

Virtual and Augmented Reality

VO, UE - Vorbesprechung

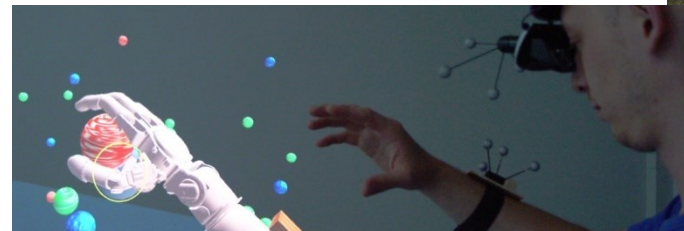
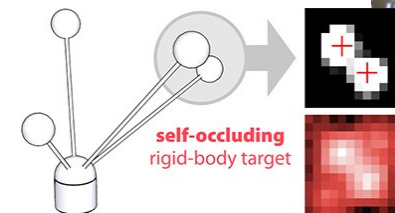
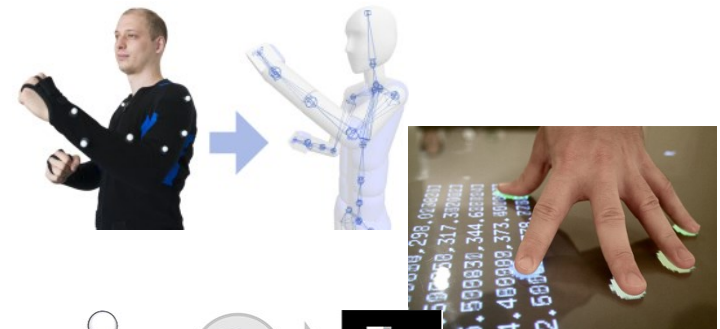
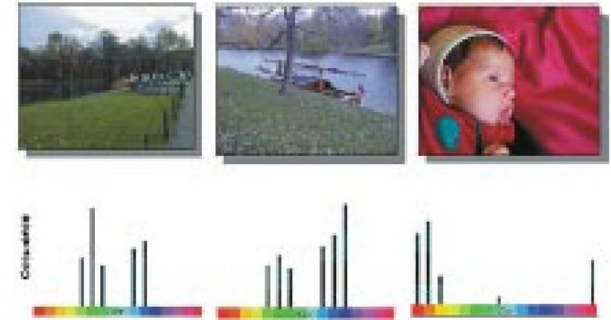
Hannes Kaufmann
Khrystyna Vasylevska
Iana Podkosova

Interactive Media Systems Group (IMS)
Institut für Softwaretechnik und
Interaktive Systeme

Interactive Media Systems Group (IMS)

- Media Processing
 - Multimodal information retrieval
 - 3D TV - Segmentation / 3D reconstruction

- Virtual and Augmented Reality
 - tracking and motion capture
 - mobile augmented reality
 - 3D reconstruction for AR/VR
 - 3D interaction including locomotion
 - high quality rendering for AR/VR
 - immersive VR applications in general





Virtual and Augmented Reality Research

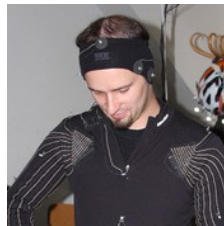


Hannes Kaufmann

Vienna University of Technology - IMS

Research Staff:

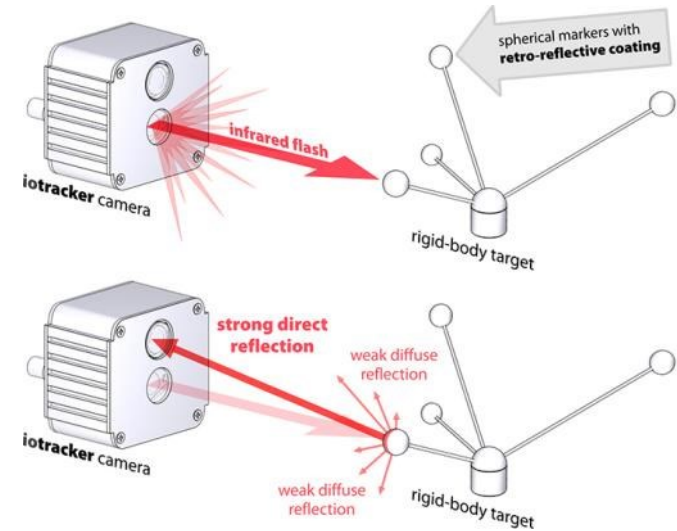
Dr. Annette Mossel, Dr. Christian Schönauer, Georg Gerstweiler, Emanuel Vonach, Dr. Peter Kan, Khrystyna Vasylevska, Iana Podkosova, Mohammedreza Mirzaei



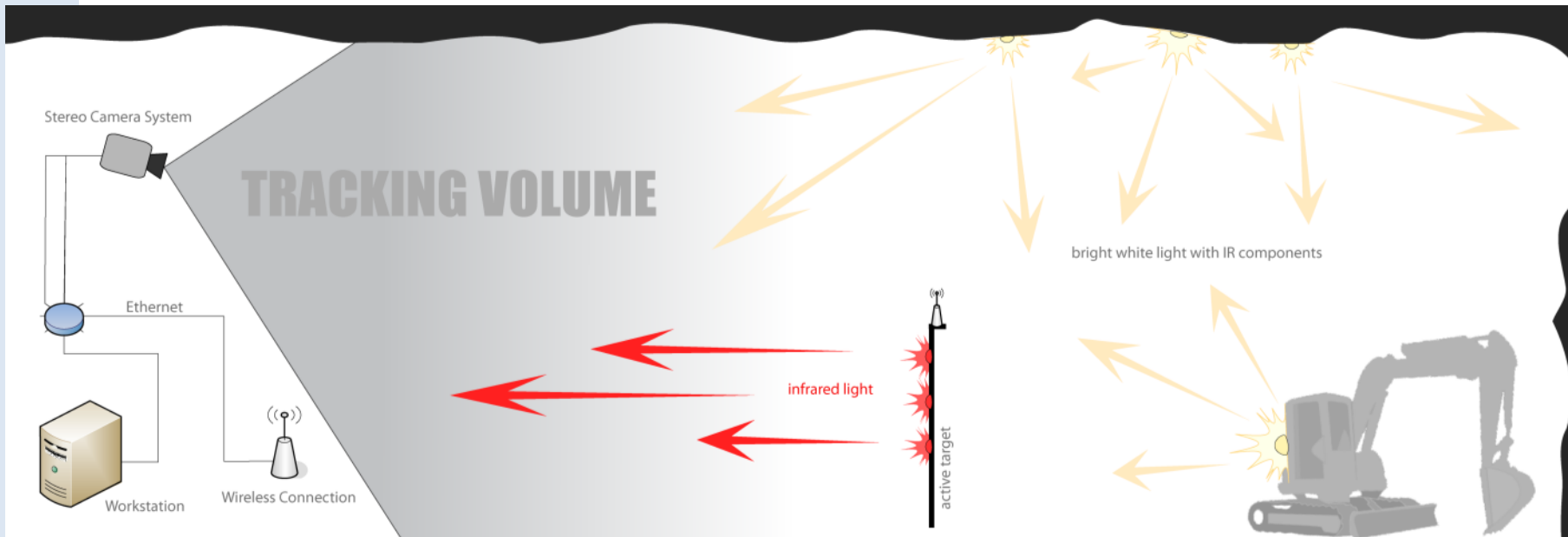
Tracking Technologies

- iotracker

Low-cost infrared optical tracker for room-sized VR environments



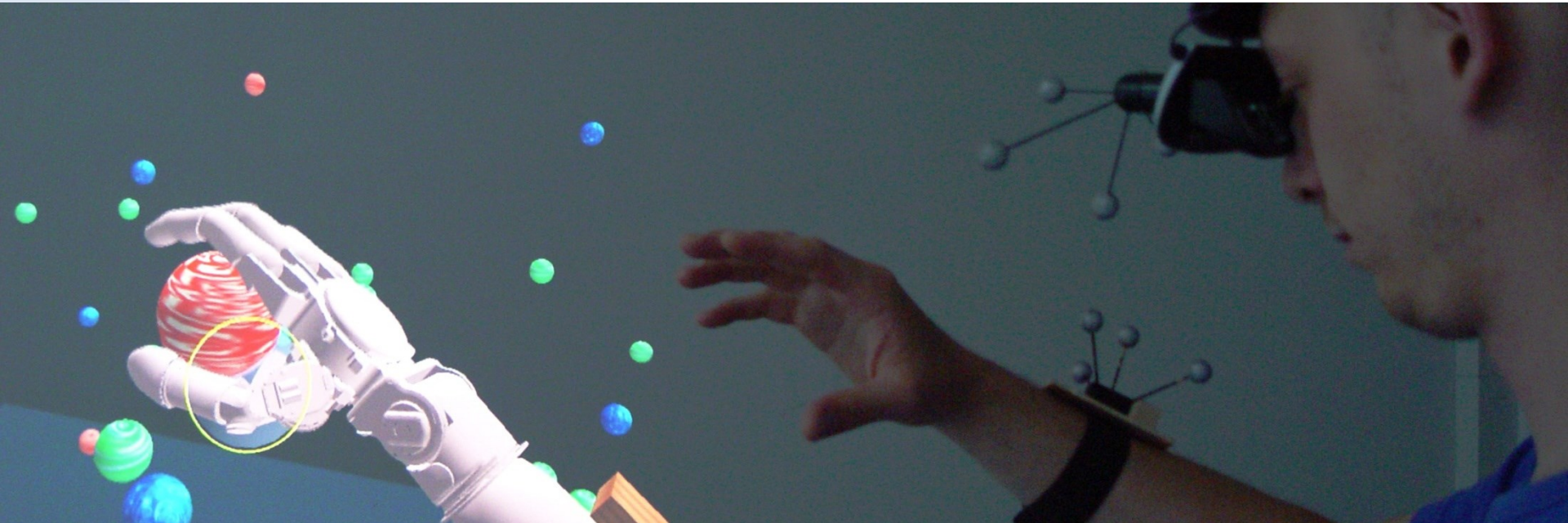
- Tunnel Measurement (RTMIOT)



Medical & Biosensor Applications

- Virtual Reality Training for Upper Limb Prosthesis Patients

Training for amputees with EMG sensors



Medical & Biosensor Applications

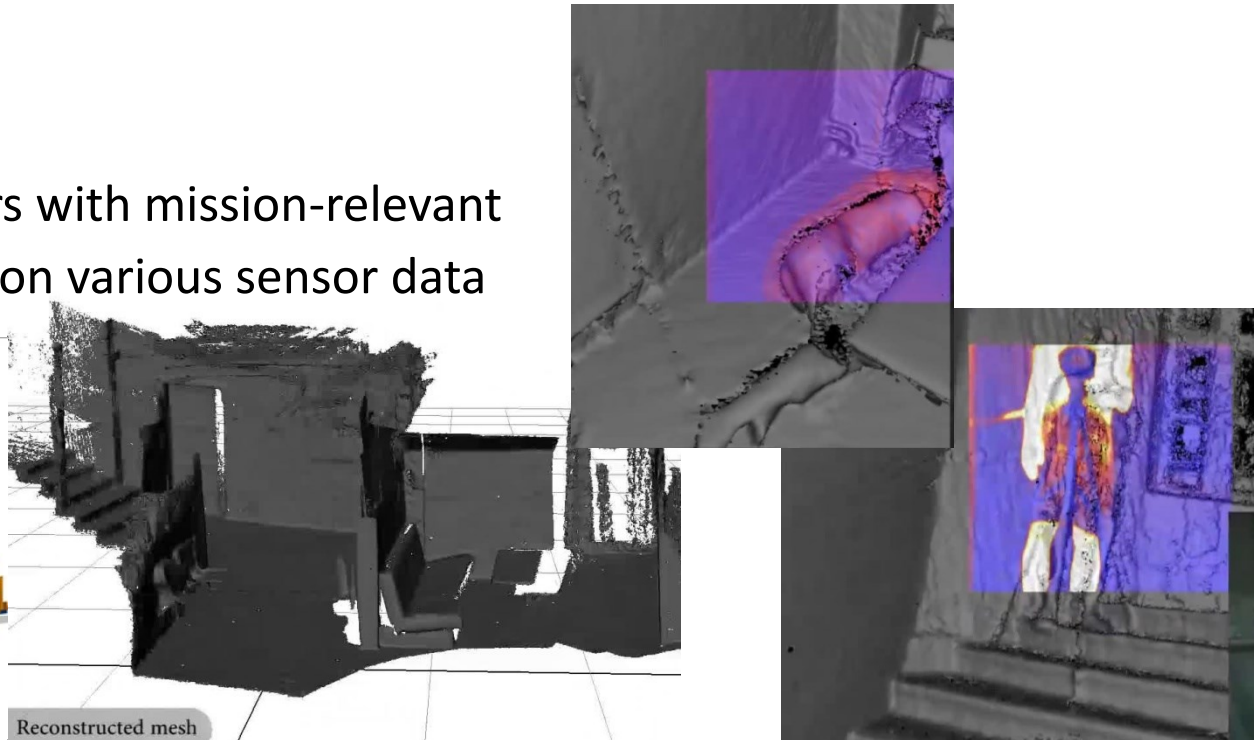
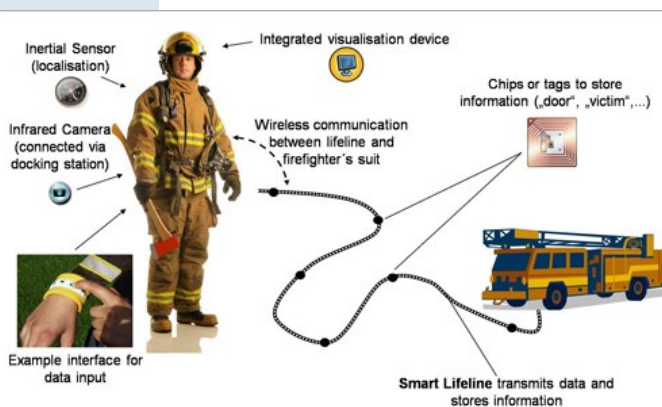
- **PLAYMANCER**

3D-Serious Game Environment
with real-time motion capturing
and bio-signal feedback for
physical rehabilitation



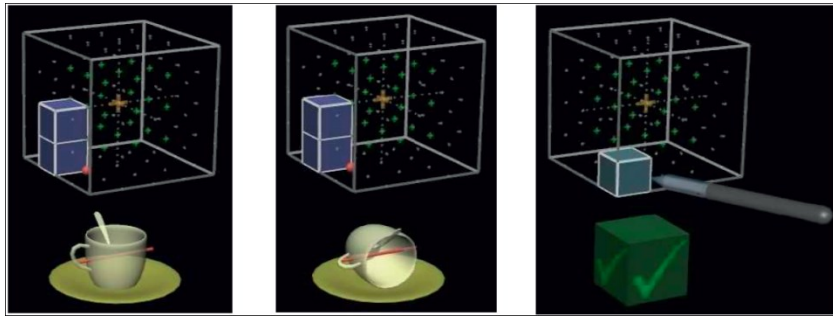
- **ProFiTex**

Support fire fighters with mission-relevant
information based on various sensor data

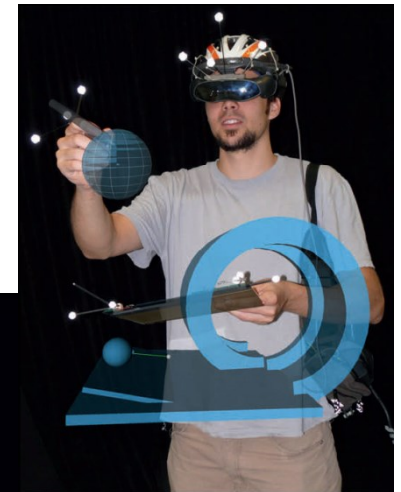
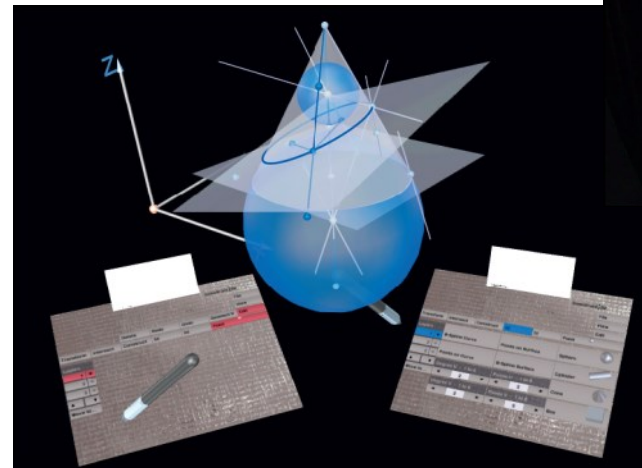


Psychological & Educational Applications

- ARST – Augmented Reality Spatial Ability Test



- Education in VR
 - PhysicsPlayground
 - Construct3D



Real Walking through Large Virtual Environments



ImmersiveDeck

Basic Research

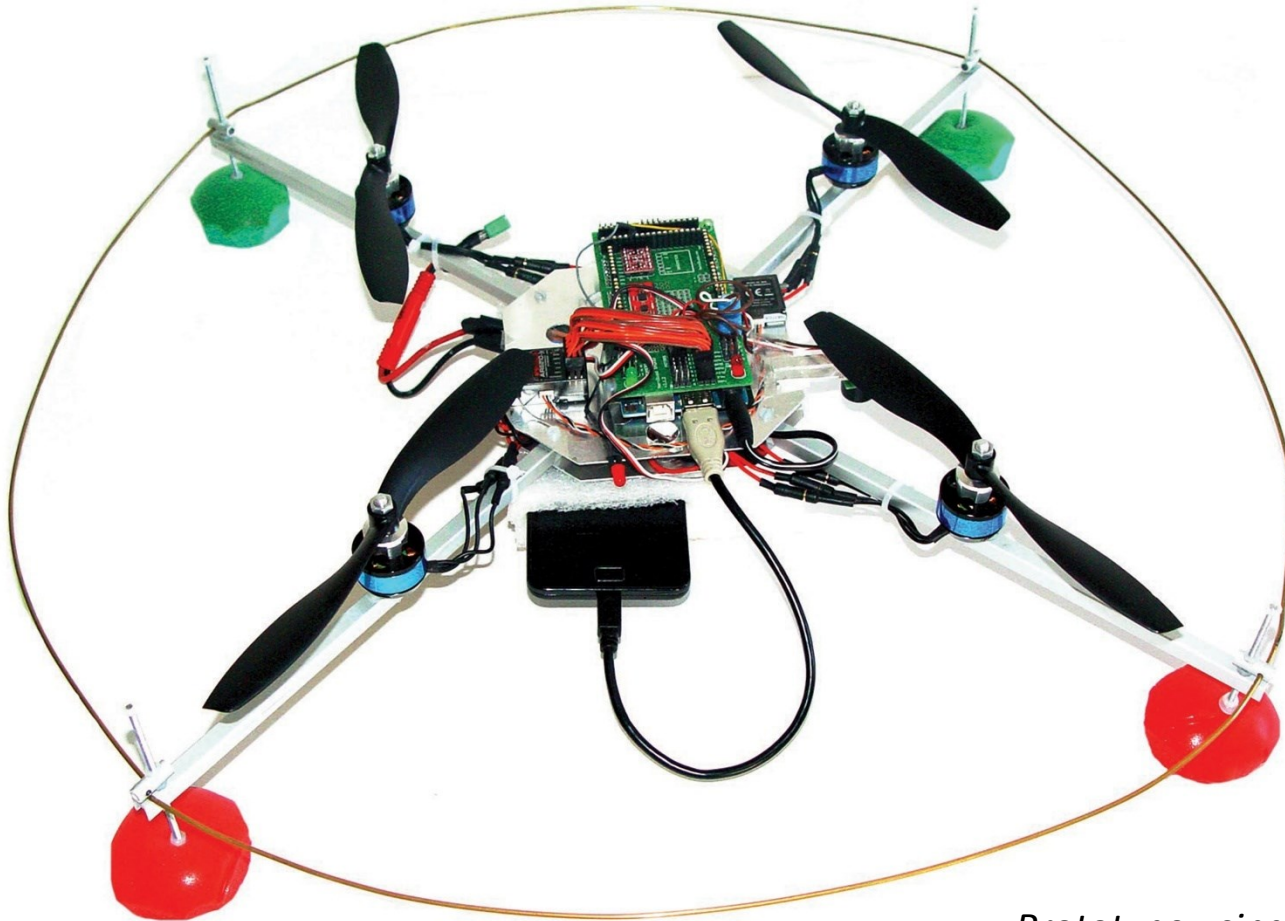
- Redirected Walking
 - Dynamic creation of large virtual environments

- Mobile Tracking
 - Precise tracking on mobile platforms in large environments



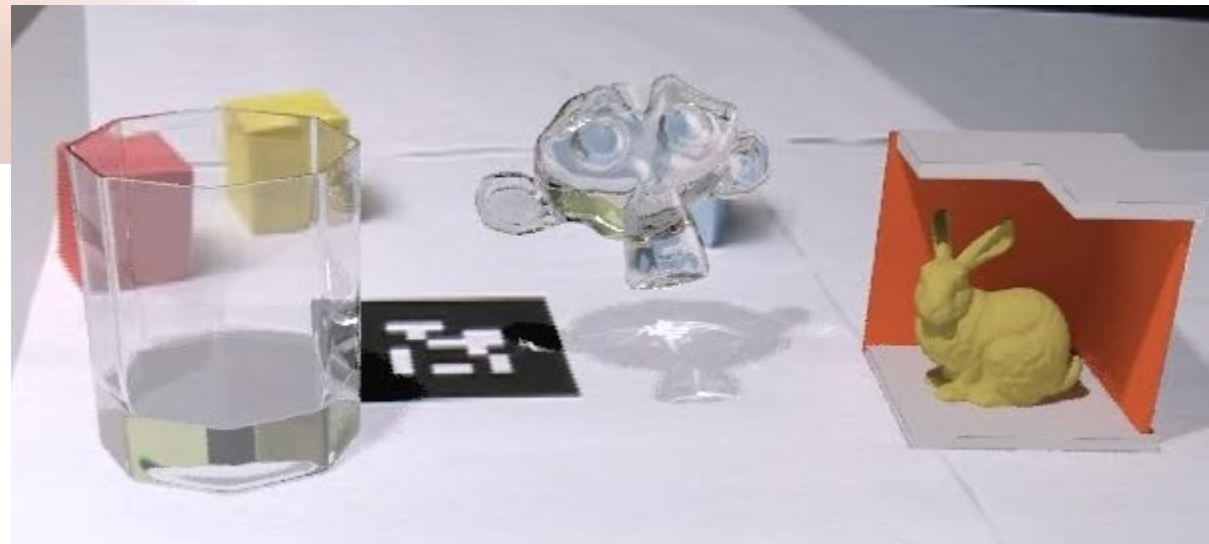
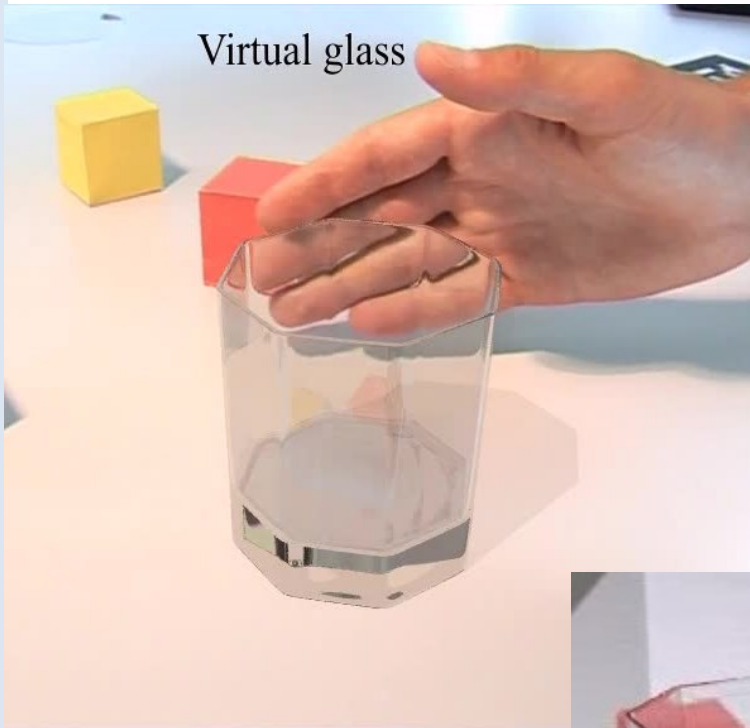
SmartCopter - Mobile AR & Robotics

Autonomous Flight with a Smartphone as On-Board Processing Unit



Prototype using Arduino & Android

Real-time Ray Tracing in AR



Virtual Reality VO – Termine

- VO 2.0 SwS, 2.0 ECTS, LVA Nummer 188.369
 - Ort: Zemanek
 - geblockt
-
- MO 2.10. 11:00 - 13:00 Zemanek
 - DI 3.10. 13:00 – 16:00 Zemanek
 - MI 4.10. 10:00 – 13:00 Zemanek
 - DO 5.10. 13:00 – 16:00 Zemanek
 - FR 6.10. 10:00 – 13:00 Zemanek
 - MO 9.10. 13:00 - 16:00 Zemanek

Prüfung

- Prüfung: Schriftlich (nächste 3 Termine)
 - MI 18.10.2017, 14:00 - 16:00, EI 9 Hlawka HS
 - DI 31.10.2017, 14:00 – 16:00, EI 9 Hlawka HS
 - DO 22.2.2018, 14:00 – 16:00, HS 7 Schütte-Lihotzky
- Kontakt:
 - Tel.: 01/58801 18860
 - Email: Hannes.kaufmann@tuwien.ac.at
 - Favoritenstr. 9-11; 4. Stock; Stiege 3; HD 04 05

INHALTE

- Einführung, Anwendungen
- Input Devices & Tracking
- Output Devices – Displays, Haptics,...
- 3D Grafikhardware
- AR/VR Framework & Scene Graphs
- 3D Interaktion
- Usability, Evaluationen
- Aktuelle Forschung



Fragen?

VO – Website mit allen VO Unterlagen im TISS!

Virtual Reality Übung 2017

VRUE'17

LVA-LeiterInnen:

Khrystyna Vasylevska

Iana Podkosova

TutorInnen:

Philip Krachler,

Wiktor Monczarski,

Rebecca Nowak

VRUE 2017 (188.913)

- Umfang: 3.0 h, 4.0 ECTS
- Dauer: 02.10.2017 – 16.01.2018
- Kalender (VRUE)
 - <https://calendar.google.com/calendar/embed?src=hfbkjq0e5gdtcac9ibgoveoi8s%40group.calendar.google.com&ctz=Europe/Vienna>
- Materialien (TUWEL)
 - <https://tuwel.tuwien.ac.at/course/view.php?id=12052>
- Hilfe & Kommunikation
 - LVA Leitung: vrue@list.tuwien.ac.at
 - TutorInnen: TUWEL Forum
 - Fragestunden mit den TutorInnen

Anmeldung

- Per TISS bis Do, 05.10.17 12:00
 - 188.913: Virtual and Augmented Reality
 - Abmeldung 10.10.17 23:59!

- Voraussetzungen
 - Masterstudium
 - Grundlegende Programmierkenntnisse (in C#, C++)

Ziele & Inhalte

Device Tracking

3D Virtual Scene

VR View

Physics

TRACKING

VISUALIZATION
(Rendering)

INTERACTION
(HCI)

DISTRIBUTION

Virtual Hand

Networking

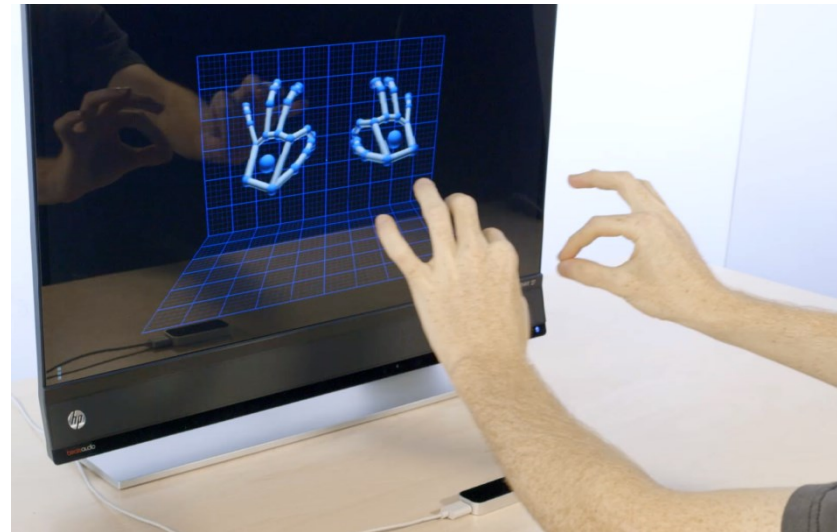
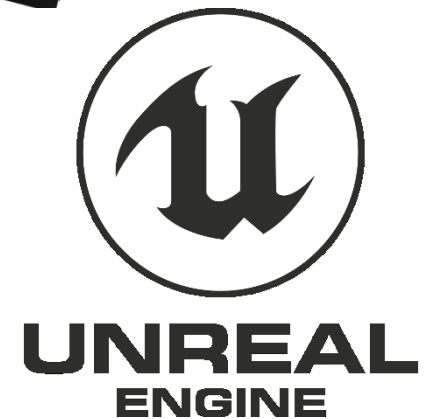
3D Interaction Metaphors

Collaboration

Multi User

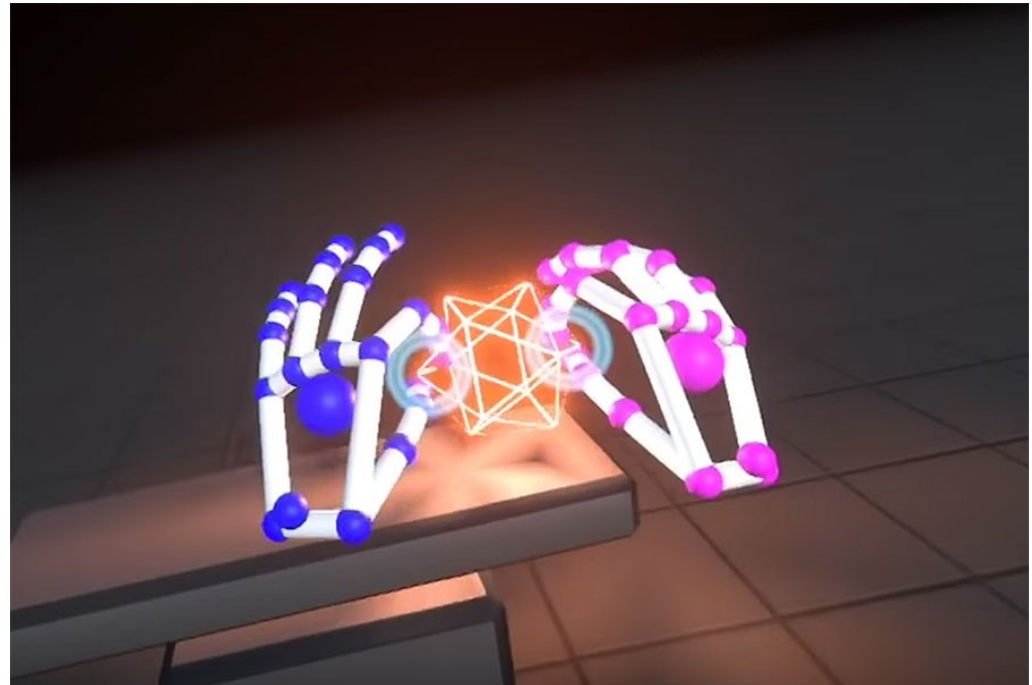
VRUE Dev Environment

- Game Engines
 - Unity
 - Unreal
- 3D Tracking and Input
 - HTC Vive
 - Leap Motion



VRUE Software

- Unity3D 2017.1.1
 - Installation: Beantragung einer freien Lizenz
- Unreal 4.16
 - Max. 5 Gruppen
- HTC Vive SDK
 - Steam
 - Steam VR
- Leap Motion SDK



Vorbereitung & Aufgaben

- Vorbereitung bis 5.10.17
 - 2er-Gruppen herstellen
 - Unity oder Unreal Game Engine wählen
 - Bis zu 5 Gruppen kann Unreal nutzen
- Aufgaben
 - Aufgabe 1 Basics: Unity/Unreal, Physics, Hand gestures
 - Aufgabe 2 3D Interaction, Physics
 - Aufgabe 3 Networking, Collaboration, Distribution
 - Projektphase: **make your own game!**

Tutorials & Abgaben

- Vier begleitende Tutorials
 - Termine und Zeiten (auch im Google Kalender und TISS):

Tutorial 1	5.10.17
Tutorial 2	13.10.17
Tutorial 3	24.10.17
Tutorial 4	14.11.17
 - Ort: Zemanek Hörsaal
- Abgabe
 - Dateiupload im TUWEL
 - Abgabe 1 15.10.17
 - Abgabe 2 29.10.17
 - Abgabe 3 17.11.17
 - Projektphase ca.10.01.17

VRUE Hardware Requirements

- Sie brauchen 2 PCs pro 2er-Gruppe
- Mindestens 1 HTC Vive kompatibler Rechner pro Gruppe
 - **GPU:** GeForce GTX 970 / AMD Radeon R9 290
 - **CPU:** Intel i5-4590 / AMD FX 8350
 - **RAM:** ≥ 4 GB
 - **Video Output:** HDMI 1.4



Wenn Ihre Gruppe keinen HTC Vive kompatiblen PC hat – kontaktieren Sie uns vrue@lists.tuwien.ac.at
-> Für wenige Gruppen, Arbeit im Labor möglich.

VRUE Hardware Hand-Out

- Allgemeines
 - IMMER Studentenausweis mitbringen!
 - Ort: HG 04 06 (Favoritenstr. 9-11, 4. Stock)
 - Ausleihe **im Anschluss an 1. Tutorial am 05.10.17**
 - Kopie Ausweis + Vertrag in doppelter Ausführung mitbringen
 - Verträge im TUWEL!

Jede Gruppe bekommt:

- 1 HTC Vive
 - 2 Light House base-stations
 - 2 Controllers
 - 1 HMD
- 1 Leap Motion

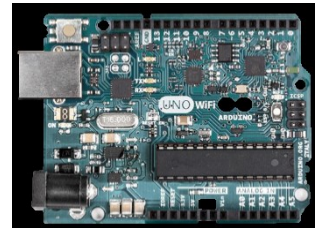


Los geht's ..

- Vorbereitungsaufgabe **bis 05.10.17**
 - Einarbeitung in Virtual Reality
 - Software-Download und Installation (Unity)
 - Einen Partner finden
- 1. Tutorial:
 - **Do, 05.10.17**, 11.15 – 12.15 Uhr - Zemanek Hörsaal
 - Anschließend Hardware Ausleihe
 - **Nur für 2er-Gruppen!**
 - Kopie Ausweis + Verträge in doppelter Ausführung mitbringen
- 2. Tutorial
 - **Fr, 13.10.17**, 12.15 – 13.15 Uhr - Zemanek Hörsaal
- 1. Aufgabe
 - Abgabe: So, 15.10.17 (TUWEL)

Multimedia Interfaces LU

- Task: Extending of the project task of the lecture **(UE) Virtual and Augmented Reality** with a custom Hardware interface
- Hardware
 - Arduino WiFi, multiple Sensors
- Schedule
 - Preliminary Discussion: 3.Oct.2017 – 16:15 – Sem 188-2
 - Tutorial: 25.Oct 2017 – 16:00-17:00 – Sem 188-2
 - Concept hand-in 20.November
 - Final Hand-In: 26. January 2018
- Registration in TISS 3.10.2017 – 25.10.2017
- Contact mmilu@list.tuwien.ac.at



Themen aus den Bereichen

- Multimedia Interfaces; 188.461; 1.5 ECTS
 - Inkl. Praktikum Themen
 - 3.Oct.2017 – 16:15 – Seminarraum 188-2
- Virtual Reality Advanced Topics; 188.456; 3 ECTS
- Praktikum
 - Praktikum aus Visual Computing; 188.938; 9 ECTS
 - From Design to Software 1; 188.934; 6 ECTS
 - From Design to Software 2; 184.743; 6 ECTS
- Diplomarbeiten

Betreuer direkt kontaktieren

Themen: <https://www.ims.tuwien.ac.at/topics>