

Einführung in die Erweiterte Realität

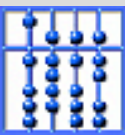
1. Introduction

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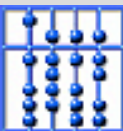
klinker@in.tum.de

Oct 19, 2004



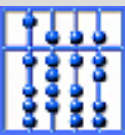
Schedule

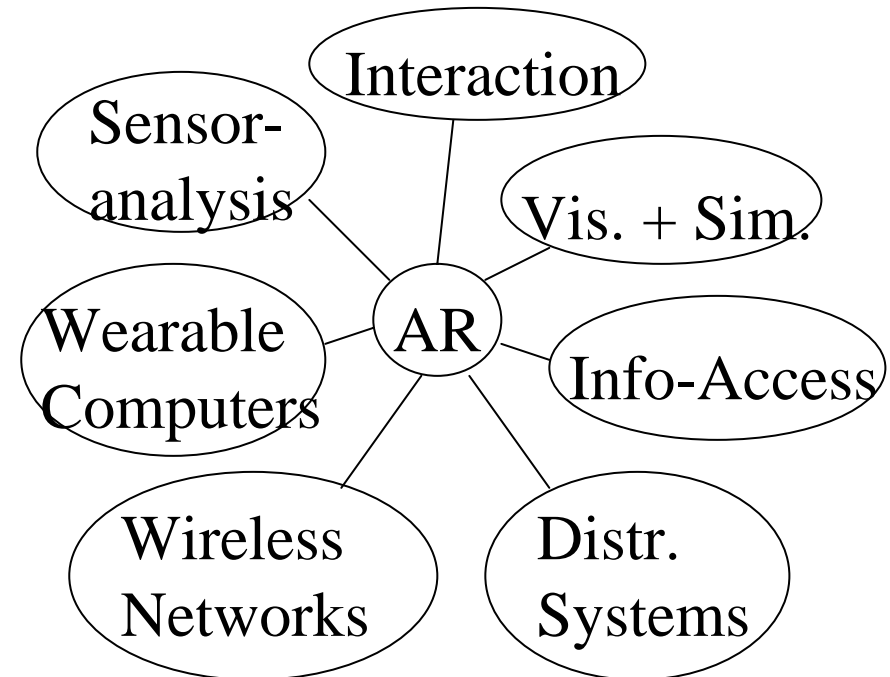
- **19.10.** **1. Introduction**
- 26.10. 2. Coordinate Systems, Projective Geometry (2D)
- 2.11. - no class -
- 9.11. 3. Rendering (Open GL, Occlusions)
- 16.11. 4. APIs (VRML, Open Inventor)
- 23.11. 5. Displays
- 30.11. 6. Tracking Devices
- 7.12. 7. Camera Calibration (Tsai)
- 14.12. 8. Basics of Computer Vision
- 21.12. 9. Sensor Fusion
- 28.12., 4.1. – winter holidays –
- 11.1. 10. Mixed Reality, Information Presentation
- 18.1. 11. System Architectures for Augmented Reality
- 25.1. 12. Context Toolkit
- 1.2. 13. Intelligent Environments and Ubiquitous Computing
- 8.2. 14. Discussion



Today's Agenda

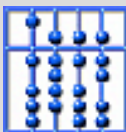
1. Augmented Reality -
Definition, Different Approaches
2. Applications
3. AR-Related Trends/Enablers
4. Research Issues
5. Requirements





- Real + virtual
- Interactive in real-time
- Registered in 3 Dimensions

[Azuma 98]



1. Augmented Reality

- Different Approaches -



[FhG-IGD 97]

Head based



[Sony 98]

Hand based



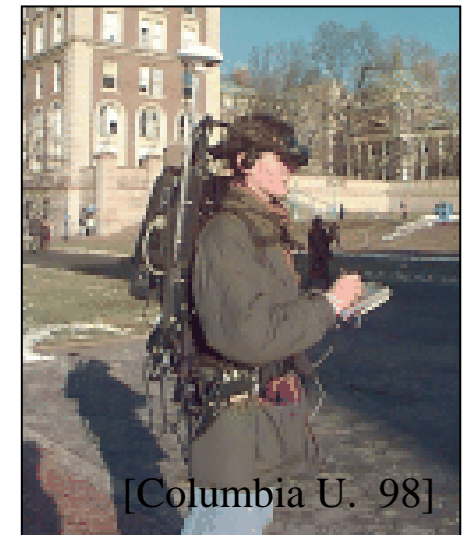
[FhG-IGD 97]

Desktop based



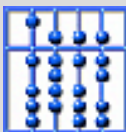
NOV. [MIT 94]

Wall based



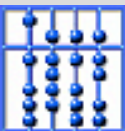
[Columbia U. 98]

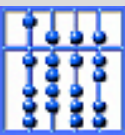
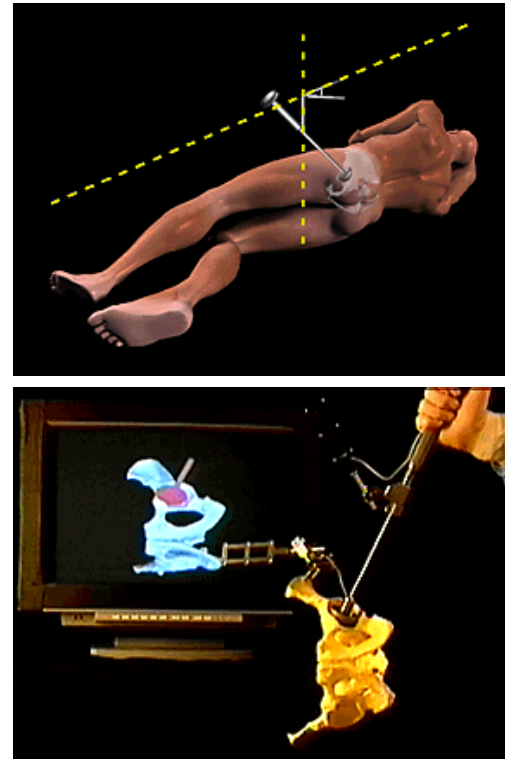
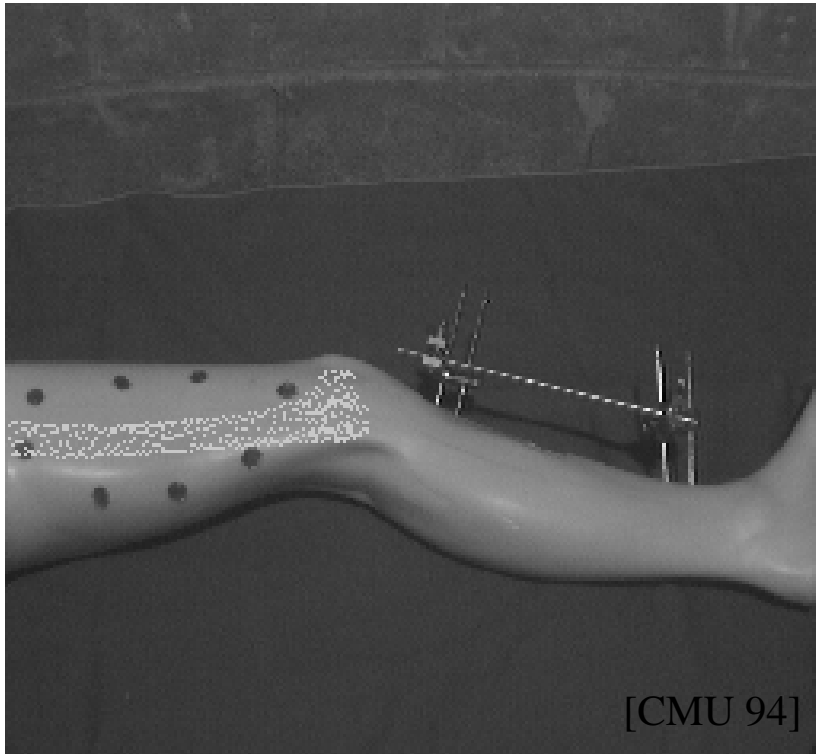
Hybrid

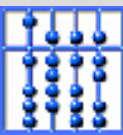
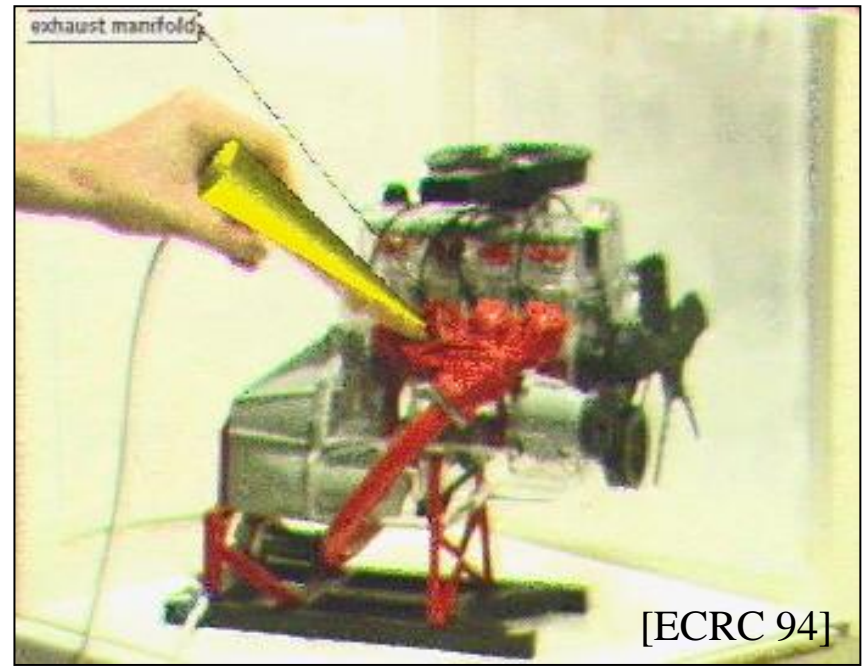


2. Applications

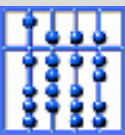
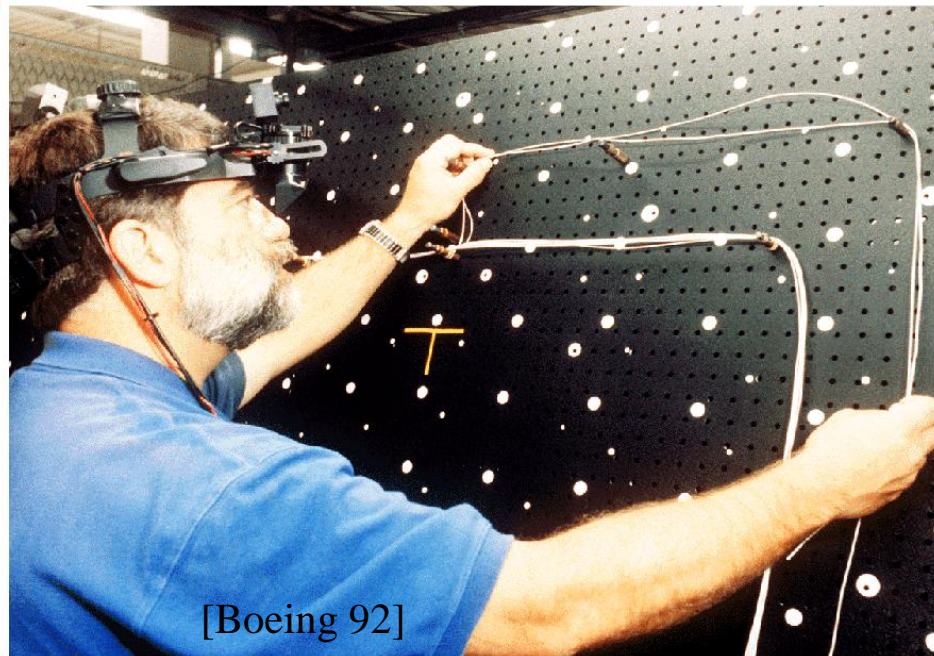
- Medicine
- Machine Assembly and Repair
- Building Construction and Maintenance
- Architecture, Interior Design
- Edutainment, Games
- Tourism



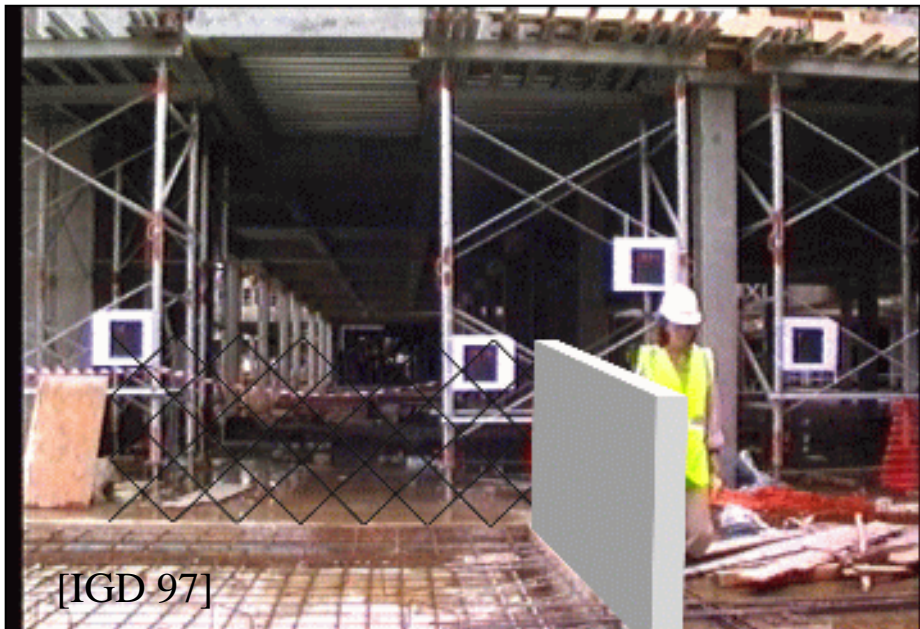


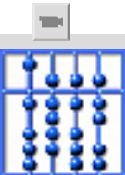


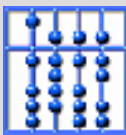
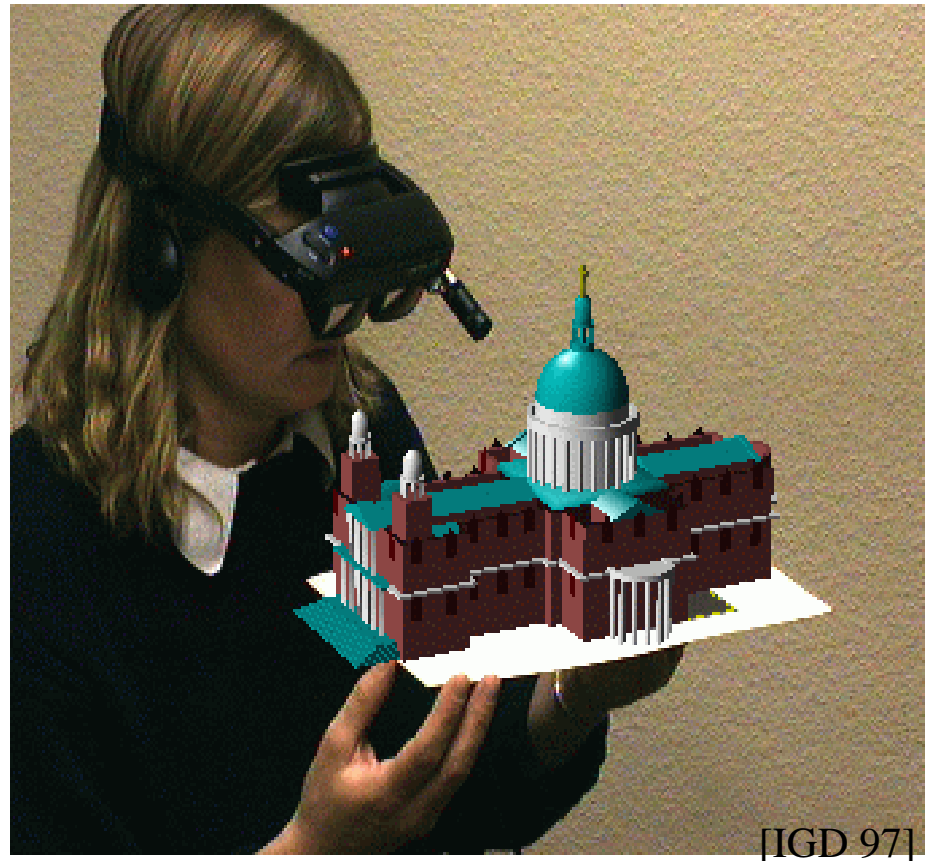
2.2 Machine Assembly and Repair - Wire Bundle Assembly -



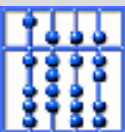
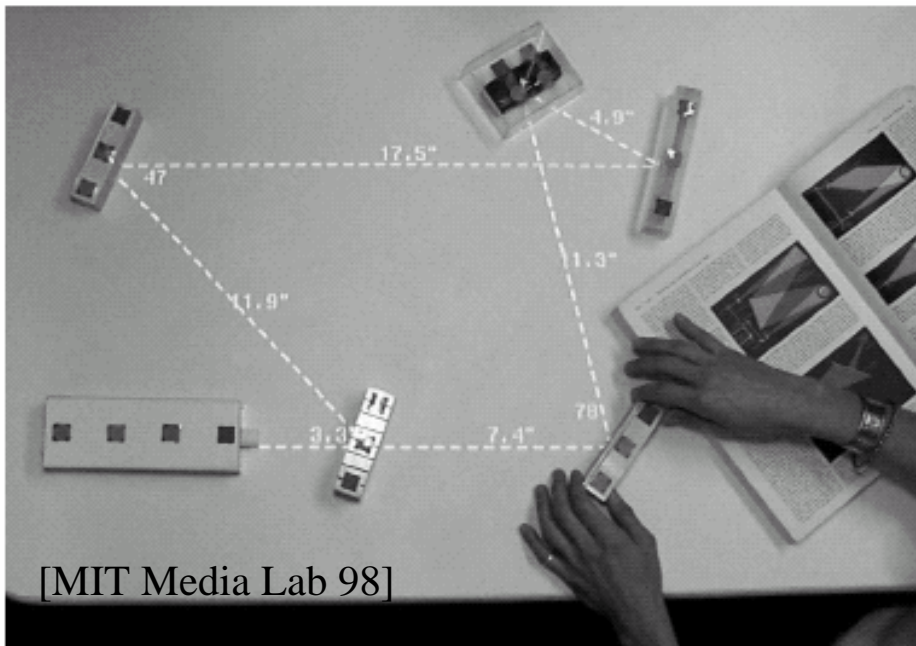
2.3 Building Construction and Maintenance

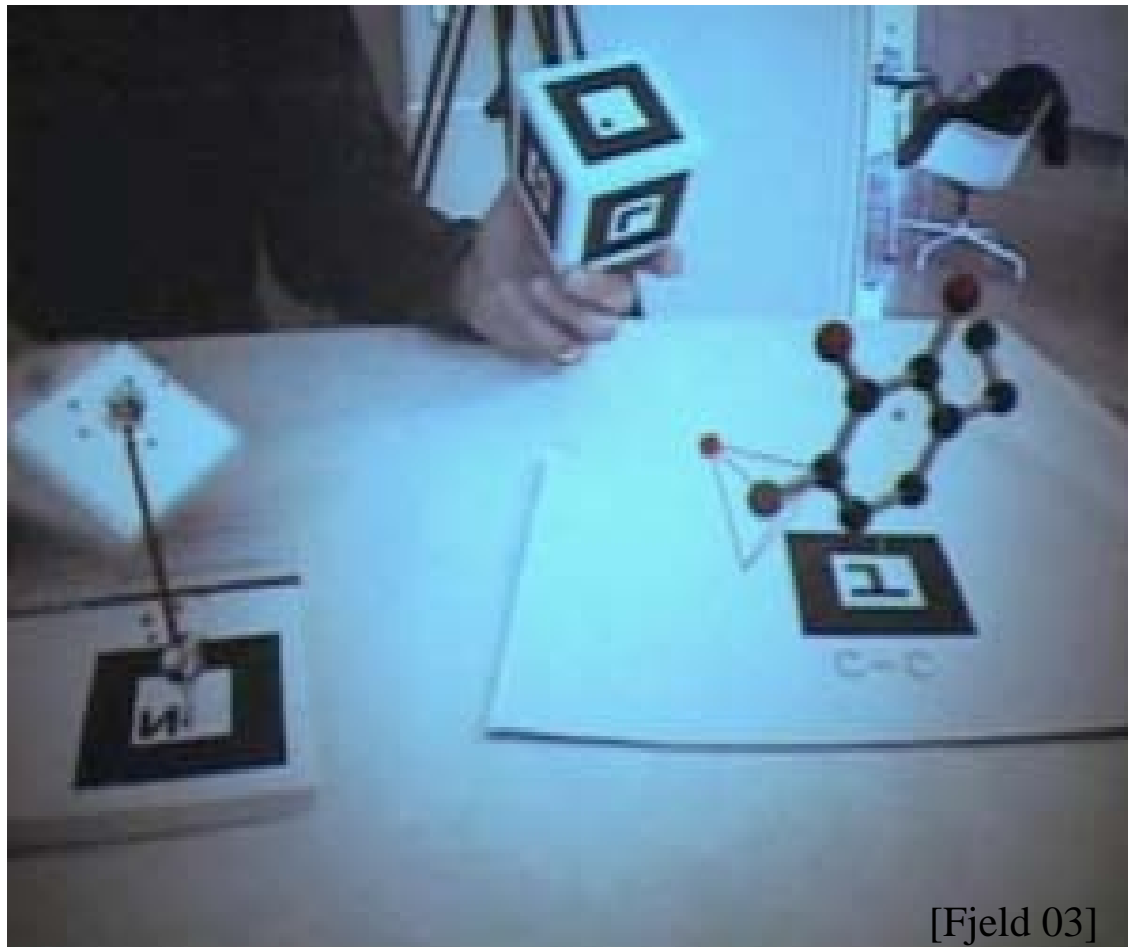


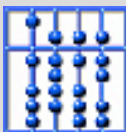




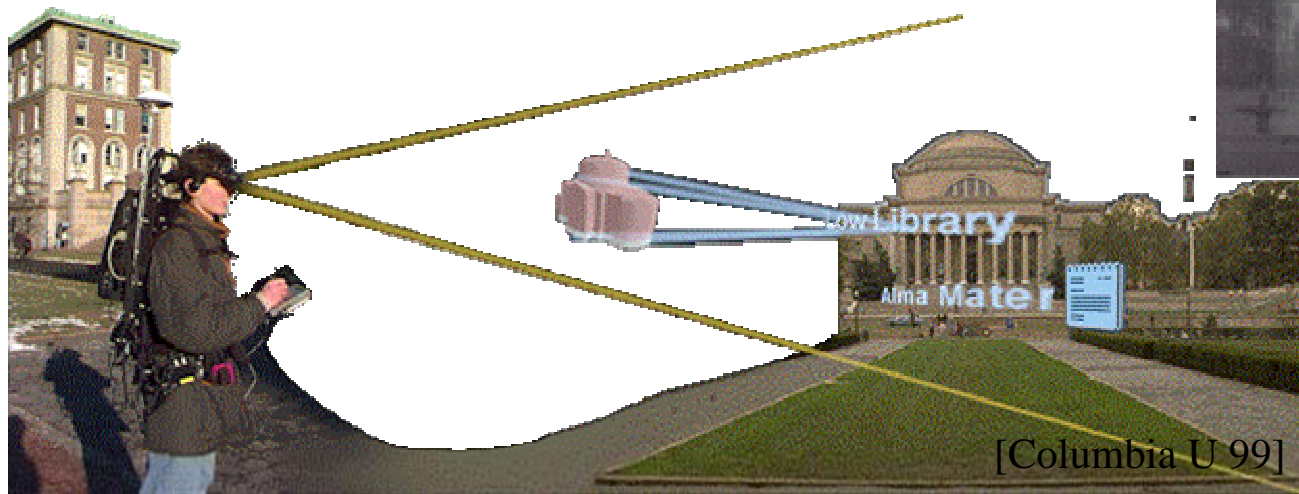
2.5 Edutainment and Games - Illuminating Light, Tic Tac Toe -





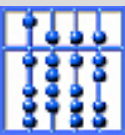


2.6 Tourism



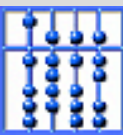
3. AR-Related Trends/Enablers

- Wireless Networks
- Wearable/mobile Devices
- Multi-media (sound & speech, video)
- Virtual Reality (3D)
- Tracking Systems (GPS: navigation system in cars)
- Tele-presence, Tele-manipulation
Tele-collaboration
- Games



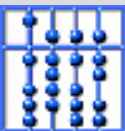
4. Research Issues

- **Sensor Analysis** (user tracking, scene modeling)
- **Information Presentation** (Multi-media data; storage, access, data security, visualization)
- **Mobile Communication** (distributed systems)
- **Wearable Devices** (Hardware), **Human Factors**
- **HCI** (multi-modal interaction)
- **Efficient Algorithms** (real-time)
- **Software Engineering** (extendable, scalable, efficient system)



5. Requirements

- Efficiency
- Flexibility
- Quality of Service in Networks
- Load Balancing
- Adaptive System Behavior
- System Security (Datenschutz)
- User Safety, Acceptance



Multimedia Combination of Reality und „Virtuality“

