Technical University of Sofia
We succeed!

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Cyprus University of Technology

1862 RIGA TECHNICAL UNIVERSITY

DaCaDu 2026

CUT, Limassol
February 9th - 13th

TECHNICAL UNIVERSITY OF SOFIA

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Cyprus University of Technology

RIGA TECHNICAL UNIVERSITY

DaCaDu 2026

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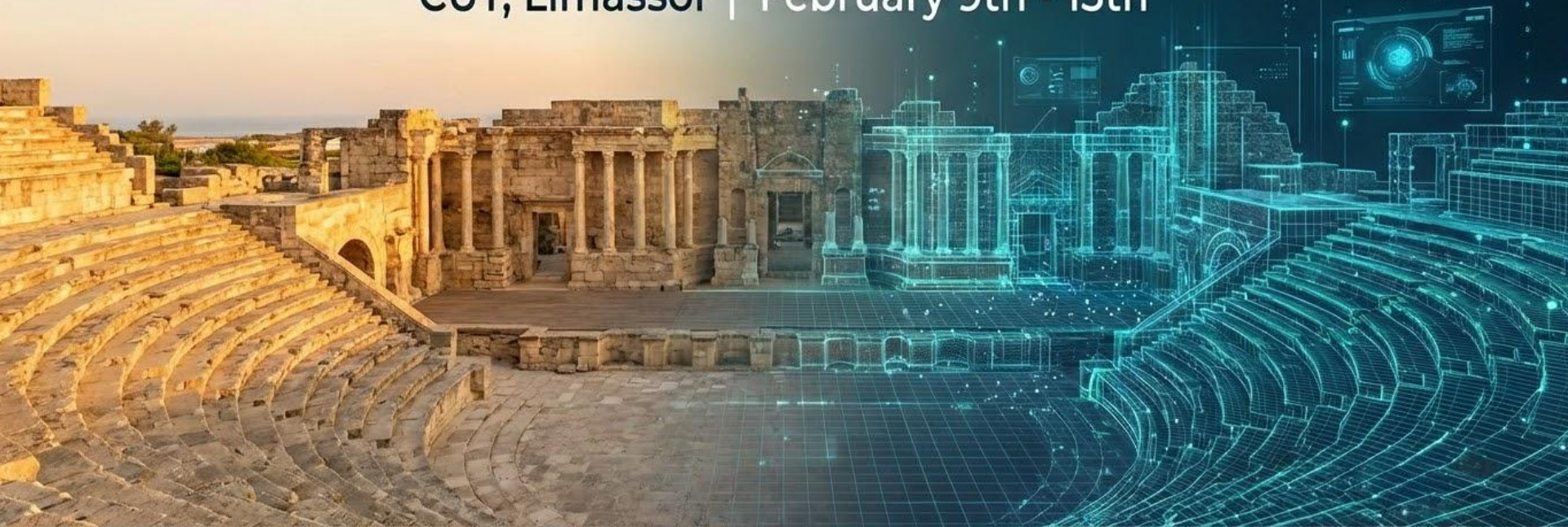

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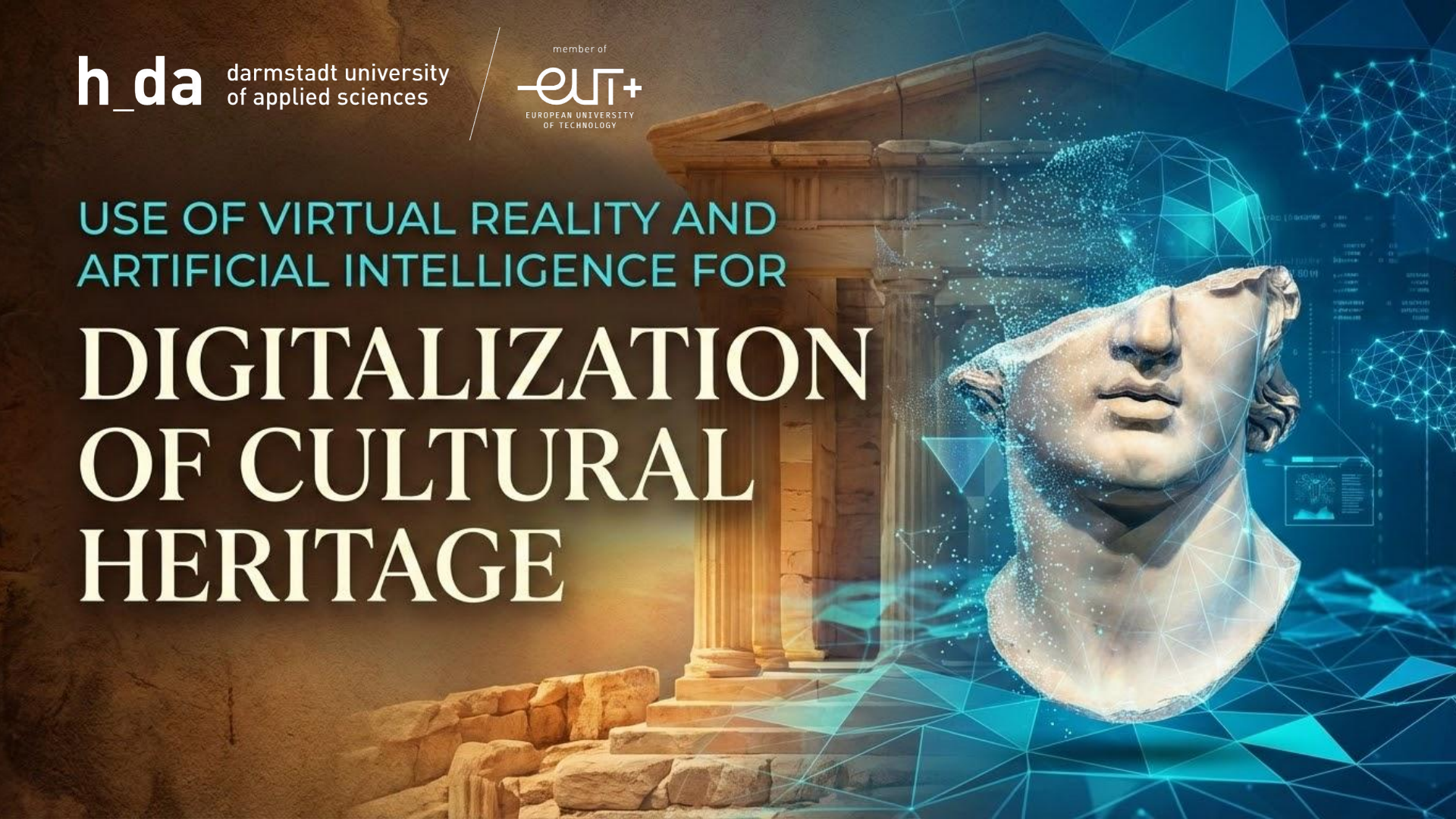
USE OF VIRTUAL REALITY AND ARTIFICIAL INTELLIGENCE FOR DIGITALIZATION OF CULTURAL HERITAGE



Schedule

	Monday	Tuesday	Wednesday	Thursday	Friday
9:00	Welcome (Dimitris)	Introduction to AI and overview of AI-Enhanced applications (Dimitris & Paul)	Field Trip: Kourion (Start: 8:30)	Class: Digital Heritage (CUT) or Intercultural scenarios via AI (Stefanie/ Vessela)	Language & Presentation of 3 D Object (UNICAS & Portugal) Final presentations (students)
10:00	Coffee break	Coffee break	Coffee break	Coffee break	Coffee break
10:30 11:00	Warming up (Stefanie & Vessela) Introduction for Final presentation on Friday: Blueprint for new users (Dimitris & Paul) Digitalization of Cultural Heritage (Paul) VR Introduction 360 + Photogrammetry Introduction	Hands-on Groupwork: Intercultural scenarios via AI (Stefanie/ Vessela)		Language & Presentation of 3 D Object (RTU students) Library is closing at 12:00	Final Presentations (students) Feedback End: 12:00
12:30	Lunch	Lunch	Lunch / Mountain (13:00)	Lunch	Lunch
13:30	Group Finding (5 per group, Minimum 3 different universities) Language & Presentation of 3 D Object (CUT)	Language & Presentation of 3 D Object (h-da)	Language & Presentation of 3 D Object (TUS)	Cultural Event	
14:00	Smart glasses: Hands On *Mehrsprachigkeit* (CUT/ Dimitris) Group Work	Field trip Theater Production (Mixed groups)	Group work (students) Back: 15:30	Group Work (students)	
16:00	Wrap up Session Walk to University/ Marina			Cultural Event	
17:00	Social Event	19:00 Superbowl & Karaoke Night			

Monday

Welcome

WELCOME TO

DACADU+ 2026

In Limassol,Cyprus

Cyprus University of Technology

Let’s introduce ourselves

Cyprus University of Technology

Let’s introduce ourselves

Let’s introduce ourselves

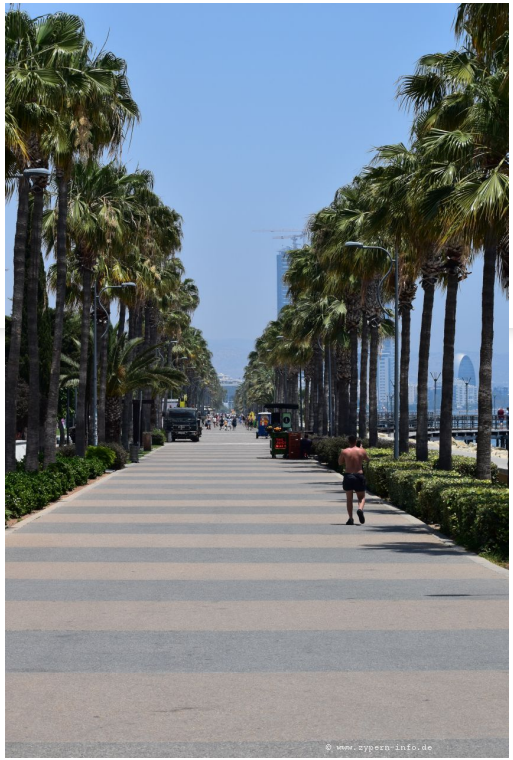
We will be taking photos.

If you do not wish to be photographed, please make this clear.

Cyprus University of Technology

The City of Limassol

https://www.youtube.com/watch?v=JQu9zzKZ7C4



Cyprus University of Technology

The Cyprus University of Technology

Who are we and what do we offer?

Let’s take a look

https://www.youtube.com/watch?v=LE4XpM53XEU

https://www.cut.ac.cy/studies/bachelor/

The CUTing Edge at CUT

A very busy and flexible center.

During this week we will learn about..

- Extended Reality (XR)
- Smart Glasses
- Digital Heritage
- 3D Printing
- 360 Photography and many more

Cyprus University of Technology

EUROPEAN UNIVERSITY OF TECHNOLOGY

Warming-Up

Erasmus+

Co-funded by the European Union

Have a TEAM

Spotlight on YOU - SELL yourself!

Get to know each other – TWO out of THREE

SMILE!

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Cyprus University of Technology

Erasmus+

Co-funded by the European Union

Introduction to Virtual Reality


COMBO
2
×4

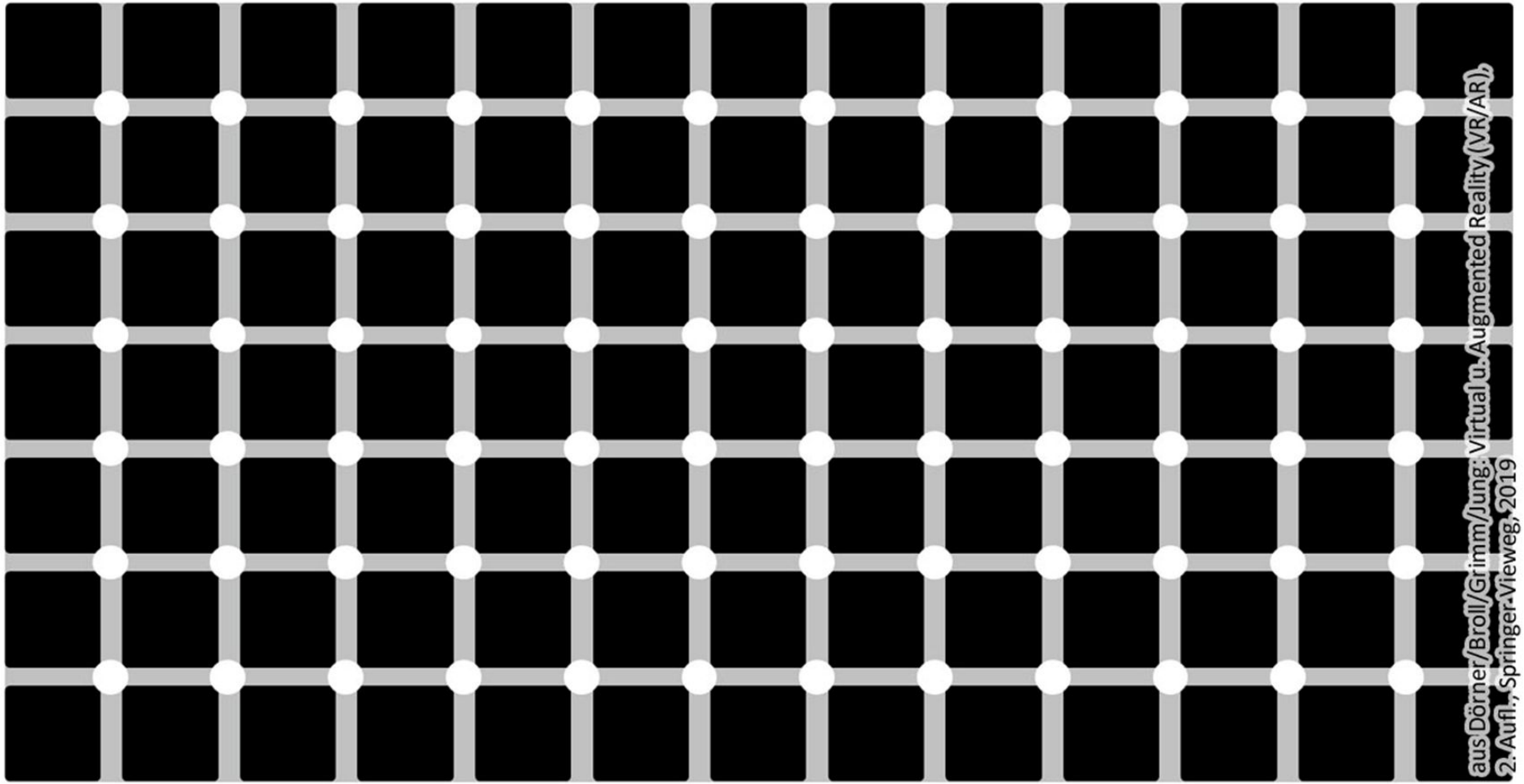


Abb. 1.1 Ein Hermann-Gitter

Goal for today

- Introduction

- Definition of fundamental terms

ARQuake
in 2002

Virtual Reality vs Augmented Reality

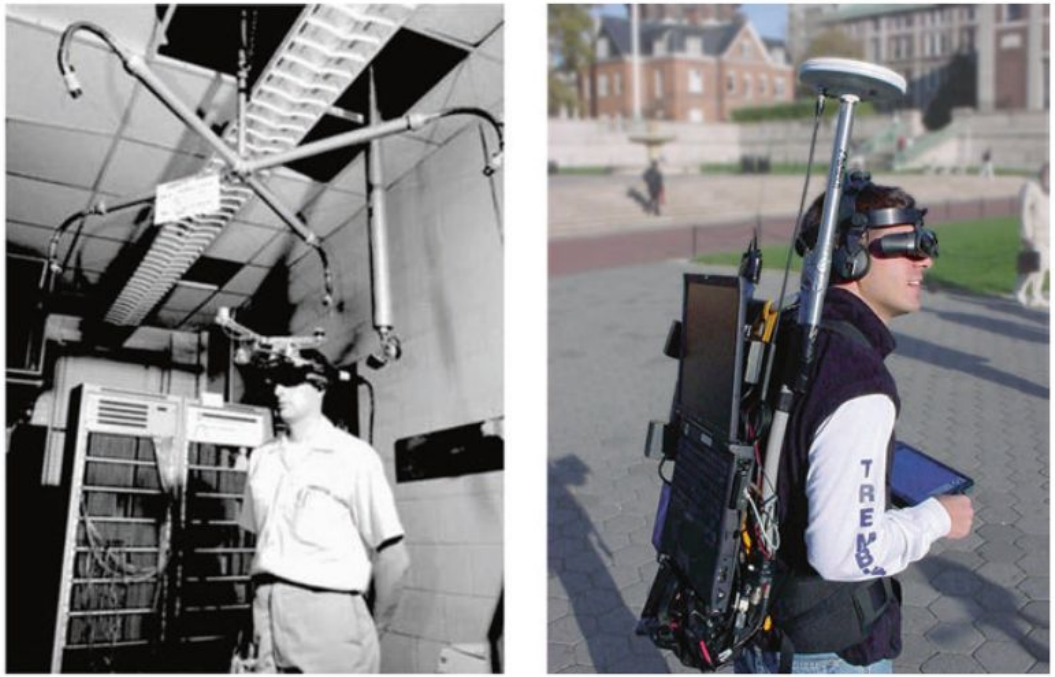


Fig. 1.7 Pioneering work in the field of VR/AR. (Left) Sutherland's data glasses with 6-DOF ultrasound tracking; image courtesy of © Ivan Sutherland, all rights reserved. (Right) Replica of the MARS system of 1997 (Bell et al. 2002). (Image courtesy of © Steve Feiner, all rights reserved)

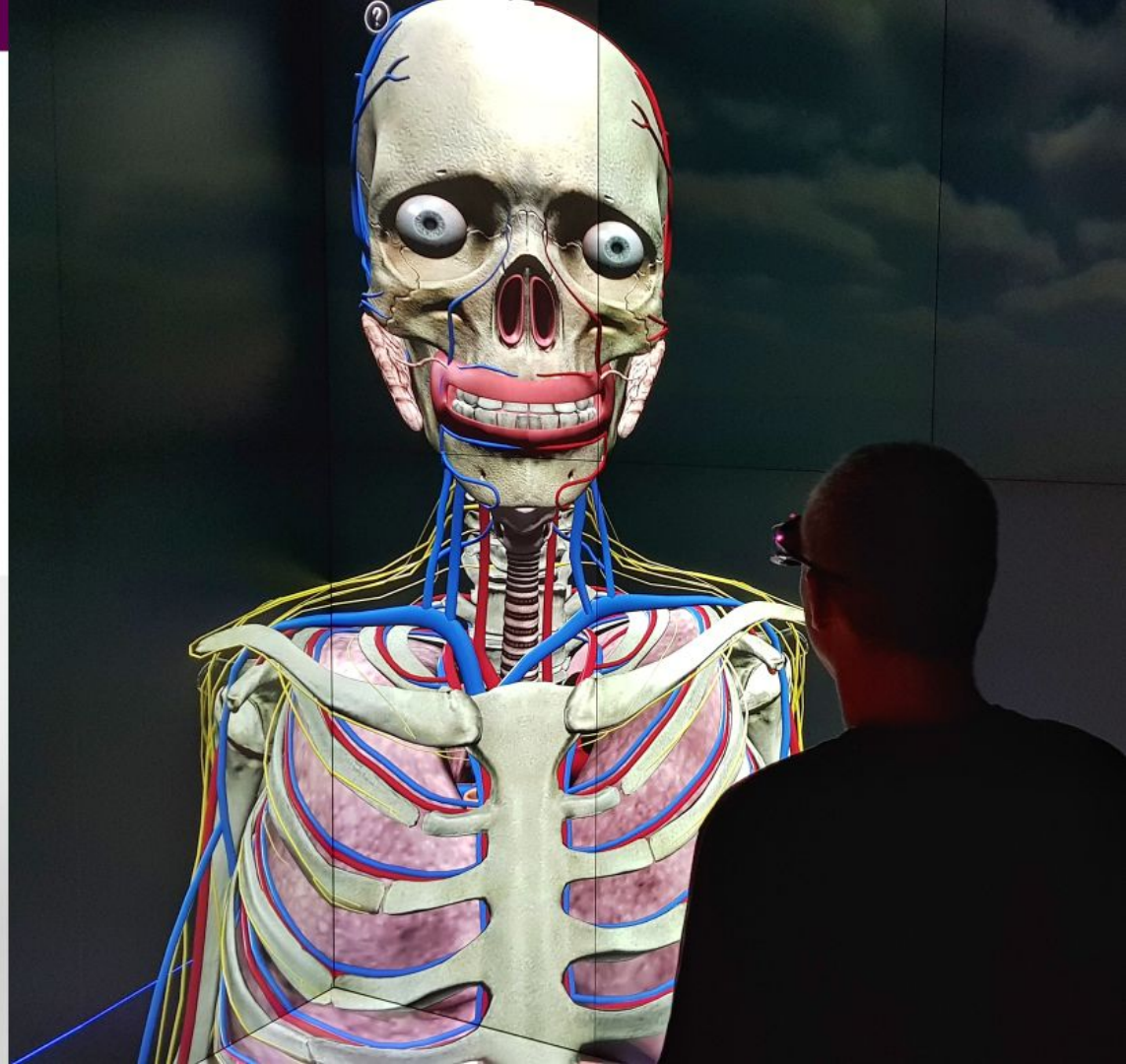
Microsoft Vision 2019
shown 2011

HASE 2


Virtual und
Augmented Reality

Virtual Reality

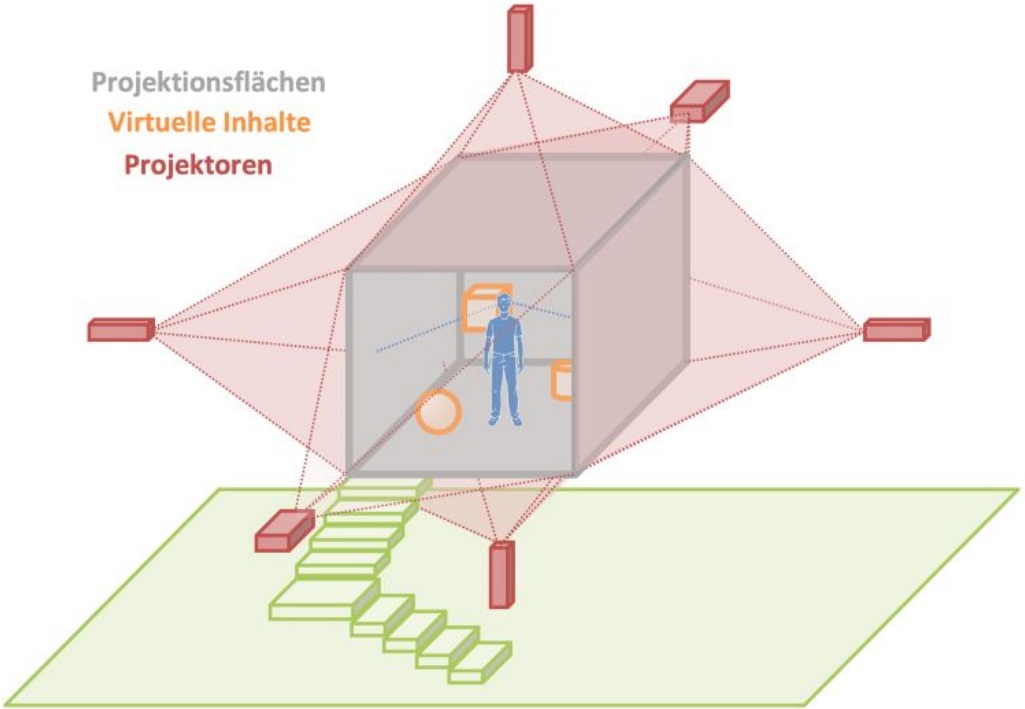
- Games demand it
- Industry it the real user



Virtual Reality

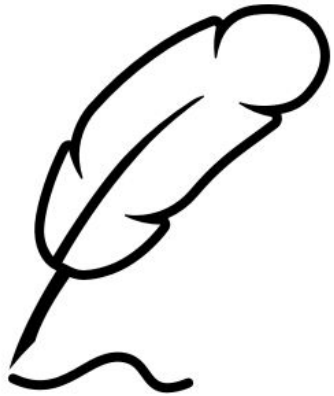
- Games demand it
- Industry it the real user

Cave automatic virtual environment (Cave)



Exercise in groups of 2 or 3 people

- How would you define Extended Reality ?



10 min

Definition of Virtual Reality

"The ultimate display would, of course, be a room within which the computer can control the existence of matter. A chair displayed in such a room would be good enough to sit in. Handcuffs displayed in such a room would be confining, and a bullet displayed in such a room would be fatal. With appropriate programming such a display could literally be the Wonderland into which Alice walked." (Sutherland 1965)

Virtual Reality

Characteristics of Virtual Reality

- Immersion
- Presence

Quantification

- Subjective measures (questionnaires, ...)
- Physiological measures (heart rate, pupil size, ...)
- Performance measures (reaction time, ...)

Virtual Reality

Characteristics of Virtual Reality

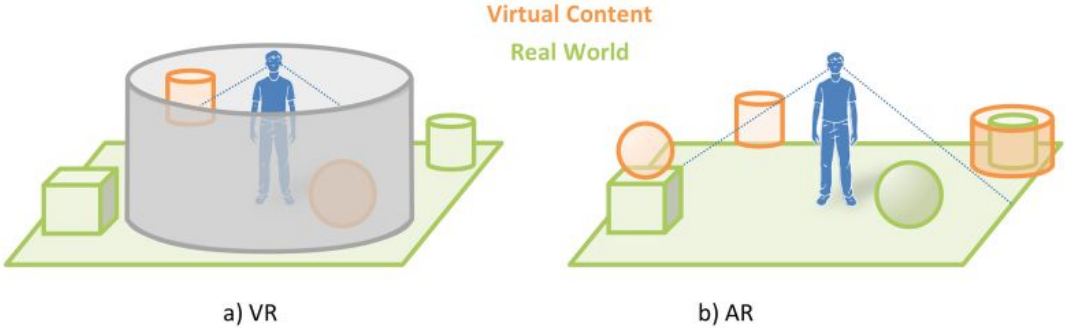
- Immersion
- Presence

Quantification

- Subjective measures (questionnaires, ...)
- Physiological measures (heart rate, pupil size, ...)
- Performance measures (reaction time, ...)

Definition of AR by Azuma

"Augmented Reality (AR) is a variation of Virtual Environments (VE), or Virtual Reality as it is more commonly called. VE technologies completely immerse a user inside a synthetic environment. While immersed, the user can-not see the real world around him.
In contrast, AR allows the user to see the real world, with virtual objects superimposed upon or composited with the real world. Therefore, AR supplements reality, rather than completely replacing it." (Azuma 1997)



Hispetra

Let history guide your every step among the stones.

PLAY NOW ON

iOS & Android

Meta Quest

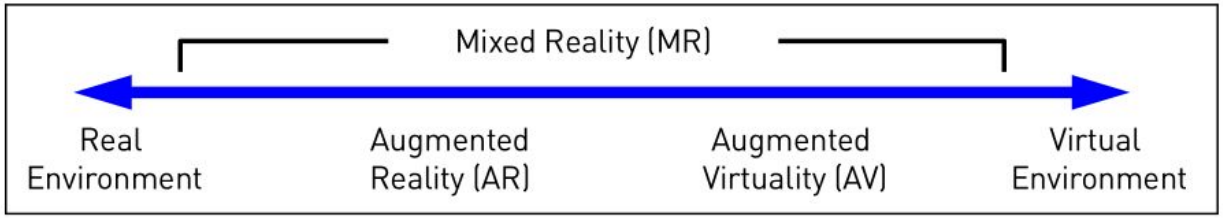
presented by

in cooperation with

made with Unity

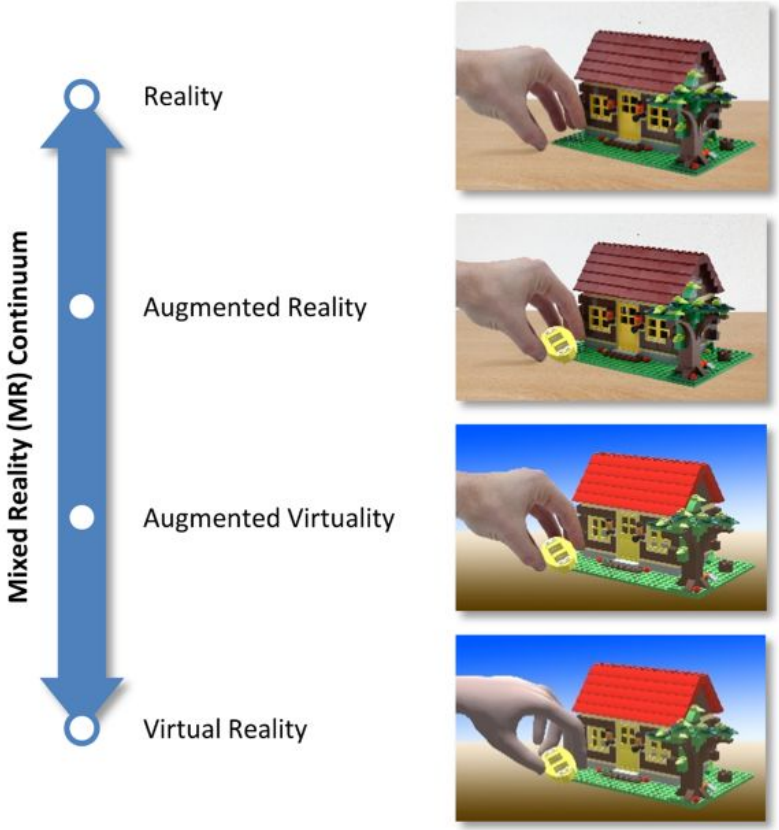
Music by Adrian von Ziegler

Virtuality Continuum



[Milgram & Kishikino 94]

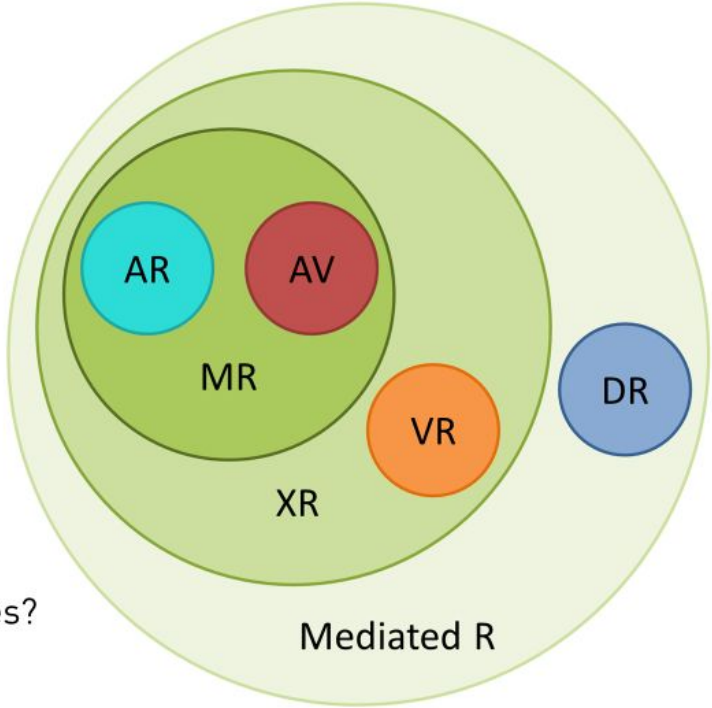
Definition of the Reality-Virtuality-Continuum (Milgram)

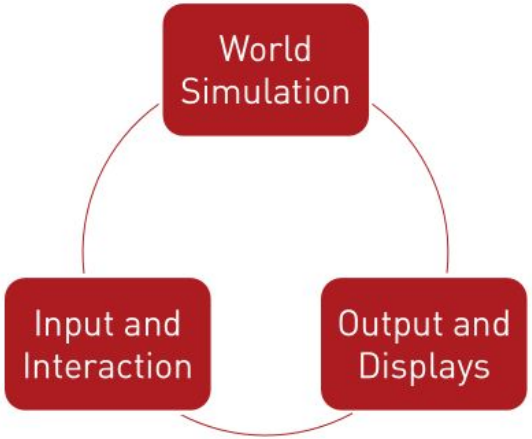


Reality-Virtuality-Continuum (according to Milgram): Mixed Reality (MR) is a continuum that extends between reality and virtuality (Virtual Reality), whereby the share of reality continuously decreases while that of virtuality increases. As far as the share of virtuality is prevailing here, without the environment being completely virtual (Virtual Reality), one speaks of Augmented Virtuality. If on the other hand the share of reality is larger, then we are talking about AR.

Extended Reality or eXtended Reality

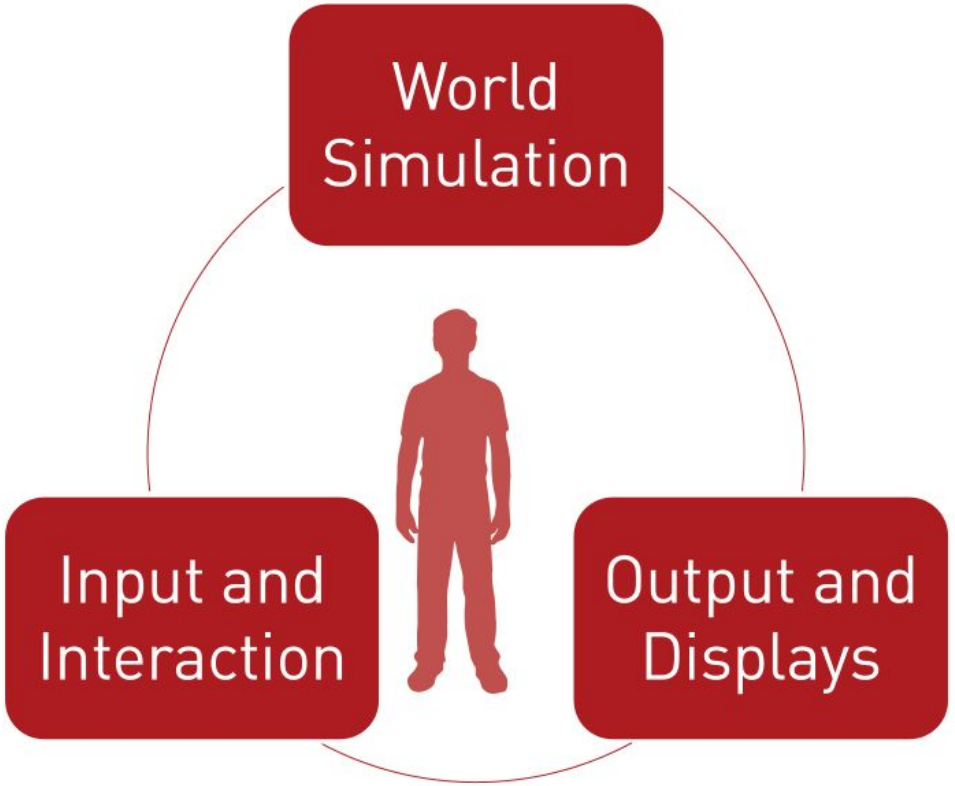
- XR as a generic term for VR and MR or AR
- XR as an Abbreviation for eXtended Reality or Cross-Reality) or X as a placeholder for V,M oder A
- What is the difference Expanded Realities vs Extended Realities?



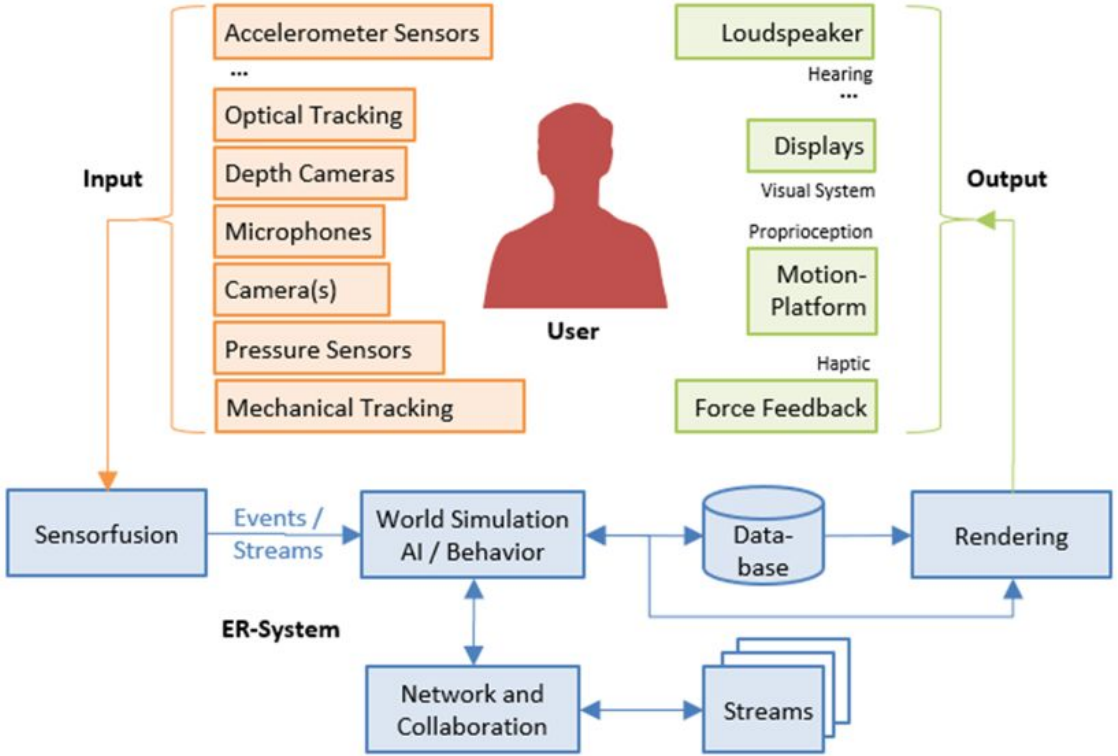


XR Development

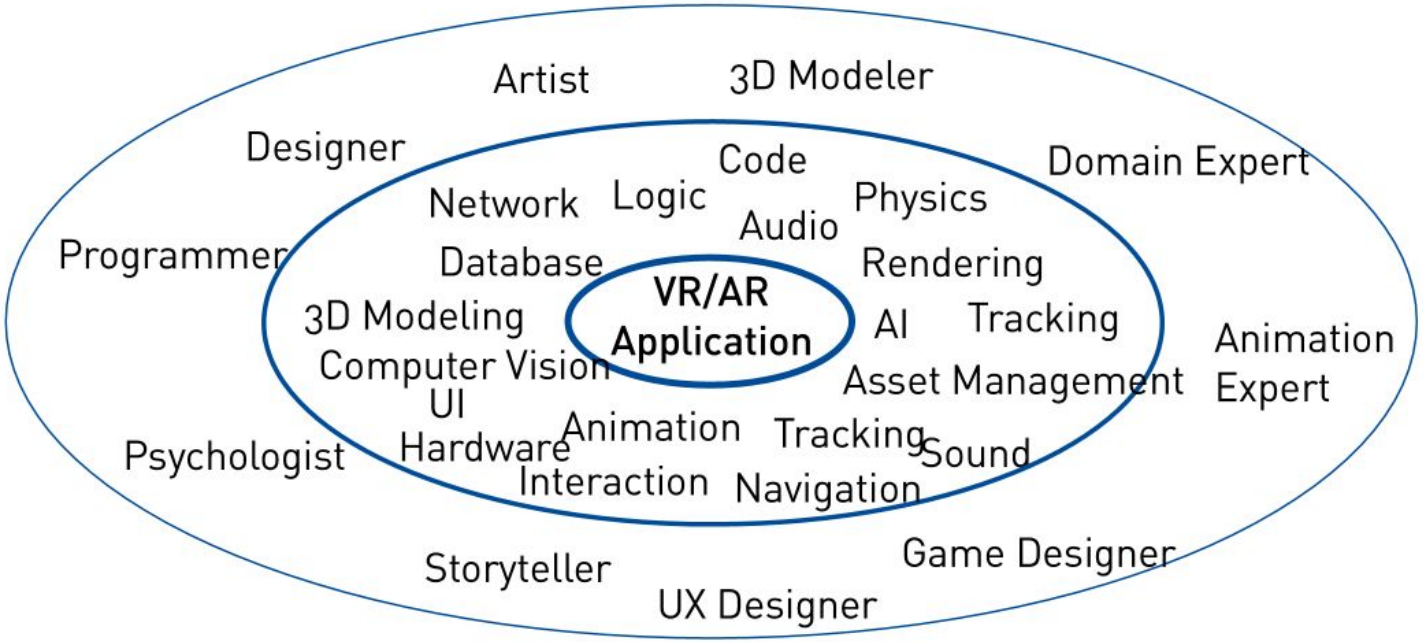
Virtual Reality Systems



Virtual Reality Systems

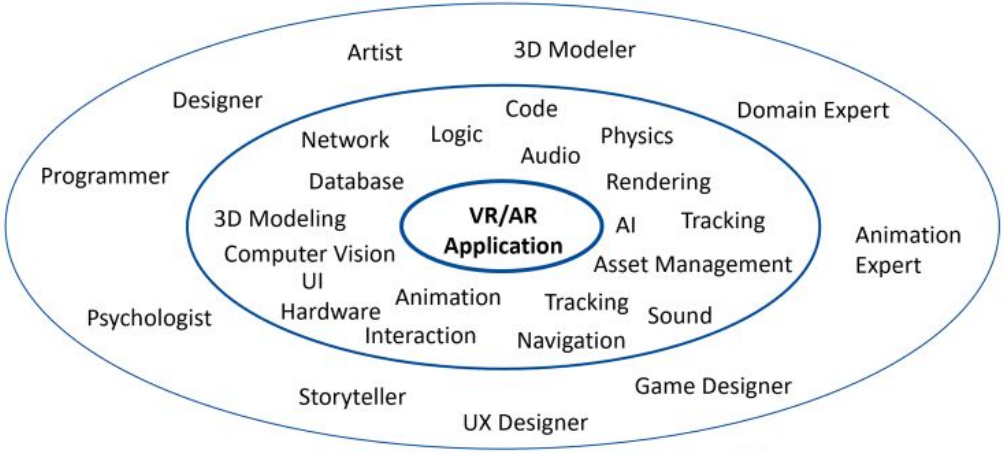


VR/AR Development – Authors and Technologies



Software-Design Requirements

- Technical Requirements
  - High performance
  - Robust
  - Extendable
  - Device independent
  - Support of collaboration
  - Easy to use



- Special software for special purposes
  - Assets (generation, animation, management)
  - Usage of libraries
  - Compiler
  - Databases
  - Timeline

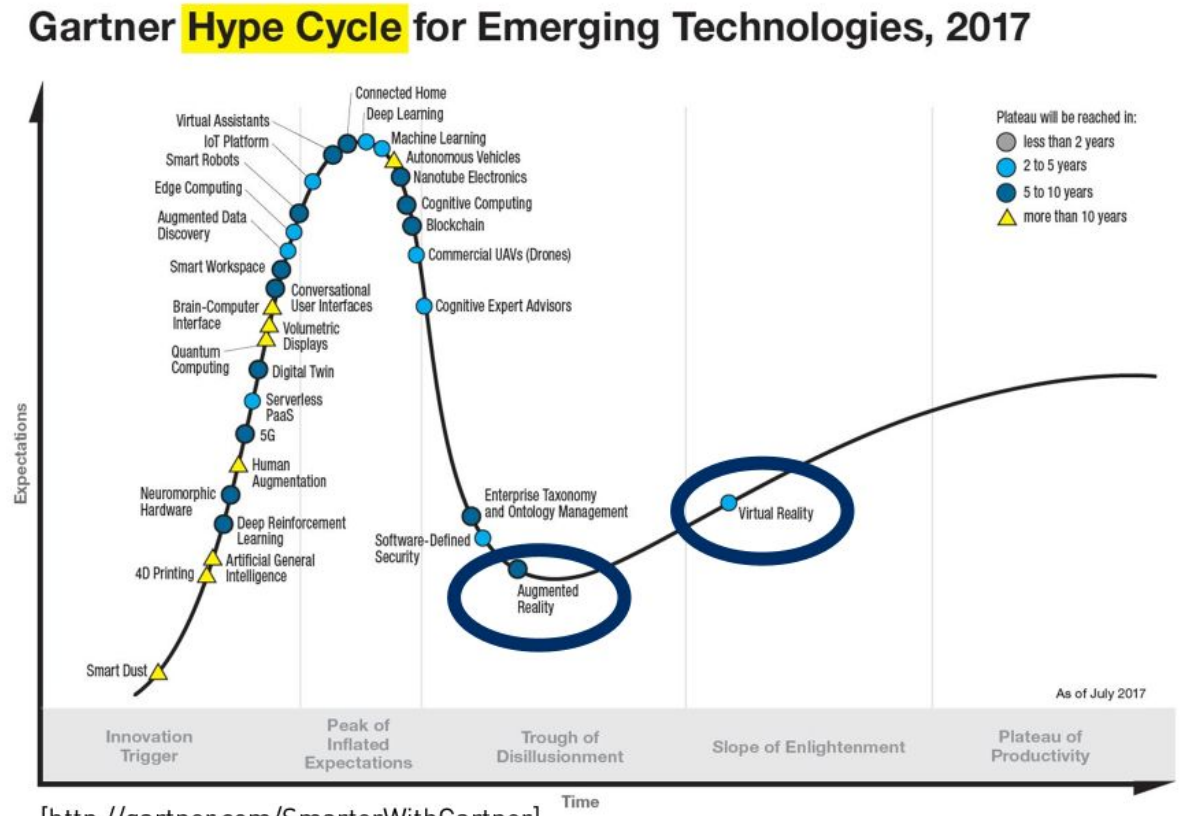
unity

UNREAL ENGINE

- → Really good Editor to integrate everything

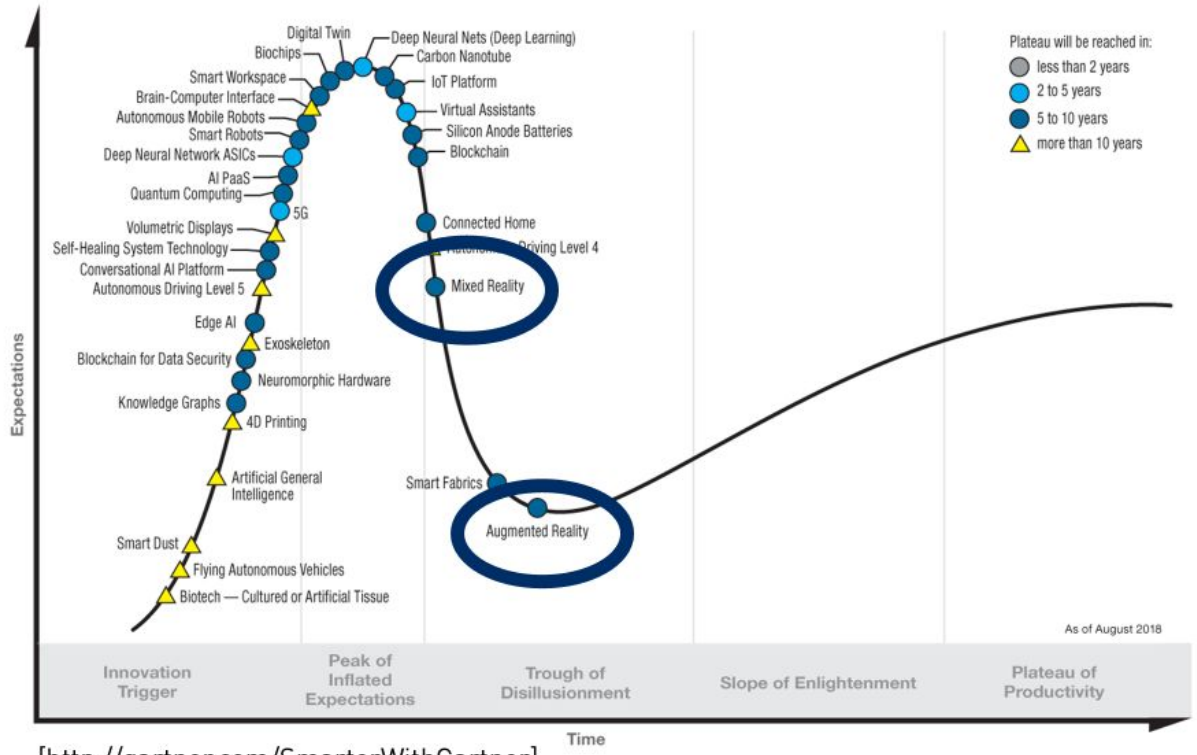
Outlook

Gartner Hype Cycle for Emerging Technologies 2017



[http://gartner.com/SmarterWithGartner]

Gartner Hype Cycle for Emerging Technologies 2018



[http://gartner.com/SmarterWithGartner]

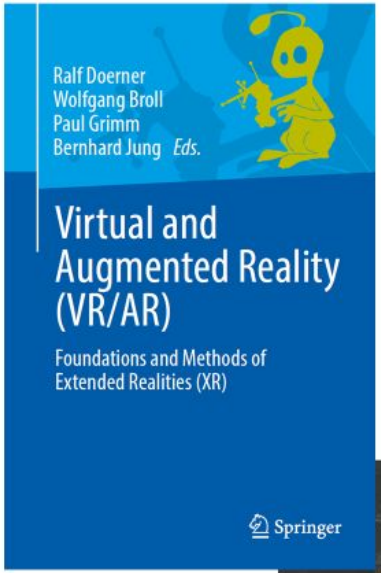
Who knows this ?

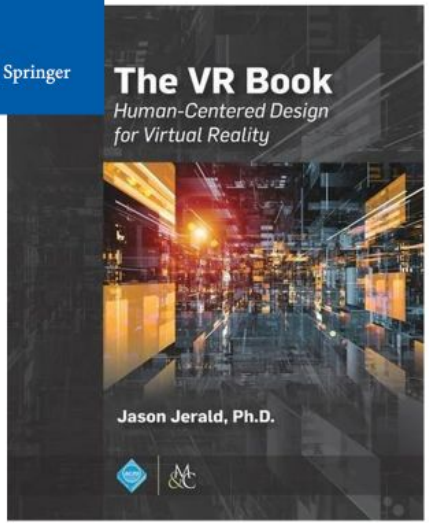
Interaction changes over time – What will be next ?

Further Reading

- Ralf Doerner, Wolfgang Broll, Paul Grimm, Bernhard Jung Eds.: Virtual and Augmented Reality (VR/AR), Foundations and Methods of Extended Realities (XR), Springer 2022
  Free download via:
  https://bib.h-da.de/recherche/e-medien/e-medien-fernzugriff

- Jason Jerald, Ph.D.: The VR Book: Human-Centered Design for Virtual Reality (ACM Books), Morgan & Claypool Publishers Acm (1. September 2015), ISBN-10: 1970001151





Evaluation of VR Application

- Safety first !

- Use VR glasses as a team
  - One person wears the headset and tests the app
  - Second person pays attention to safety !

Task Introduction

Task Description - Bring History to live again

Experience the history – Speak the language of cultural heritage

Create an immersive Experience using Virtual Reality / 360° - Video and Artificial Intelligence

Steps

1. Build an international team
2. Develop a concept
3. Digitalize a historic place or asset on Cyprus
4. Bring this to live – using VR/360° and AI
5. Demonstrate a first version
    a. Short Presentation + Demo (5 min per group + Q&A)
    b. February, 13th from 9:30 to 12:00
6. Demonstrate a final version
    a. Final Presentation + elaborate Demo (7 min per group + Q&A
    b. February, 25th from 10:00 to 12:00 CET online

Task Description - Bring History to live again

Experience the history – Speak the language of cultural heritage

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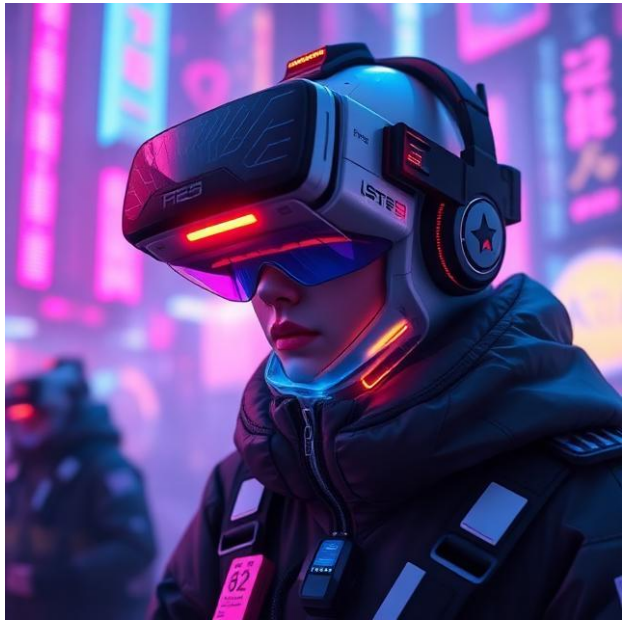
VR in education and VR and Language Learning

Our VR journey from 2016 to 2026



Challenges

For instructors

For students


HARNESSING THE POTENTIAL OF VR IN EDUCATION BY CREATING CONTENT AND LEARNING HOW TO NAVIGATE THE VIRTUAL WORLD

Hands on

Tuesday

Intercultural Scenarios via AI

Introduction: Design a Shared Virtual Culture World

Imagine you are creating a virtual world in VR for international students. This world is supported by Artificial Intelligence and combines all cultures of your group.

Group Discussion:

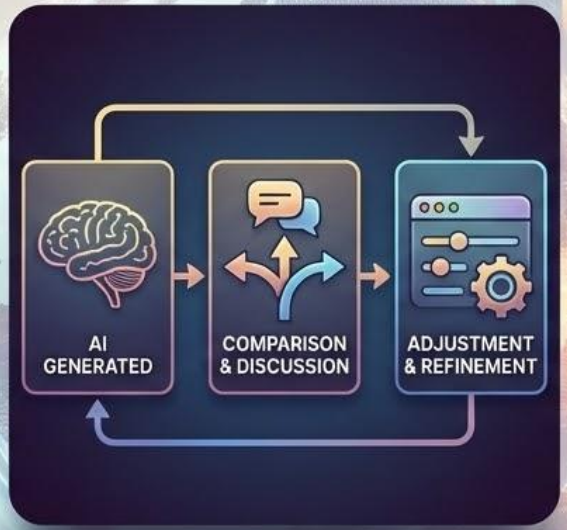
Languages - Cultural Elements - Places - Intercultural Challenges

Create ONE key sentence that describes your virtual world.

Creation of intercultural scenarios generated generated via AI

1. AI-DRIVEN STORYTELLING & CULTURAL FUSION

Use AI to create a short story combining cultural elements from at least two EUT+ countries. Explore how they interact.



2. SCENARIO DEVELOPMENT WORKFLOW

Create scenarios: AI generated / Comparison / Discussion in group / Adjustment.

3. CRITICAL INCIDENTS & CULTURAL RESPONSE

Include critical incidents. Discuss how to react in your country and compare diverse perspectives.

Creation of intercultural scenarios generated via AI

1. Communicating: Group 1
2. Leadership
3. Persuading: Group 3
4. Giving negative feedback: Group 4
5. Decision making
6. Trusting : Group 2
7. Disagreeing: Group 5
8. Scheduling
9. Welcoming
10. 3 Important thing to know for a country

Creation of intercultural scenarios generated via AI

Creation of intercultural scenarios generated via AI

Assignment/Group work: Intercultural scenarios

Describe situation based on your topic

Choose format for intercultural scenario (video, photo)

Include critical incidents (how to react in your country)

Deadline/upload: 24.02.2026

Introduction to Artificial Intelligence

Science is _____

Google

science is

Science Is Real
Song by They Might Be Giants

science is **elegant**

science is **fun**

science is **real bedeutung**

science is **real shirt**

Science is Wonderful

What is science?

- Science is _____

- What is the most likely next word?

What is science?

- Science is _____
- What is the most likely next word?
- How can you calculate this propability?

AI Ethics

AI Guidelines

Core Principle

use of all tools is allowed

user's own creative contribution must significantly outweigh the contribution of the tools.

Transparency

Authorship policy.

Personal Responsibility

You are responsible for "every word" of your results.

Legal and Ethical Compliance

rules of good scientific practice, copyright laws, and data protection regulations

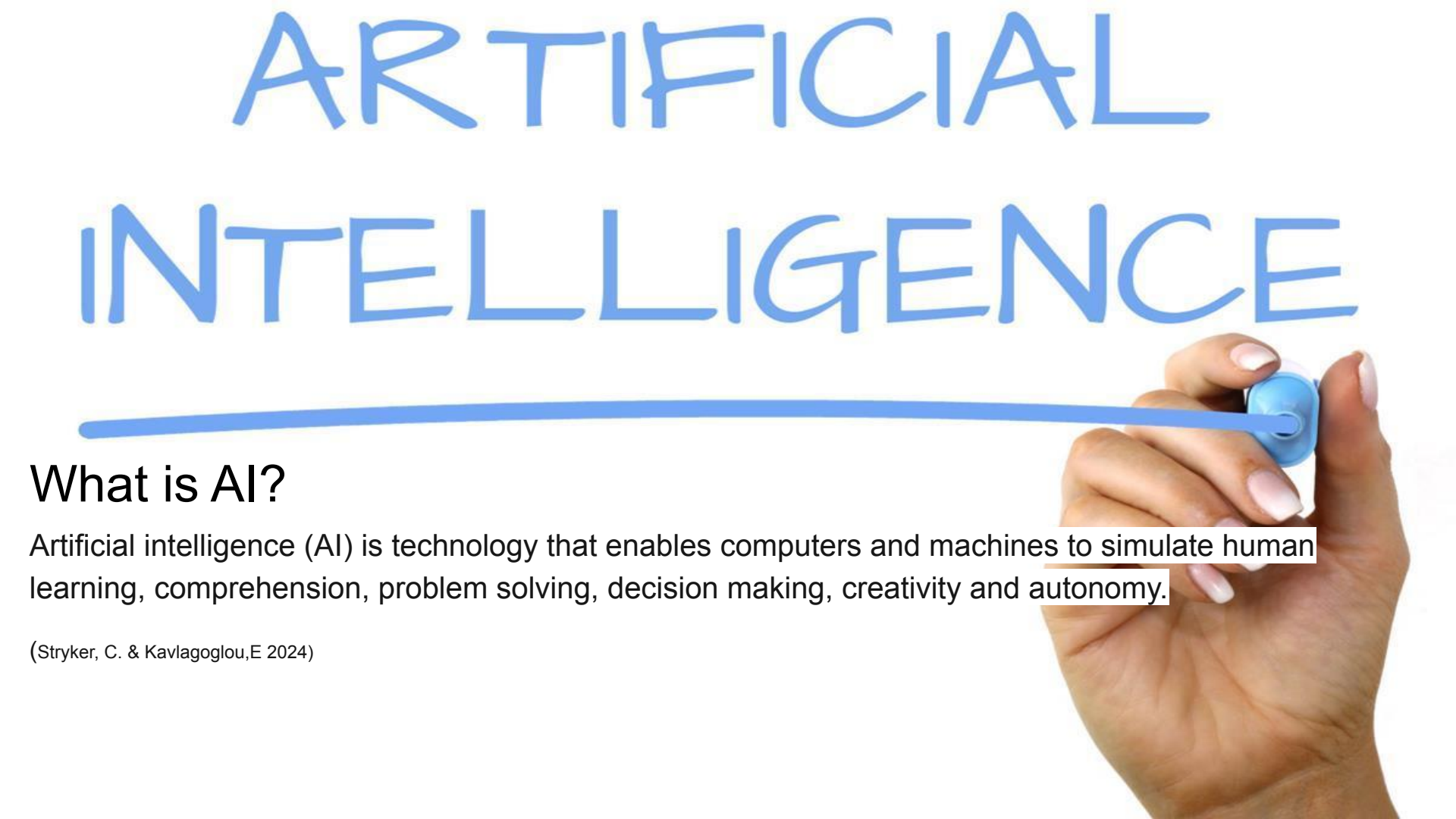
Instructor Discretion

Instructors have the right to exclude the use of certain tools for didactic reasons.

AI Guidlines

- **Core Principle**
  The university generally allows the use of all tools (including generative AI, apps, and correction tools) to prepare students for future professional tasks. However, the **user's own creative contribution** must significantly outweigh the contribution of the tools.
- **Personal Responsibility**
  You are responsible for "every word" of your results. Because AI tools can produce factual errors, hallucinations (non-existent sources), or bias, you must verify and revise any content generated by a tool. The tool is an aid to your thinking, not a replacement for it.
- **Legal and Ethical Compliance**
  You must adhere to the rules of good scientific practice, copyright laws, and data protection regulations (especially regarding personal data in prompts).
- **Transparency**
  You are required to confirm in a declaration of independence that your own creative work predominates. It is recommended that you document how you used specific tools (e.g., in an appendix) to ensure transparency.
- **Instructor Discretion**
  Instructors have the right to exclude the use of certain tools for didactic reasons, provided they announce and justify this restriction at the beginning of the course.


3
You Are Responsible
Owning Every Word
Fully responsible
AI



What is AI?

Artificial intelligence (AI) is technology that enables computers and machines to simulate human learning, comprehension, problem solving, decision making, creativity and autonomy.

(Stryker, C. & Kavlagoglou,E 2024)

So what is Generative AI?

Generative artificial intelligence has the capability to produce original context such as text, images, video, audio or software code in response to a user's prompt or request. (Pavlik, 2024)

GenAI now powers a range of consumer and professional applications and services that help save time, money, and effort.

Who is using it and what industries are using it?

According to the Organisation for Economic Co-operation and Development (OECD) latest data

https://goingdigital.oecd.org/datakitchen/#/cover/5/ict/indicator/explore/en

Group Exercise

Identify three Gen AI tools for academic use

Group 1:
For **Research**
(literature, citations, etc.)

Group 2:
For **Writing**
(Improving, correcting, etc.)

Group 3: For
Presentations

Group 4: For
Charts and Pictures

Group 5: For
Automatization

What you should look for

Functionality:

Does the tool have the features you need?

Ease of Use:

Is it user-friendly, or does it require special training?

Integration:

Does it work well with your current systems?

Cost:

Is it affordable and does it offer good value for money?

Does it solve my problem or the task?

Presentation

Choose 1 person from your group to present in Ovation VR