**virtUOS**
Zentrum zur Unterstützung virtueller Lehre
der Universität Osnabrück

# Automation Techniques for Broadcasting and Recording Lectures and Seminars

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# Introduction

- For most people watching television or video is the most common way to get information
- Recorded information can be repeated for a better understanding and is more accurate than handwritten records
- Highly decorated scientist are seldom teaching at your university and in most cases it is expansive to travel
- Famous lecturers could enrich normal seminars with their guest appearance
- If personnel is missing some needed lectures could be imported from an other university
- Usually television does not offer the possibility to ask questions (comprehension questions, i.e.)

# Introduction

**Recording and broadcasting lectures becomes more and more important**

- Technical Reasons
  - Video recording and video conferencing equipment gets affordable
  - Students often have broadband internet access
- Political Reasons
  - Scientific personnel is very expansive
  - Universities have to offer a good quality of teaching with less money
  - Interesting video conferences or high quality lecture recordings can be an advantage in competition for an university

# Video Creation

- Normally a videographer or at least a technician is needed to control cameras and as a director
- Many procedures can be automated
  - Turning the equipment on/off
  - Connecting to the video conference
  - Start recording device
  - Moving the cameras
  - Selecting the input
  - Selecting the media for the presentation
- A professional videographer will always be better than an automated system

# Video composition



- The lecturer should be shown from a close angle
  - Face expressions
  - Gestures
  - Looks more interesting
- The lecturer should be allowed to move
  - But the camera should not follow every movement
- Students should be shown if they say something
- The audience should be shown from time to time

# Interaction techniques

- Active Selection
  - Every participant has a device to select camera positions (i.e. infrared remote)
  - Moderator can select every camera position
  - Students can select their own camera position or switch back to the lecturer
- Passive Selection
  - Computer vision detects the position of the lecturer
  - Students who ask a question are located by microphone array techniques

# Interaction techniques

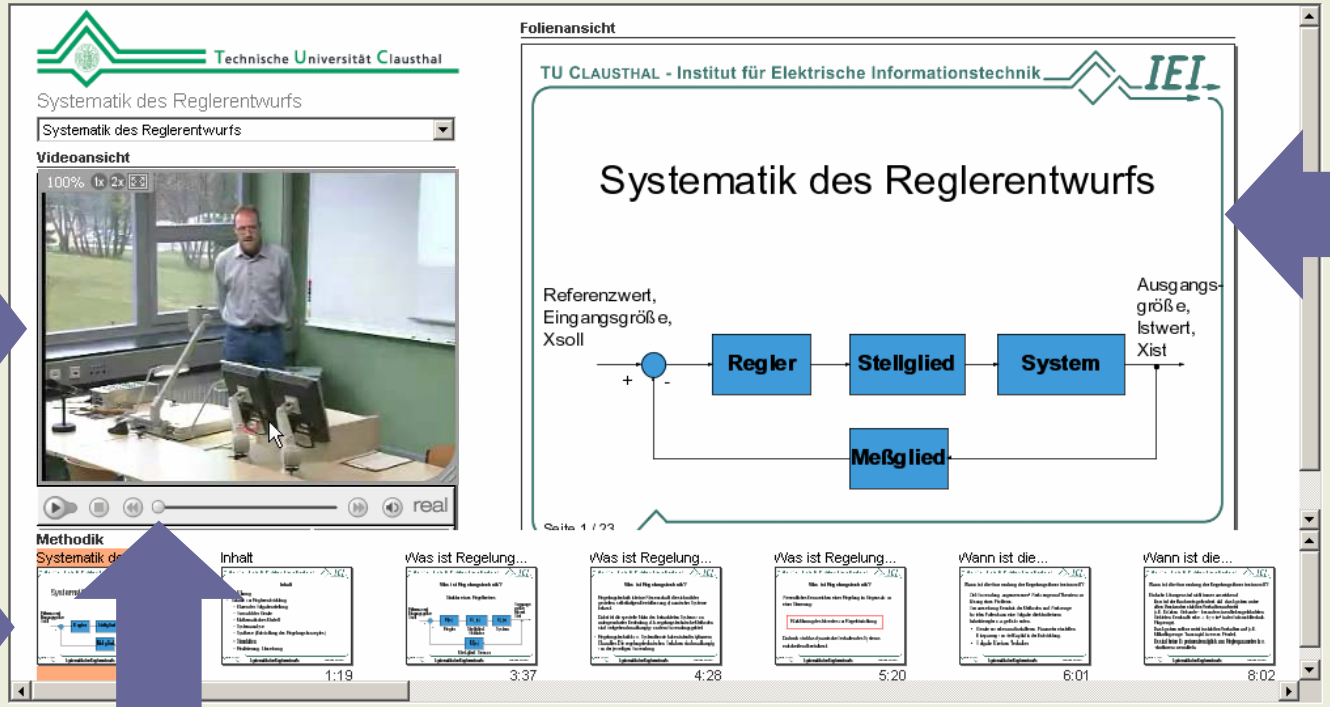
- Active selection
  - Pros
    - Technician is only needed for service and setup
    - Can be used in mobile version (flying classroom)
    - Good control about what will be shown
  - Cons
    - Positions still have to be selected
    - Moderators need training
    - Very static framing
- Passive selection
  - Pros
    - No training needed
    - Better framing than active selection
  - Cons
    - Very little control about what will be shown

# Hardware

- Cameras with pan-tilt-drive (i.e. Sony EVI D-31)
- AV-switches or mixer with computer interface (i.e. Kramer VS-1604 or Panasonic WJ-MX50)
- Several microphones
- At least one computer to control the other hardware
- A video conferencing device (i.e. Polycom Viewstation)
- Recording devices (i.e. a VCR or a computer with Helix Producer)
- For active selection
  - IR-remotes and IR-receiver (i.e. IR-Trans)
- For passive selection
  - Low cost cameras for computer vision (i.e. Super Circuit PC60XSA)

# What are Lecture-Recordings





# Criteria for current systems



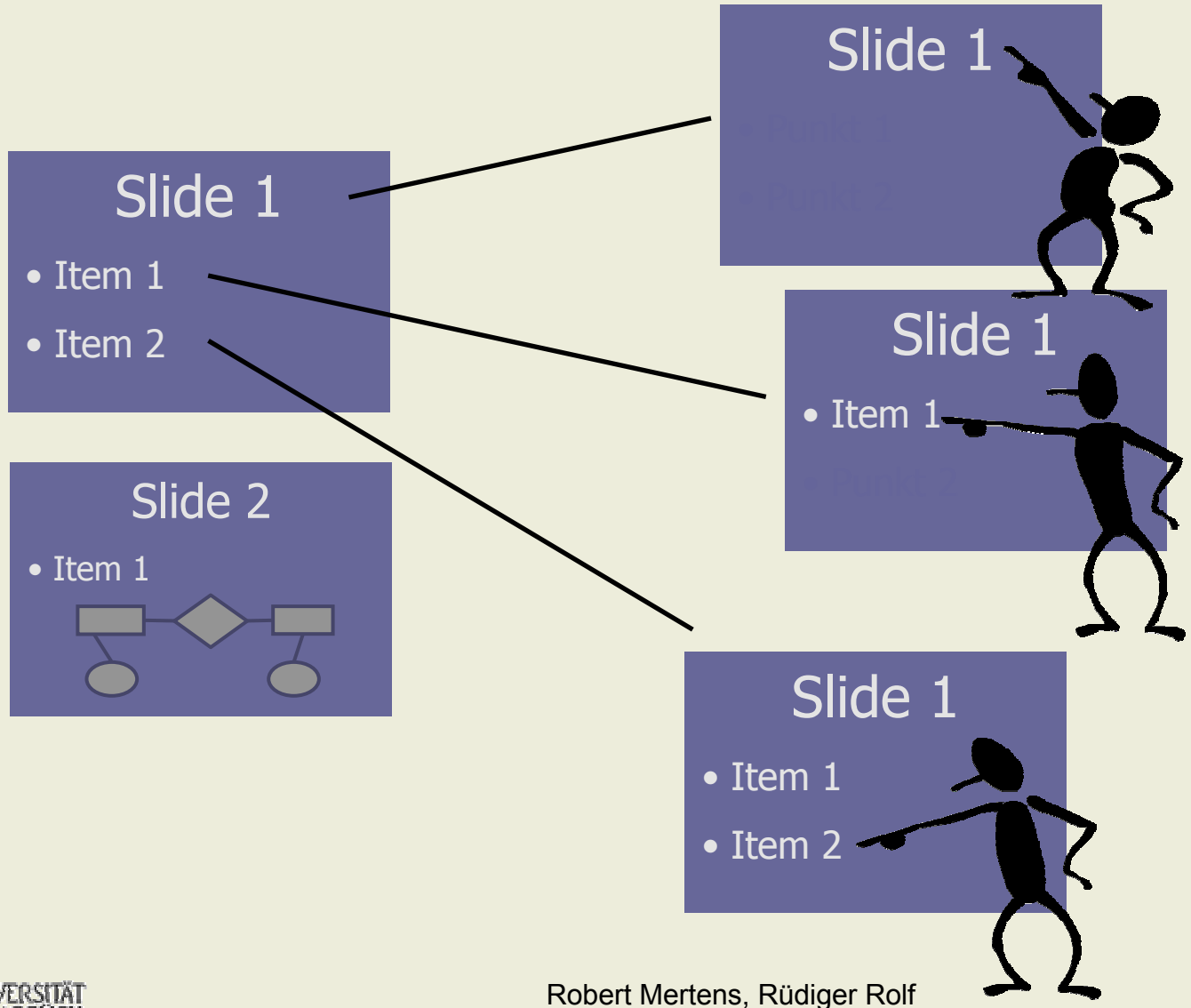
- automatic synchronisation
- annotations
- order of animations
- basic navigation features
  - slide-based navigation
  - title-based navigation
  - Full-text search

# To-Do's

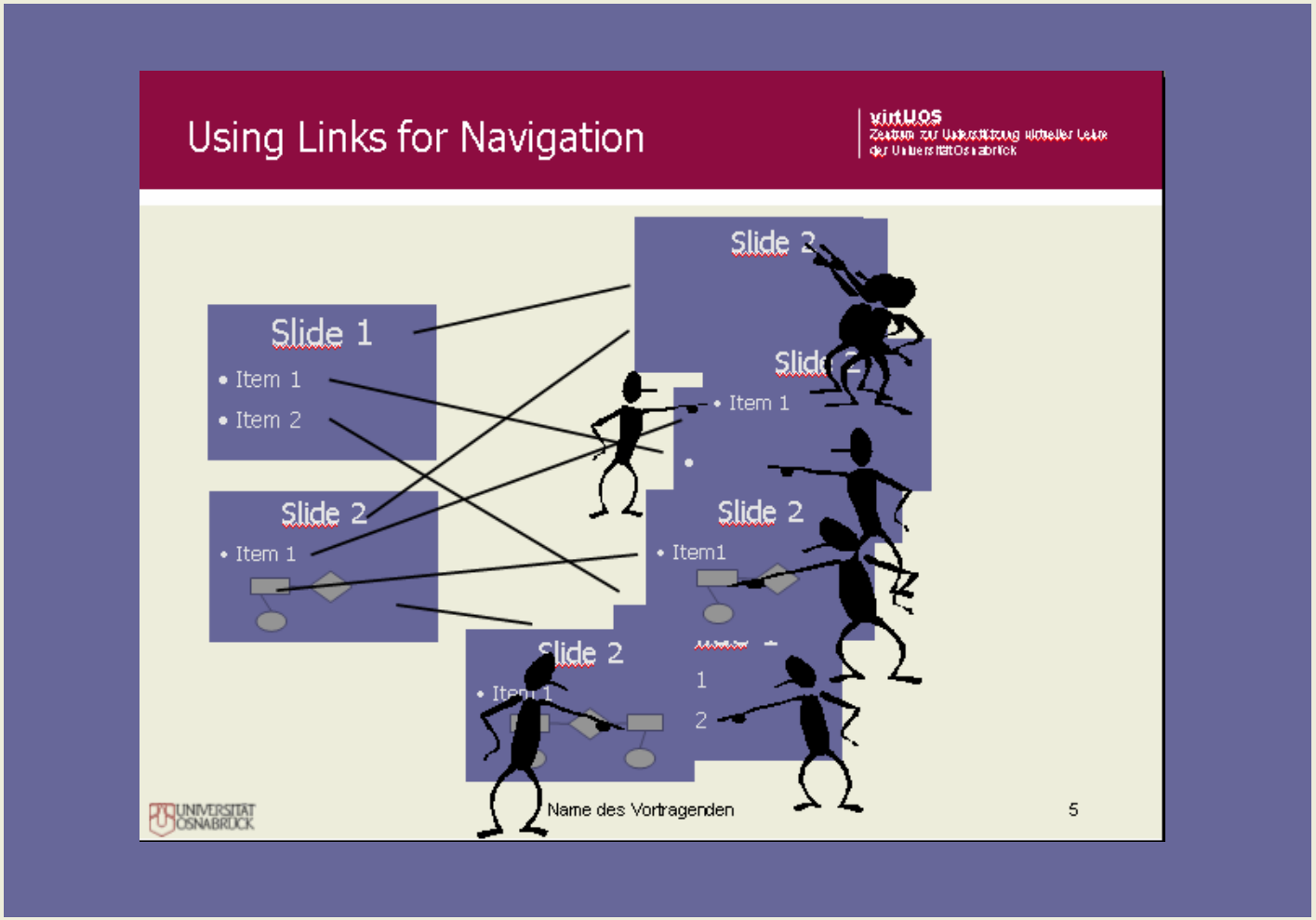
- What is missing in state-of-the-art tools
  - coarse-grained pictures
  - searchability
  - navigation
  - animation-steps
- SVG (Scaleable Vector Graphics) as a solution:
  - vectorbased
  - text representation
  - links within the slides
  - animated ...

# Using Links for Navigation

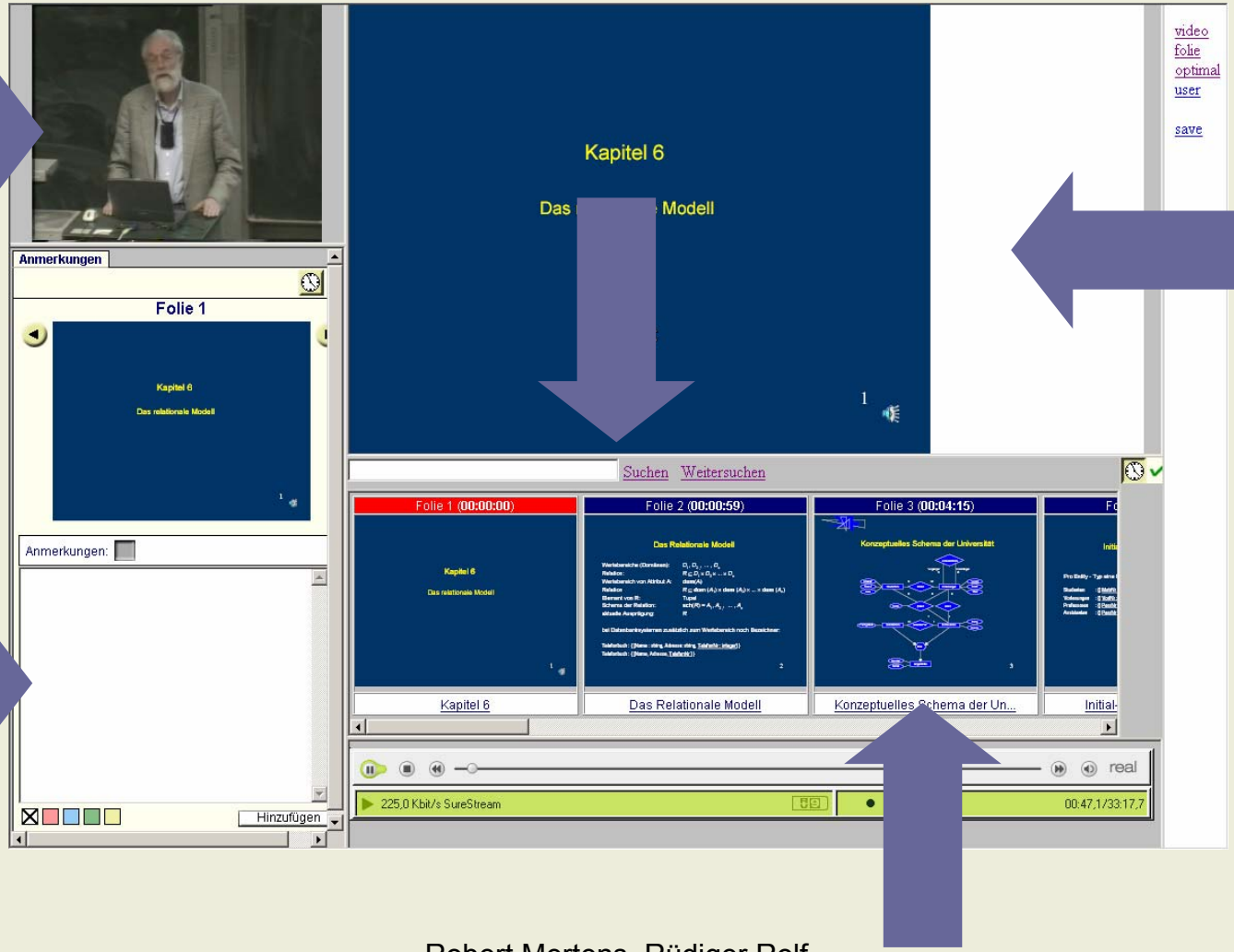




# Animation Steps



# Screenshot


Kapitel 6
Anmerkungen
Folie 1
Anmerkungen:
Hinzufügen
video
folie
optimal
user
save
Suchen
Weitersuchen
Folie 1 (00:00:00)
Folie 2 (00:00:59)
Folie 3 (00:04:15)
Kapitel 6
Das Relationale Modell
Konzeptuelles Schema der Un...
225,0 Kbit/s SureStream
00:47,1/33:17,7

# Resume

- Combination and further automation of these tools is only a matter of time
- Technically it will be easy and cheap to create an archived or broadcasted lecture
- Didactic concepts for distributed lectures are needed
- Structures are needed to promote and exchange the lectures
  - The effort of organising a broadcast of a lecture is still very high
    - Find someone who will broadcast a lecture
    - Find viewers for the lecture
  - A system is needed where universities can check, what is available and book it easily

# Literature



- Knaden, A. & Rolf, R. (2003). Automatisierte Kamerasteuerung zur Übertragung von Seminaren und Vorlesungen. In: V. Dötsch, G. Schade & K. Hering (Hrsg.), *e-Learning and beyond. Proceedings of the Workshop on e-Learning 2003, HTWK Leipzig, 14.-15. Juli 2003* (p. 87-97).
- Rui, Y., Gupta, A. & Grundin, J. (2003). Videography for Telepresentations. In: CHI letters, Volume no.5, Issue No. 1, CHI 2003, April 5-10, 2003, Ft. Lauderdale, Florida, USA (p. 457- 464)