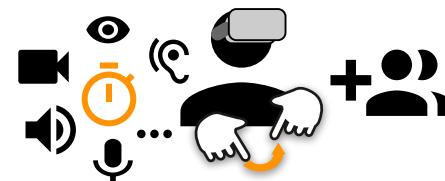


Welcome and Organization

Principles of Real-Time Interactive Systems



Fabian Unruh, Marvin Thäns, Marie Luisa Fiedler



Chair for Human-Computer Interaction

semester?

Overview



1. What?

- will you learn?

2. Why?

- is it important?

3. How? When? Where?

- Delivery Method, Time, Location, Grading?

4. Who?

- is learning? is teaching?

5. Synthesis

- Recap, Weekly Task, Q&A

General Information

Language

- Spoken language: English/German
- Material: English

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Administration on WueStudy

- [Principles of Realtime Interactive Systems, 05083160](#)
- For Module Registration → Automatic WueCampus Registration
- For Exam Registration → **Not Automatic with Module Registration**

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Communication on WueCampus

- [WS24:Principles of Realtime Interactive Systems, 69354](#)

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Teaching Materials on HCI Lectures Server

- <https://lectures.hci.informatik.uni-wuerzburg.de/ws24/pris/>

What? Module Content Overview

Real-Time Interactive System

- Virtual, Augmented, and Mixed Reality (VR, AR, MR)
- Today: **XR**: eXtended Reality, or $X = [V, A, M]$
- Here: Focusing on Virtual Reality (VR)

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Principles

- What? How? Why?
- Advantages? Disadvantages?
- Requirements?
- Tools? (Hardware & Software)
- Design, Experience and Evaluation? (*cybersickness, fatigue, immersion,...*)

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Question

- How to create successful **user experiences** with XR?

Why?

XR Technologies are here!

- Rapid Technological Evolution of VR/AR
- Rapidly become higher quality, cheaper, and more widely available.
- **Millions of consumers**
 - *AR Pokémon GO on Mobile*
 - VRBeat Saber on Facebook Oculus or HTC Vive head-mounted displays

Beat Saber (VR Game)

Pokemon GO (AR Game)

Why?

Beat Saber (VR Game)

Pokemon GO (AR Game)

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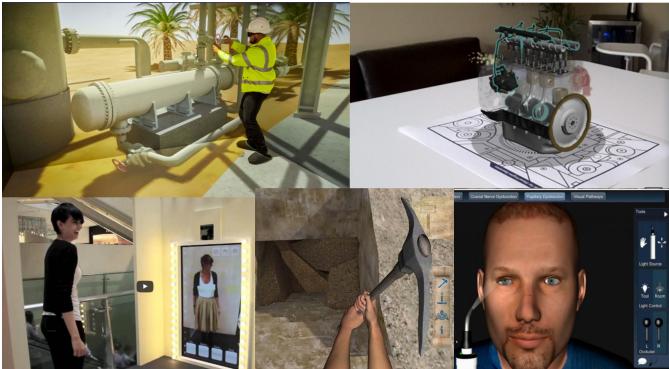
Observation

- New, Powerful ways
- to interact with computers
- (i.e. digital info)

Why (Cont.) ?



AR/VR examples consumer level.



AR/VR examples *industry level*.

Exploding Markets

40% – 60% **CAGR**

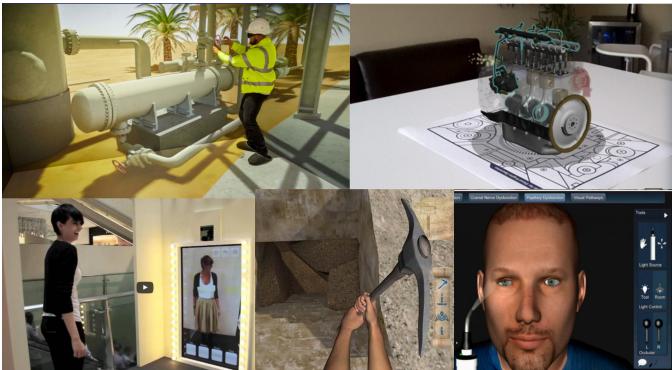
\$ 1.500.000.000.000

- Added potential value 2030 to global economy
- PwC Seeing is Believing report 2019

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AR/VR examples *industry level*.

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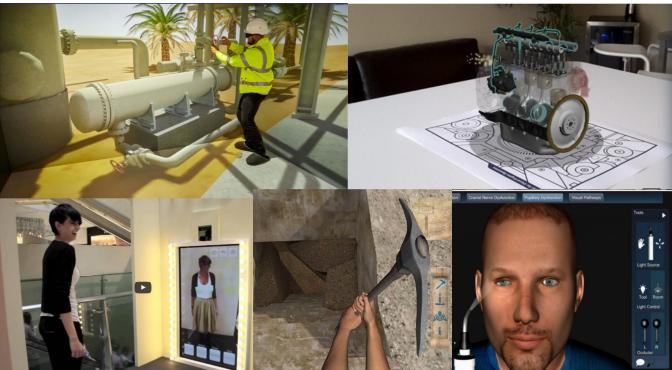
Perspective

- Comparable estimations by other market researchers.
- Equal to or surpassing Artificial Intelligence (AI).

Why (Cont.) ?



AR/VR examples consumer level.



AR/VR examples *industry level*.

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- Comparable estimations by other market researchers.
- Equal to or surpassing Artificial Intelligence (AI).

Current Buzzwords: Metaverse, Digital Twin

Why (Cont.) ?

IKEA VR Experience

*3D/Spatial Interactions in VR with
Mixed Reality Toolkit*

- (Example in AR/MR)

Why (Cont.) ?

IKEA VR Experience

*3D/Spatial Interactions in VR with
Mixed Reality Toolkit*

- (Example in AR/MR)

Numerous Application Domains

- Education
- Professional Training
- Therapy
- Social Interaction
- Sport and Recreation
- ...

Why (Cont.) ?

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Experience medium, very different from traditional software:

Why (Cont.) ?

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- (Example in AR/MR)

Numerous Application Domains

- Education
- Professional Training
- Therapy
- Social Interaction
- Sport and Recreation
- ...

Experience medium, very different from traditional software:

- **New effects on users:** Presence, Body Ownership, emotional involvement, ...
- **New 3D UI ToolKits**
- **New problems:** Cybersickness, escapism, safety, fatigue,..
- **New Guidelines**

How? Time, Place and Delivery



Lecture

- Tue 10-12 c.t.,
00.B.03 Seminarraum 2 (John-Skilton-Straße 4)

Excercise

- Wed 08-10, 12-14 c.t.,
White Lab, Building 50

Exam

- Tue Feb 11 2025, 09-11 s.t.,
00.004, Building Z6

How? Time, Place and Delivery



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Materials

- Available on our Module's Web Page

Module's Web Page



Chair for Computer Science (IX)
HUMAN-COMPUTER
INTERACTION



Principles of Real-Time Interactive Systems

Winter Semester 2024/2025

- ▶ How to use our materials ...

Week	Day of Q&A for Topic	Lecture Topics	Lectures	Exercises
01	15.10.2024	Organization	5	5
02	22.10.2024	VR Introduction	5	5
03	29.10.2024	Definitions	5	
04	05.11.2024	Timeliness Ergonomics & Cyber-sickness	5	

PRIS on HCI Lectures Server

- <https://lectures.hci.informatik.uni-wuerzburg.de/ws24/pris/>

Includes:

- Schedule
- Lectures (including videos, quizzes, Q&A)
- Exercises
- Meetings
- Additional Resources
 - Chat, Books, Exam,...
- How to use our slides
 - pdf export, Q&A,...
- Just Press "?" for Help

Grading

Grading

How?

- **Grade:** 100% multiple choice exam.
- Grading Scheme: BV1
- Exam Information [5](#)

Grading

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Alert

- **Exam registration on WueStudy mandatory!**

Grading

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What?

- Lectures & Exercises content
- Personal reading (Chapters, Papers,...)
- Quizzes
- In-class explanations
- Excluded topic marked as “Not Exam Material”

HCI Group Overview

Topics

- XR: Virtual, Augmented, and Mixed Reality
- Multimodal Interfaces
- Embodiment, Avatars and Agents
- Intelligent Virtual Environments
- Computer Edutainment and Games
- Social VR and Social Robotics

Website

- <http://www.hci.uni-wuerzburg.de/>

Who Are You?



I study ...

Who Are You?



I study ...
Human-Computer Interaction (MSc)

Who Are You?



I study ...
Human-Computer Interaction (MSc)
Informatik (MSc)

Who Are You?



I study ...
Human-Computer Interaction (MSc)
Informatik (MSc)
Games Engineering (BSc)

Who Are You?



I study ...
Human-Computer Interaction (MSc)
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Who Are You?



I study ...

Human-Computer Interaction (MSc)

Informatik (MSc)

Games Engineering (BSc)

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Who Are You?



I study ...

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Something different?

Who? Targeted Audience and Module Prerequisites



Human-Computer Interaction (HCI) studieren in
Würzburg



Master Artificial Intelligence & Extended Reality

(previously called eXtended Artificial Intelligence)

Artificial Intelligence & Extended Reality (AI&XR) is a tuition-free english master's programme offered by the University of Würzburg together with its

Targeted Audience

- Human-Computer Interaction (MSc)
- eXtended Artificial Intelligence (MSc)

Prerequisites

- HCI
- Algorithms and data structures
- OO Programming (Java,C#,...)
- Statistics
- Research Methods

Recommended

- 3D Graphics Programming
- Game Engine

Synthesis

Synthesis

Module Overview

Synthesis

Module Overview

- **What:**

Synthesis

Module Overview

- **What:**
 - Know **fundamentals characteristics of XR systems**

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- **Who:**
 - *XR Experts + Master HCI / XtAI Students*

Any Questions?



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