VREXPERT

Leveraging Augmented Reality in Technical Education

Exploring the possibilities with Magic Leap 2

Powered by Magic Leap

Introduction

In our ever-advancing technological landscape, Augmented Reality (AR) becomes a driving force, reshaping our interactions with the world. As Augmented Reality technology progresses, particularly through innovations like the Magic Leap 2, its importance becomes more and more obvious.

This whitepaper explores the realm of AR, with a particular focus on the advancements brought forth by the Magic Leap 2. Differences between the AR and MR technologies are also highlighted as well as possible Use Cases across different verticals, showcasing the possibilities with the Magic Leap 2

By understanding the distinctive features and advantages of Augmented Reality, organizations and individuals have the opportunity to utilize its capabilities to explore new possibilities and foster innovation in the digital era.

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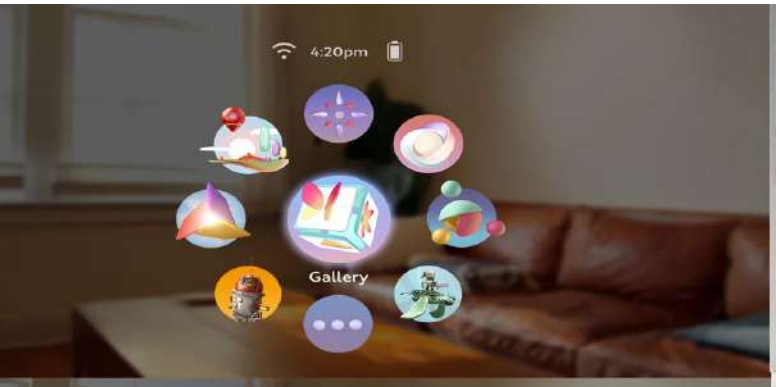
Mixed Reality vs Augmented Reality

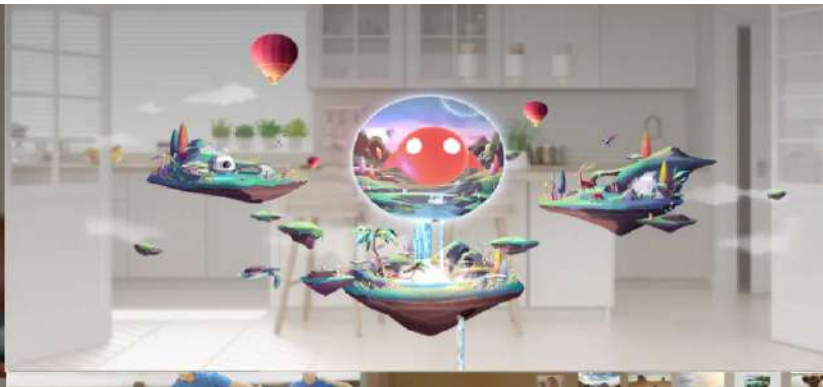
Augmented Reality and Mixed Reality are both immersive technologies, which differ in their level of immersion and the way they integrate virtual elements into the real world.

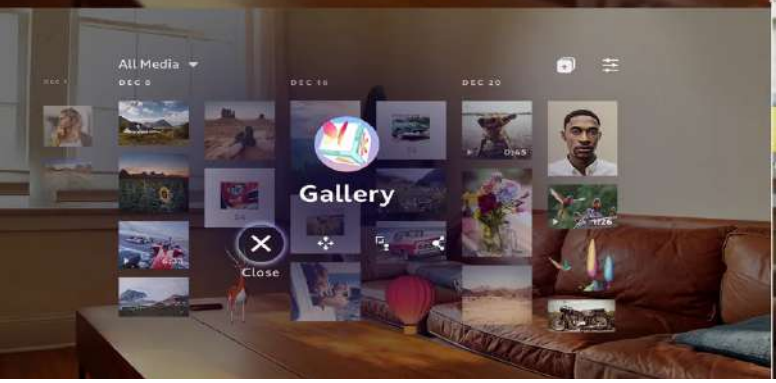
Augmented Reality
Augmented Reality (AR) integrates digital information into the real world and lets users interact with it. The users are able to see the real world as it is, through their eyes. The AR Device will only enhance the environment of the user by overlaying digital content onto it.

Mixed Reality
Mixed Reality (MR) mergers the digital world with the real one. Users will also be able to see the real world, but compared to AR the view is perceived through a picture that the MR Headset captures though cameras on the outside of the device and projecting this picture to the lenses for the user to see.

That way elements of the real world and digital elements get combined and appear to coexist and those digital elements even seem to interact with the real physical surroundings.







Advantages of Augmented Reality

When considering the benefits of Augmented Reality in comparison to Mixed Reality, several advantages become clear:

Enhanced Safety
The image that is seen through an MR headset is recorded in real time and directly displayed on the lenses for the user to see. This method however leads to a certain time delay in this real-time transmission. With an AR headset, this latency is avoided because the real world is directly visible to the user while in use. This way situational awareness can be ensured while minimizing the risk of accidents or injuries.

Outdoor Use
Certain AR devices, such as the Magic Leap 2, are designed for outdoor use, thanks to the ability to dim the lenses. This feature addresses a common issue with MR headsets, which often struggle with sunlight sensitivity. Users can comfortably engage with AR applications in outdoor environments without compromising visibility or performance.

Precise Object Detection
AR devices equipped with Lidar depth sensors enable accurate determination of objects in the user's surroundings. This technology enhances object recognition capabilities, facilitating various applications such as navigation, spatial mapping, and interaction with virtual objects.

Seamless Integration of Digital Content
AR overlays digital data onto the real world, providing users with contextual information seamlessly integrated into their surroundings. Unlike MR, which may present a composite view of the real world along with additional digital information, AR ensures that digital content appears as layers on top of the physical environment, maintaining clarity and coherence.

In summary, Augmented Reality offers several unique advantages over Mixed Reality. These benefits led to the belief that Augmented Reality represents the future of immersive (human-computer) interaction, offering various benefits across several areas by assisting in specific tasks, enhancing productivity and exceeding human possibilities.

About Magic Leap

Magic Leap was founded in 2010 by Rony Abovitz and is known for its pioneering work in Augmented Reality.

Headquartered in Plantation, Florida, the company is aiming to revolutionize digital interactions by seamlessly integrating digital content to the real world through its “spatial computing” platform.

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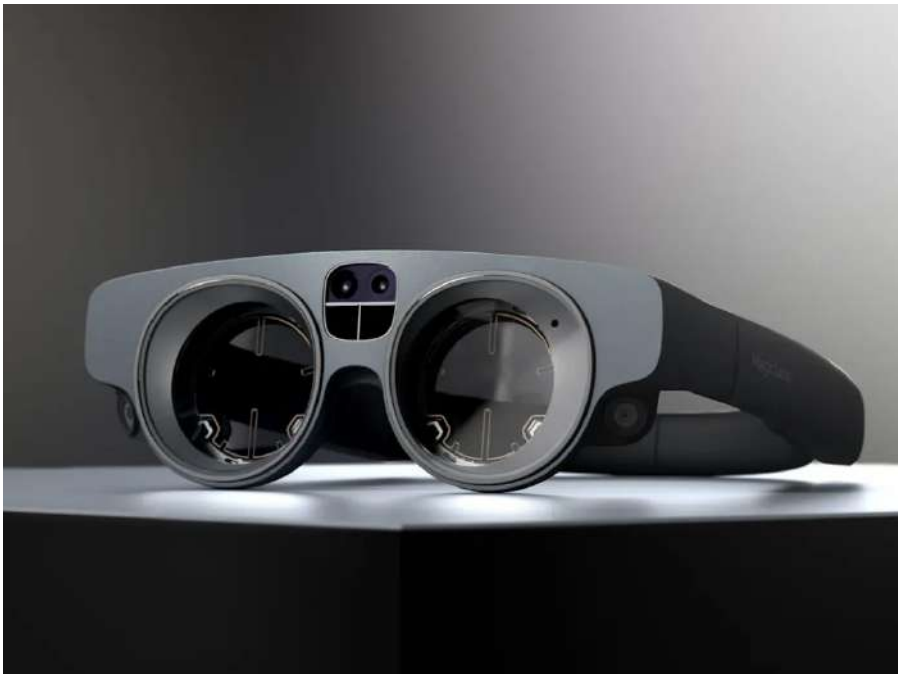
>
> We seamlessly integrate the digital world into the physical to amplify human potential.
>
> **Magic Leap**

Magic Leap 1
In 2018, Magic Leap unveiled its much-anticipated product, the Magic Leap One. However, despite its innovative features such as environment mapping and hand-tracking, the device faced mixed reviews due to concerns about its bulkiness, high price point, and limited content ecosystem.



Magic Leap 2
Responding to market feedback, Magic Leap shifted its focus towards enterprise applications of AR technology, recognizing the challenges of widespread consumer adoption. In September 2022 Magic Leap released their new headset, the Magic Leap 2.

Magic Leap 2 integrates new innovations to address the barriers that have prevented the widespread adoption of AR technology and are critical to making AR a valuable tool for daily use across multiple sectors.

Magic Leap 2

The Magic Leap 2 represents a significant leap forward in augmented reality technology, succeeding the Magic Leap 1 with its enhanced features and capabilities. This binocular AR headset offers advanced capabilities, projecting 3D objects seamlessly into the user's view of the physical world in real time. Designed with versatility in mind, the Magic Leap 2 caters to various use cases such as design projects, training, and 3D visualizations.

The Magic Leap 2

3 License types available: Base, Developer Pro and Enterprise

Product specifications

AR View:	Binocular	Camera:	12.6 MP, 4k video
FOV (Horizontal):	70 degrees	Memory:	16GB RAM / 256GB internal memory
Weight	260 grams		
Built-in Audio:	Yes (Stereo speaker)	Battery life:	3.5 hours
Microphone:	Yes	Controls:	Voice, eye tracking, hand tracking, controller
Connectivity:	WiFi, Bluetooth		
Charging:	USB C	Operating System:	Android AOSP
Operating System:	Microsoft Holographic OS	Chip:	AMD Quad-core Zen2 x86 CPU

Commercial Details

Price:	€4,120
Warranty:	1 year
Industry and safety:	PPE

Hardware

Build-in display:	✓
Build-in audio:	✓
Standalone:	✓

Pros

Spatial mapping
Can handle demanding applications
70° FOV creating a more immersive experience
Lightweight and comfortable
Easily customisable Android Open Source Project Operating System
Multiple input options
Industry-leading adaptive dimming

Cons

Compute Pack must always be carried
No memory card slots

Benefits of Magic Leap 2

Display & Visuals
The Magic Leap 2 has much improved spatial mapping capabilities. Spatial mapping allows virtual objects or holograms to interact with the physical reality around us. The Magic Leap 2 has sensors continually scanning and processing the environment around you which allows for the 3D objects and information to be projected and interacted with as if they were part of your environment. The augmented reality capabilities make it ideal for simulations, 3D visualizations and design projects.

Most powerful device
The Magic Leap 2, with its powerful computing capabilities, processes complex data flawlessly, setting it apart from competitors. Featuring a quad-core AMD Processor and 16GB of RAM, it effortlessly runs demanding applications. This advanced chipset empowers high performance, facilitating the seamless integration of digital content into the real world.

Field of view
The large field of view of 70 degrees allows for more realistic interactions and visualizations to take place between the digital and physical worlds. This is because with a wider field of view larger digital objects can stay within view, or not be half cut off when you turn your head giving a better and more natural experience. This enables almost any 3D model to be fitted into view removing the issues of the previous headset having to look up and down to view larger models.

Controlling
The Magic Leap 2 has the possibility to be controlled by multiple control options. The headset can be controlled using a controller, hand tracking, eye tracking, voice commands and optionally with other Bluetooth devices. Not only can all of these methods be used but they can also be used at the same time. Furthermore, the standard controller is much improved from the previous Magic Leap using optical tracking and infrared sensors to improve precision.

Comfortable fit
Fifth, the Magic Leap 2 is extremely lightweight with the Goggles weighing a mere 260 grams. This is thanks to Magic Leap moving all the processing power and battery into a separate external device connected by a cable to the device. The external device known as a Compute Pack can be put in a bag or connected to your belt via a clip system. The use of the external processing unit and the battery is what allows the Magic Leap to be more lightweight but still more powerful than its competitors.

Environmental Adaptability
The Magic Leap 2 has a 'global dimming' capability assisted by segmented dimming. This enables users to dim either entire surroundings or specific areas of the environment creating a more focused immersive space. The dimming also works automatically with sunlight to ensure digital objects remain visible. These can be used in a wide range of use cases ranging from global dimming to increase productivity by minimizing distractions to segmented dimming to simulate smoke visibility in fire training as used by Avrio.

Object Recognition
With the use of lidar depth sensors, Magic Leap 2 excels at accurately determining objects in the user's environment. This capability enhances the user experience by enabling precise placement and interaction with digital content in real time.

Differences between Magic Leap 2 Versions

The Magic Leap 2 comes in 3 different versions: the **Base license**, the **Magic Leap 2 Developer Pro license** and the **Enterprise license**. Although each version includes the Magic Leap 2 device, they diverge in their software configurations.

All three licenses have the Magic Leap 2 headset, compute pack and controllers, as well as multi-model input support, meaning hand-tracking, eye-tracking and voice-enabled streaming and some other features. For the full list breakdown, see the list on page 11.

Magic Leap 2 Base license
Magic Leap 2 Base model features the AR headset with the compute pack and controllers.
This version has a 1 year limited warranty.

Magic Leap 2 Developer Pro license
The Magic Leap 2 Developer Pro license is designed for developers creating custom AR software solutions. It offers the functionalities that are also provided in the base model and additionally includes support for developers, enabling pre-release testing and porting from Magic Leap 1 and Hololens devices.
With Developer Pro, users gain access to Magic Leap's Developer Portal, with unique developer tools, Magic Leap templates to streamline the development process (for more information see: https://ml2-developer.magicleap.com/) , and beta updates, fostering collaboration within the developer community. Additionally with the Developer Pro license users can get early access to developer updates.
However, the Developer Pro license does not include commercial deployment rights and comes with a one-year warranty.

Magic Leap 2 Enterprise license
Magic Leap 2 Enterprise license includes all functionalities from the Developer Pro license, with extended warranty and commercial deployment rights, as well as specialized support tailored to meet the unique demands of enterprises.
The Enterprise license is the ideal choice for augmented reality integration within corporate settings, specifically tailored for businesses implementing AR applications for commercial purposes. This license includes an extended warranty period of 2 years, facilitating a free-of-charge repairs or replacement on defective units* within 1 - 2 working days.

After the purchase, you can activate your license by scanning your license QR code with your Magic Leap 2 headset or by entering your license key into the Settings App on your Magic Leap 2 device.

* For more information, please see Magic Leap's warranty information here: https://www.magicleap.com/warranty

	Base	Developer Pro	Enterprise
Hand tracking	✓	✓	✓
Eye tracking	✓	✓	✓
Voice-enabled	✓	✓	✓
Design for extended wear	✓	✓	✓
Largest FoV in its class	✓	✓	✓
Dynamic Dimming™ technology	✓	✓	✓
Compute Pack	✓	✓	✓
Mixed reality capture and streaming	✓	✓	✓
Support for Custom Start Screen	✓	✓	✓
App Launcher	✓	✓	✓
Support for Locked Task Mode (Kiosk Mode)	✓	✓	✓
Single-user mode	✓	✓	✓
On device Spatial Mapping (up to 250m2 in a single space)	✓	✓	✓
AR Cloud-ready hardware		✓	✓
Multi-user mode		✓	✓
Iris ID authentication		✓	✓
Enterprise app signing (Spring 2024)		✓	✓
Magic Leap Remote Rendering		✓	✓
2-year warranty		✓	✓
Commercial deployment rights		✓	✓
			✓

Use Cases with the Magic Leap 2

For its wide range of potential applications across industries in construction, engineering, manufaction, healthcare and education, Magic Leap was prized with the iF Award in 2022, under the Product & Gaming category.

Magic Leap 2 represents a significant milestone for Augmented Reality technology, extending the range of potential Use Cases across various industries from healthcare training to product development to spatial planning and more. It opens up new possibilities for learning and collaboration with immersive experiences and improved productivity.
In this section, we explore some of the key use cases with the Magic Leap 2.

Magic Leap 2 in Real-time Training & Simulation

Guidance: Magic Leap 2 for Architecture, Spatial and Urban Planning

Magic Leap Revolutionizing Collaborative Design

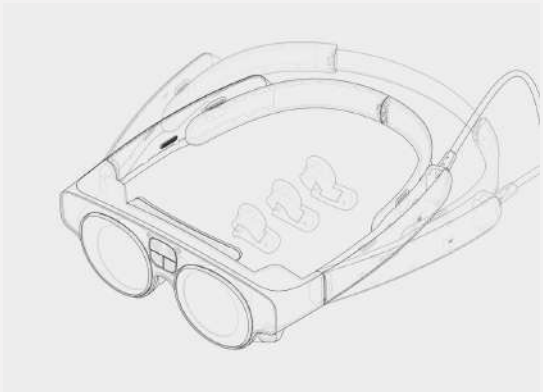
Magic Leap 2 in Real-time Training & Simulation

Magic Leap 2 opens new dimensions in training and simulation scenarios, offering advanced capabilities in merging digital information with the physical world. With the help of software like frontline.io it, dynamic workflows become possible where users can access real-time instructions directly on machinery.

Magic Leap 2 enables comprehensive training simulations by incorporating entire buildings, offering immersive experiences such as fire alarm training scenarios where users engage with realistic environments and equipment interactions, ensuring effective learning outcomes.

Magic Leap 2 for Manufacturing
Magic Leap 2 revolutionizes maintenance procedures and can help reduce human error with its Lidar Depth Sensor technology.

The Lidar Depth Sensor of the Magic Leap 2 makes machinery recognition possible, identifying the specific machinery and therefore displaying the relevant instructions on screen, overlayed on top of the physical world-image.



Guidance: Magic Leap 2 for Architecture, Spatial and Urban Planning

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Magic Leap 2 "enables direct interaction with 3D digital content in the physical world. The device strikes an optimal balance between powerful computing technology and extended comfort that allows the headset to be worn for extended periods of time."

Magic Leap Newsroom, 2022

Magic Leap 2 empowers architects and designers to bring their ideas to life with precision and efficiency. Combining remarkable spatial mapping and high quality visualization capabilities, Magic Leap 2 allows architects and spatial planners to create, manipulate and interact with realistic 3D models in real-time, by overlaying 3D models on top of the current world cityscape, in real-time.

This means that whether it is visualizing buildings on location and processing big skyscraper modules or visualizing interactive zoning maps, Magic Leap 2's powerful computing capabilities, combined with the relevant software options makes ideas come to life before commiting to the building stage.

Enabling a proactive approach, using Magic Leap 2 can help iron out the details and pinpoint potential complications, reducing planning error and changes that might become costly after committing to the construction phase.

Magic Leap Revolutionizing Collaborative Design

Awarded with the iF Award under the Product & Gaming Hardware/VR/AR category, Magic Leap is an AR industry leader with its advanced 3D visualization capabilities of Magic Leap 2. Its 2 LCoS displays and powerful computing capabilities enable the visualization of complex models with high precision, where every detail counts.

Magic Leap 2 facilitates collaborative design environments by allowing multiple users to interact with and manipulate 3D models together in real-time, thanks to the AR Ready Hardware. This enables synchronized spatial data across all devices which enables collocated experiences. 3D Modules can therefore be seen by multiple people in other headsets in the exact same position.

These collaborative design environments are particularly beneficial for industries such as automotive and industrial design, where teams can visualize and refine complex modules together in real-time, when combined with the right software.

VR Expert

VR Expert is Europe's leading provider of VR & AR hardware. Active in the Netherlands, Belgium, France and Germany. With offices in Utrecht and Cologne. Our mission is to help companies successfully implement VR & AR hardware solutions.

We focus on service and perfect delivery. Providing VR/AR hardware advice, installation, support and distribution services. We can configure your headset, install your software. Ship internationally to any wished addresses and optionally can be the first line of support.

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Get advice

Looking for a complete augmented reality solution?
Contact us for tailored advice from our experts, on about the perfect fit for hardware as well as software and service according to your use case.

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