to orient ourselves in space.

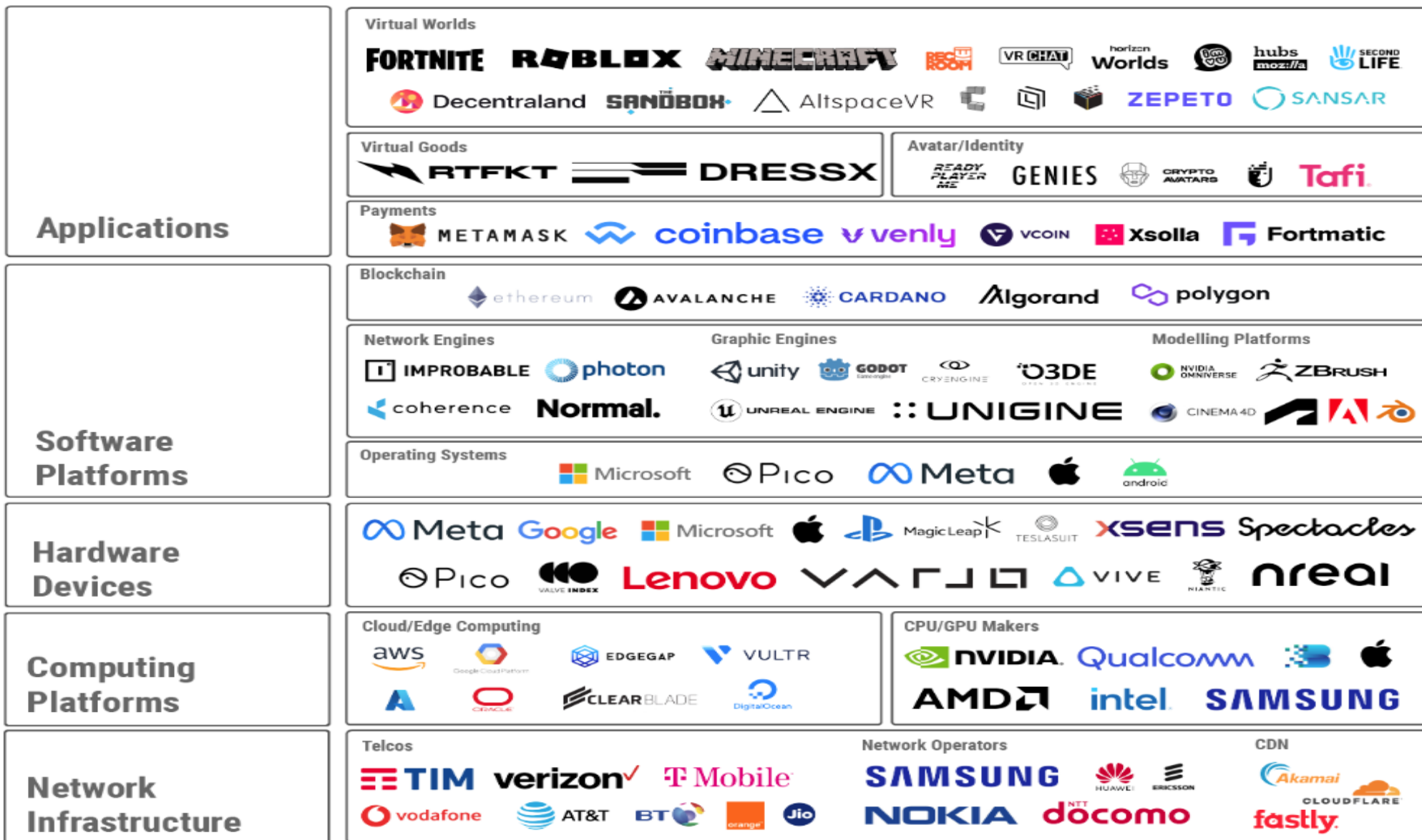
They play a vital role in our memory. We build our identity through memory. For example, we are student because we go to the university.

# METAVVERSE



# The Metaverse Ecosystem

 [osservatoriometaverso.it](http://osservatoriometaverso.it)



# METAVVERSE

Neal Stephenson spoke about the “metaverse” for the first time in 1992 in his science fiction novel **Snow Crash**. Neal describes it as a three-dimensional digital world that allowed users to escape from a physical world that had become uninteresting.

Today Metaverse is a shared, online 3D space where users can interact with each other and with computer-generated objects and avatars.

The Metaverse opens up a whole new world of economic prospects, from virtual music events to NFT-based products, to name a few.

# METAVVERSE

**ItaliaOggi7**

*Lunedì 23 Gennaio 2023*

**INNOVAZIONE**

## La definizione

Il Metaverso rappresenta un ecosistema immersivo, persistente, interattivo e interoperabile, composto da molteplici mondi virtuali interconnessi in cui gli utenti possono socializzare, lavorare, effettuare transazioni, giocare e creare, accedendo tramite strumenti di realtà estesa

*Fonte: definizione dell'Osservatorio Realtà Aumentata & Metaverso*

<https://www.osservatori.net/it/ricerche/osservatori-attivi/realta-aumentata-metaverso> : [Realtà Aumentata & Metaverso: la Ricerca 2022-2023 \(osservatori.net\)](#) - Politecnico di Milano;

# METAVERSE

Il metaverso deve possedere determinate caratteristiche:

- **Persistente;**
- **Accessibile a tutti;**
- **Immersivo;**
- **Modulabile;**
- **Transazionale;**
- **Consentire il possesso di asset;**
- **La rappresentazione tramite avatar.**

Fonte: Osservatorio Realtà aumentata e metaverso della School of management del Politecnico di Milano

# METAVVERSE

In other words Metaverse is:

- a universal and immersive virtual world
- a network of 3D virtual worlds focused on social connection

based on these technologies:

- virtual reality (VR)
- augmented reality (AR)



# METAVERSE

The experience of our body is not direct but is the result of a simulation created by our mind through the multi-sensory integration of different body signals.

Considering for example **PHANTOM LIMB SYNDROME**, amputees suffering from this syndrome continue to feel pain in the empty space where their limb used to be.





# METAVEVERSE



# METaverse

- ***The first Metaverse idea*** is digital three-dimensional worlds accessible through dedicated viewers and devices. In this vision there are companies such as Meta, HTC, Sony and ByteDance, owner of TikTok.
- ***The second Metaverse idea*** is augmented reality. In this vision are companies such as: Niantic, Snap and Apple. The Metaverse, in this case, is the world we see enriched by digital objects and information that are superimposed on our vision through a smartphone and/or glasses.
- ***The third Metaverse idea*** is 3D worlds accessible from a browser or a desktop or mobile application. Examples of this vision are Roblox, Minecraft and Fortnite games and 3D meetings by Google.
- ***The fourth Metaverse idea*** is the future of the Internet not as html pages but as three-dimensional, interconnected immersive places.

# METAVVERSE

Fonte: Osservatorio Realtà aumentata e metaverso della School of management del Politecnico di Milano

## Classificazione dei 141 mondi esistenti:

**METAVVERSE READY:** liberamente accessibile, economicamente attivo, dotato di grafica 3D, uso di asset digitali, consentono interoperabilità (DECENTRELAND, THE SABDBOX, THE NEMESIS – italiana);

**OPEN WORLD:** spazio virtuale aperto, persistente, immersive sia per imprese che per finalità sociali - no NFT=certificati digitali (HORIZON WORLDS);

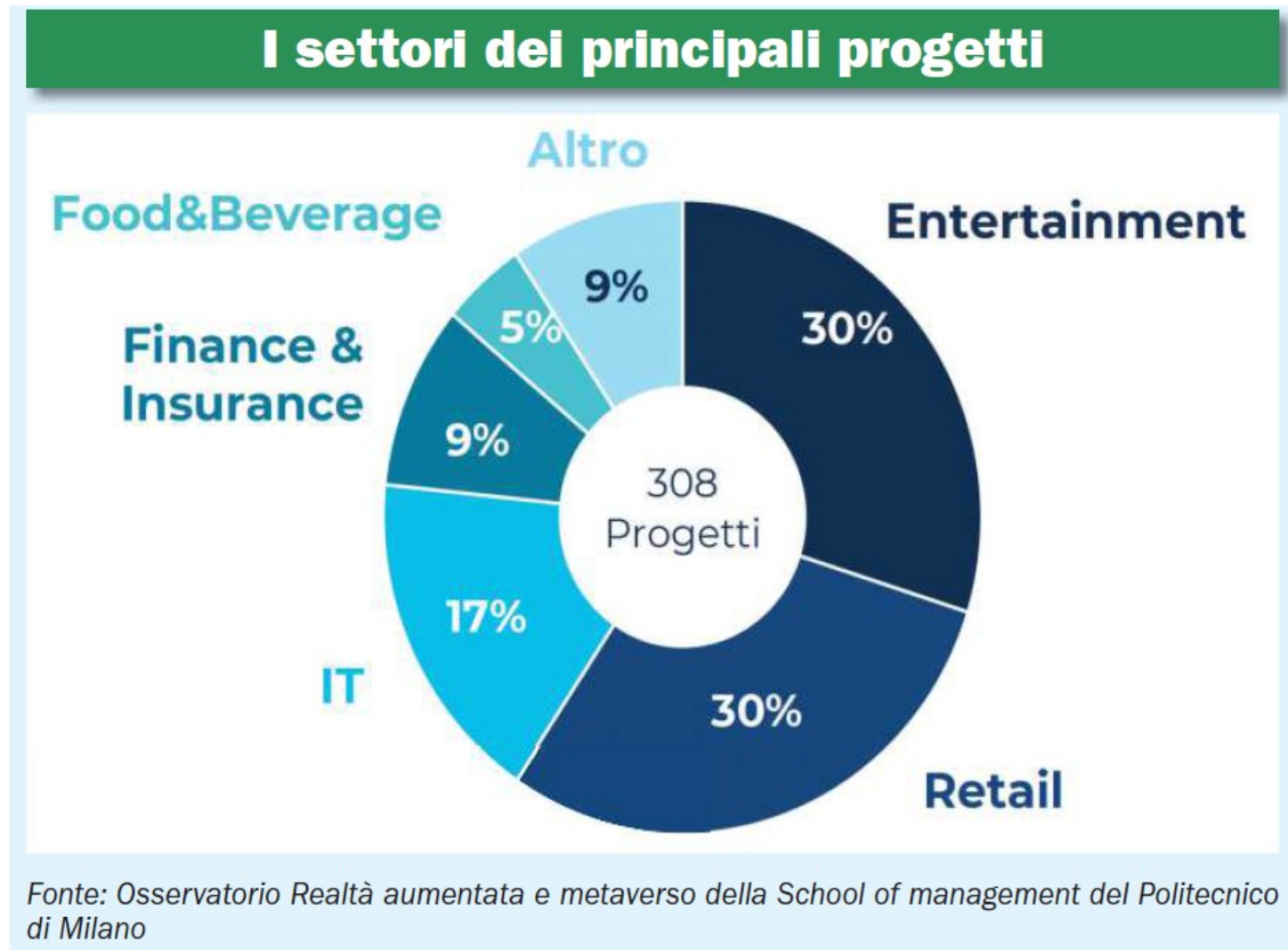
**FOCUSED WORLD:** mondi virtuali settoriali: gaming , commercio, formazione, collaborazione lavorativa (FORTNITE, MICROSOFT MESH);

**SHOROOMING WORLD:** vetrine virtuali destinate alle esposizioni senza la presenza di un economia interna (MUSEE DEZENTRAL)

**TEMPORARY SPACE:** create per uno specifico evento o manifestazione.

# METAVVERSE

Fonte: Osservatorio Realtà aumentata e metaverso della School of management del Politecnico di Milano



# METAVERSE: BODY SWAPPING

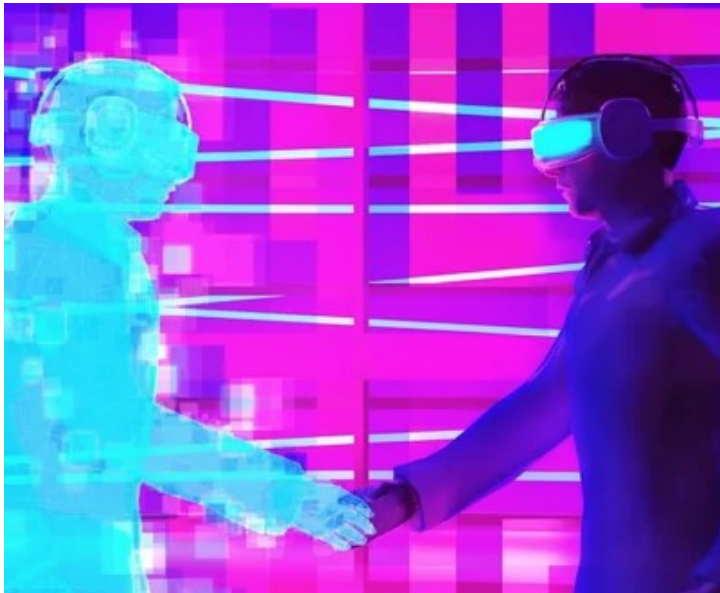
Television and social media are persuasive technologies, the Metaverse is a transformative technology. The metaverse allows one to enter a body other than one's own.

**EXAMPLE 01:** By entering Albert Einstein's body, subjects become significantly more intelligent.

**EXAMPLE 02:** By entering the body of a black person, racial prejudice is reduced.

**EXAMPLE 03:** By entering the body of a bad guy, I could become a dangerous person.

In practice, our brain enters a different body in an automatic way and changes its simulations. Positive applications: health, wellness, training..



# METAVEVERSE: MIXED REALITY

The term 'mixed reality' (MR) was coined by Paul Milgram (1994).

The two worlds are by the “digital twins”, virtual clones of real objects, connected directly with the physical counterpart, for example:

- **AVATAR:** If I move in the real world my virtual avatar also moves. If the avatar is touched in the digital world, tactile feedback is provided to the physical body.
- **OBJECTS:** If I start the washing machine in virtual reality, the physical one in my apartment also starts working.



# INDUSTRIAL METAVERSE

The objective is to create virtual copies of one or more elements of a company: workshop, production chain, marketing department to simulate without blocking operations.

Operating parameters could be analyzed and then these can be modified in order to increase performance and decrease costs.

Only when the suitably modified virtual model creates the desired advantages in terms of both economics and performance then the real counterpart is modified. In this way these interventions will produce the desired effects with high probability of success.



# METAVVERSE





# METAVVERSE



# METAVVERSE



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Thank you