Introduction

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Jörg Cassens

Lab Course Media Informatics
SoSe 2017

medieninformatik
IMAI – Institut für Mathematik und Angewandte Informatik

Welcome

Me

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  - Building Samelsonplatz, Office A 115
- My Background
- Deutsch oder English
- German: Du oder Sie

What is a lab course?

1. Single task every (n) week(s)
   - I give an assignment, you solve it
2. Big project being done by yourself
   - You get one task, I evaluate
3. Training practical skills through mid-sized project
   - More structured than the second option
   - Mixture of “lectures”, group meetings and independent group work phases

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This lab course is of the third kind, with somewhat more supervision in the beginning and more and more independent work (but with reporting) at the end.

Process

Problem-Based Learning

Solving an open-ended problem found in trigger material. We do not focus on problem solving with a predefined solution, but we strive for the development of skills through solving a real world problem.

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Student-focused active learning

I provide guidance and scaffolding, you solve the problem. This type of process is not suited for learning basic knowledge, which is better served by lectures (cognitive load, retention of knowledge).

Feedback

Agility

The number of course vs. group meetings depends on the topics chosen, individual and group competencies and the need for support.
Constant feedback is explicitly welcomed.

Just quitting the course does help neither you nor me, therefore, I ask you to tell me about any problems with the course immediately (if needed anonymously).

Rules & Regulations

Workload

Workload

- 3 SWS
  - (At least) 2 SWS during term time
    - Course meetings
    - Group meetings
  - The rest group meetings & presentations during the autumn break
- 5 ECTS
- 125 hours
  - 45 hours course/group meeting
  - 80 hours self-study
- Self-study includes
  - 60 hours group work
  - 16 hours written documentation
  - 4 hours presentation (incl. preparation)
- If you want to finish the course during term time (up to July) this translates to a workload of about 8 hours per week.

Credits

Credits

- **WINF (PO $\leq$ 2011):** Veranstaltungen Master, entweder
  - Gebiete der Informatik, Gebiet Algorithmen
  - Wahlbereich, Gebiet Medieninformatik
- **WINF (PO $\geq$ 2014):** Wahlbereich
- **IMIT (PO $\leq$ 2011):** Veranstaltungen Master
  - Gebiete der Informatik – Gebiet Medieninformatik
  - Gebiete der Informatik – Gebiet Algorithmen
- **IMIT, AI (PO $\geq$ 2014):** Veranstaltungen Master
  - Wahlmodule – Informatik – Gebiet Medieninformatik
- **Data Analytics:**
  - Elective – Application – Media Systems
- **Andere**: Maßgabe des zuständigen Prüfungsausschusses

Learning Outcomes

Lernziele

Aus dem **Modulhandbuch**:
[…] Erfolgreiche Studierende *konzipieren und realisieren* kleinere und mittlere *Projekte* im Bereich der Medieninformatik. Sie wenden dazu die in der Veranstaltung benutzten *Prinzipien, Methoden und Werkzeuge* an und kennen deren Möglichkeiten und Grenzen. Die Studierenden erlernen die *Lösung komplexer Probleme in kleinen Teams*. Hierfür sollen sie lernen, verschiedene Aufgaben zu identifizieren sowie komplexe Aufgaben in handhabbare Bestandteile zu zerlegen, und ihr Projekt so zu planen, dass sie das gesetzte Ziel erreichen. Das im bisherigen Studium *angeeignete Wissen* soll von ihnen *genutzt* werden, um sich die für die Aufgabe nötigen technischen und methodischen Fertigkeiten *anzueignen* […]

Learning Outcomes

From the **course catalog**:
[…] Successful students *design and implement* small or medium sized *projects* in the area of media informatics. They make use of *principles, methods and tools* presented and know their limits and benefits. Students learn to *solve complex problems in teams*. To do this, they have to identify different tasks and divide complex tasks into solvable sub problems. They learn how to plan and manage their projects so that they can achieve the set goal. The *knowledge accumulated* in previous courses has to be *put to use* in order to *acquire* the technical and methodological competencies necessary to solve the task at hand […]

Course Content

From the **course catalog**:

- Requirements elicitation for multimedia systems
  - User-Centered Processes (Contextual Design, Scenario-Based Design)
- Design of multimedia systems
  - Prototypes, design methods
- Use of modern authoring tools
  - Android SDK, Arduino SDK, Livecode, gitlab, …
- Implementation of multimedia applications
  - Java, Python, JavaScript, (angular, meteor, node), …
- Project documentation and presentation
  - Writing a documentation and giving presentations

Course Format

Project

- Problem-Based Learning
- One project from requirements analysis up to a finished product
  - One larger task to be finished until the end of term or, if the group chooses so, until the end of autumn break
  - Group work in groups of 3-6 students (group size depends on size and complexity of task)
- Voluntary task if suited for the course
  - Product demos
  - Presentation of tools, methods and processes

Team Building

- Usually 3-6 students
  - In particular: you cannot work individually
- Formation via topic
  - Groups of student can collectively decide on topics
  - Individual students can join groups for the topics
- If groups should get too big it is usually possible to divide them into sub-groups with independent topics

Regulations

Admission

The number of slots in the seminar is limited. Therefore, admission to the course is prioritized as follows:

1. Number of courses in the area of “Media Informatics” that have successfully been completed
2. Special circumstance (work in the university self governance institutions, parenting, …)
3. Year of study

Exam

1. Implementation of an **artifact** in media informatics
   - Generally a software artifact
   - Other types of artifact can be developed, in particular a film
2. **Two presentations**
   - Mid-project presentation
     - 30 minutes of presentation plus 15 minutes of discussion
     - Requirements analysis and concept done
   - End-project presentation
     - 30 minutes of presentation plus 15 minutes of discussion
     - Description of artifact and process
     - Includes demonstration of the artifact
3. Written **documentation**
   - At least $15 + n * 5$ pages, where n is the number of group members
   - The media informatics template has to be used
     - mi.kriwi.de/templates
4. **Self-evaluation** of group

Evaluation Criteria

Evaluation Criteria

- The exam grade takes both presentations, the development process, the documentation and the implemented artifact into account
- All components mentioned on the previous slide have to be delivered
- Active participation in course discussion is required and can be part of the grade
- You are committed to the course when you accept a topic and do not withdraw at a cut-off date that will be announced in due time

A detailed list of evaluation criteria can be found in the handout version of this slide deck.

Dates & Times

Options

- There are two options for completing the course
  1. Complete the whole task during term time, giving the mid-project presentation in the middle of summer term time and the end-project presentation at the end of term time
  2. Make use of the autumn break for the completion of the project, giving a mid-project presentation at the end of term time and the end-project presentation at the end of the break (approximately 1-2 weeks before the lectures start, exact date to be given in due time)
- Each group decides for themselves which option to chose
- A group that decides to complete the course during the summer term has to state this intention in due time to organize the mid-project presentations

Meetings

- Two different types of meetings
  - Course meetings
    - Topics of interest to everyone
    - Mid-project presentations
    - End-project presentations
  - Group meetings
    - What have we done recently?
    - What are we going to do next?
    - What are the problems, where is support needed?
- Course meetings during term
  - Wednesday, 12-14 o'clock (kick-off, topic meetings) *or*
  - Wednesday, 12-18 o'clock (presentations)
  - Samelsonplatz A 102
- Course meetings during autumn break
  - Approximately 1-2 weeks before start of winter term
- Group meetings on individual arrangements
  - Group meetings can be canceled by the group if a meeting is not needed

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- Group meetings on individual arrangements
  - Group meetings can be canceled by the group if a meeting is not needed
- Any Conflicts?

Dates: Term Meetings

05.04., 12-14	☒	kick-off, topics announced
12.04., 12-14	☒	topics assigned, tools lecture
18./19.04.	☐	group meetings
25./26.04.	☐	group meetings
02./03.05.	☐	group meetings
09./10.05.	☐	group meetings
16./17.05.	☐	group meetings
23./24.05.	☐	group meetings
31.05., 12-18	☒	mid-project presentations Campusfest
07.06.	○	*no meetings (project week)*
13./14.06.	☐	group meetings
20./21.06.	☐	group meetings
27./28.06.	○	*no meetings (conference)*
05.07., 12-18	☒	end-project presentations

Dates: Meetings During Autumn Break

Groups deciding to work during autumn break:

05.07., 12-18	☒	mid-project presentations
	○	Meetings/Hangouts if needed
26.07.	○	Status report (email)
16.08.	○	Status report (email)
06.09.	○	Status report (email)
27.09.	○	Status report (email)
10.10.	☒	end-project presentations (time tbd)

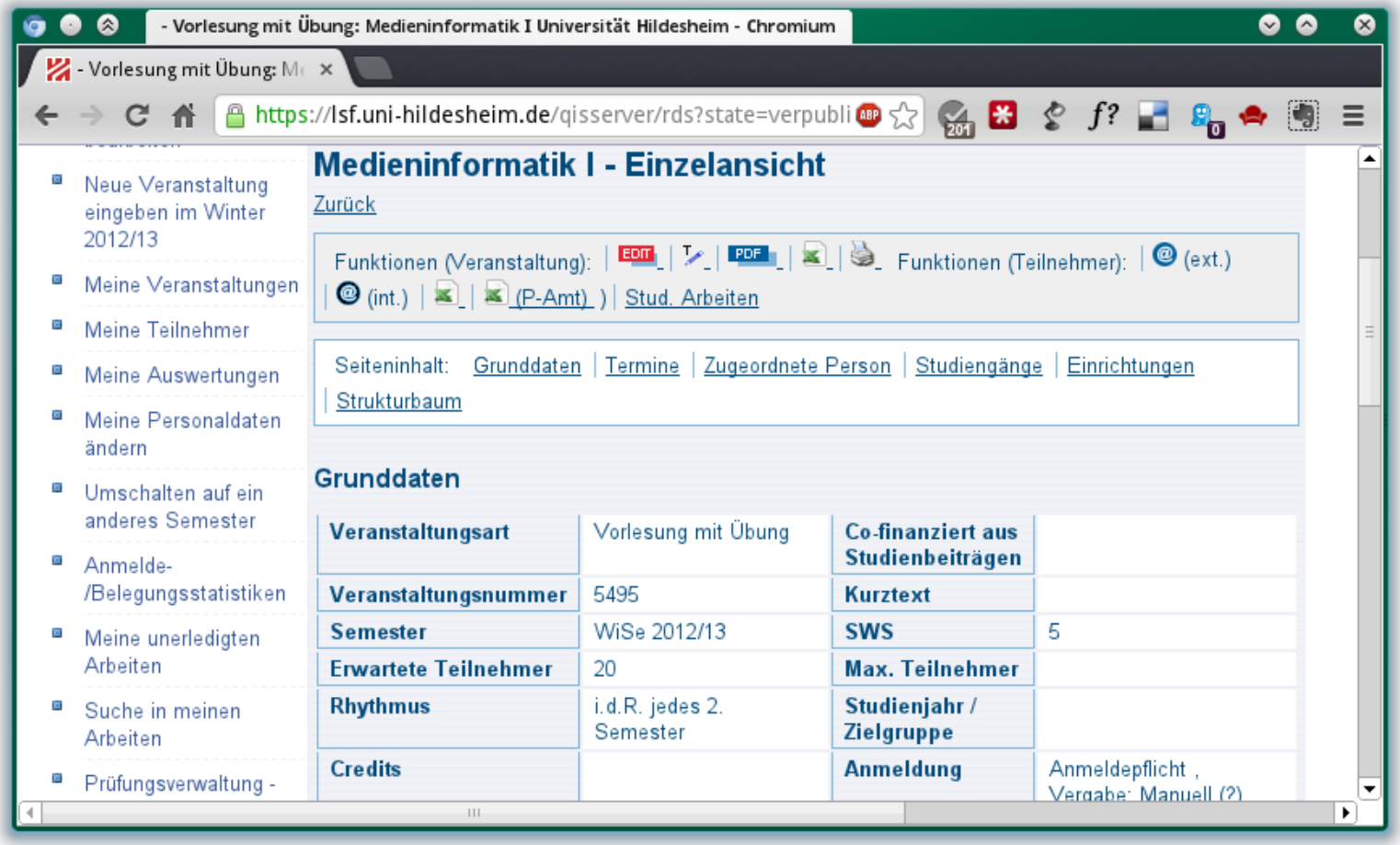
Dates: Deliverables

Deliverables for all groups:

- **10.04** Outline of own project idea (email)
- **05.07.** slides mid-project presentation (learnweb)
- **18.10.** slides end-project presentation (learnweb)
- **18.10.** project documentation (learnweb & paper)
- **18.10.** artifact (how depends on artifact type)

Websites

LSF



☞ lsf.uni-hildesheim.de

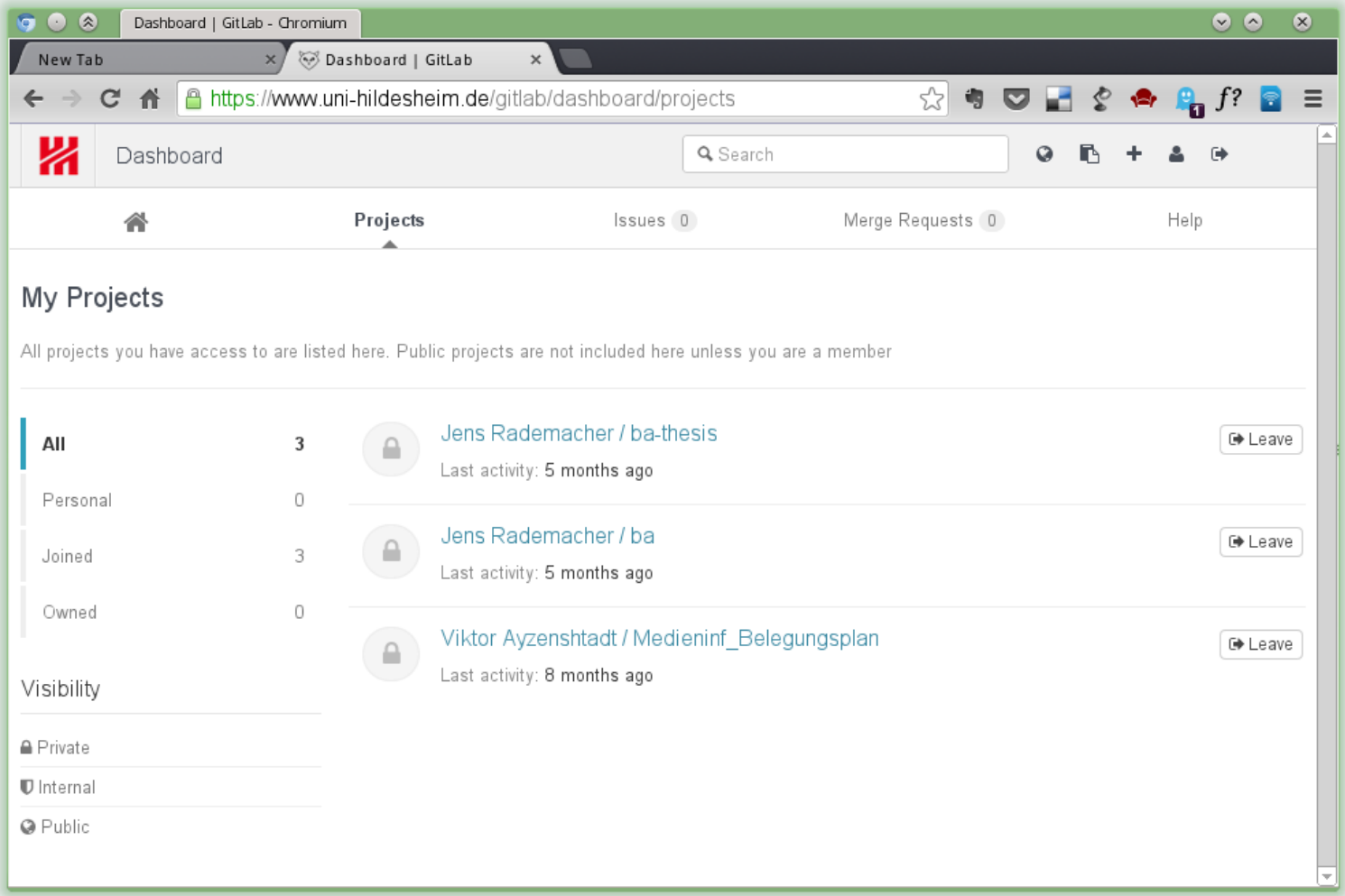
Learnweb

☞ learnweb.uni-hildesheim.de, course So17_5497

mi.kriwi.de

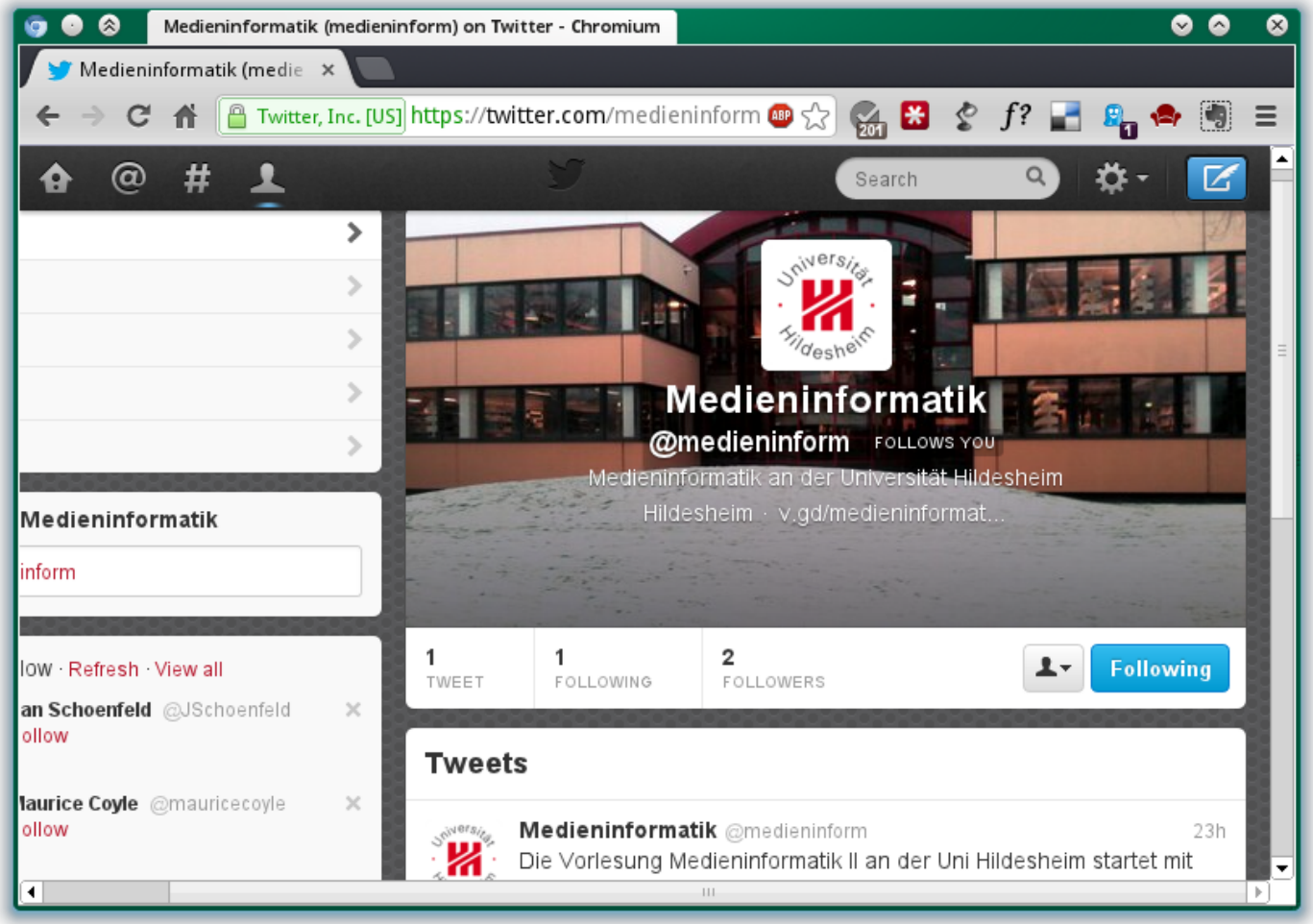
☞ mi.kriwi.de/pmi

Development Server



☞ www.uni-hildesheim.de/gitlab

Twitter



☞ https://twitter.com/medieninform

Projects

Project Outlines

In the following, I am going to introduce a number of possible project topics.

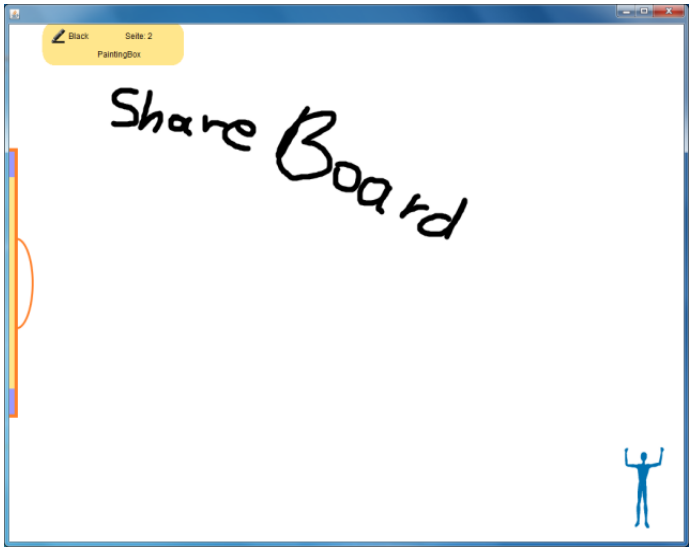
Caveat

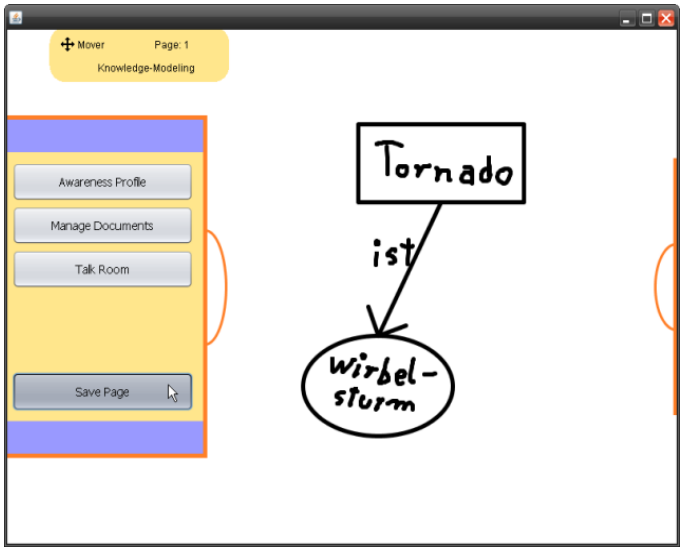
All ideas for projects are “underspecified” – what could or should be implemented depends on on how many of you commit to the different projects. It also depends on the competencies you bring into the project. Every project idea can be expanded as well as reduced. Not every project is suited for all group sizes, though. It does not make sense to let 16 people build an Arduino-based RFID scanner.

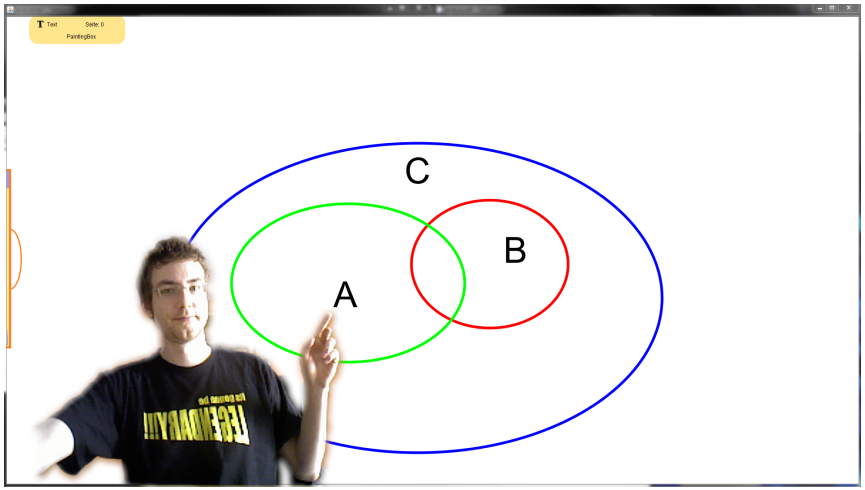
More information for the different projects can be found in the handout-version of the slides which will be available tomorrow.

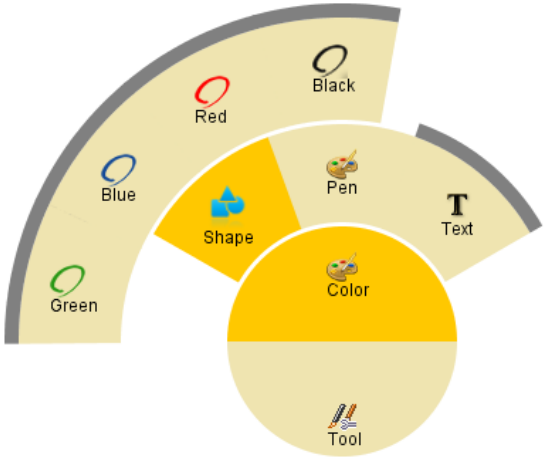
ShareBoard

ShareBoard: Examples









ShareBoard: Status

Existing Work

- **What has been done before?**
  - First implementation (lab course)
  - 3D-Gestures (large lab course)
  - Diverse enhancements (Concept Maps, handwriting recognition, video chat; projects and bachelor theses)
  - User-Avatars with depth keying (bachelor thesis)
  - HTML5-Version (bachelor and master theses)
  - Analysis of group behaviour when using ShareBoard for planning tasks (bachelor thesis)

Technologies used

Java, C#, sensors (kinect), web technologies

ShareBoard: Topics

New Opportunities

- **Further development of web-version (ShareBoardJS)**
  - Starting from existing master thesis
  - HTML-based, works out-of-the-box in the browser
  - Uses angular.js and meteor.js
- **Communication**
  - Video and Voice
  - Support meetings, brainstorming, etc.
- **Natural Interaction**
  - Supporting multi-modal interaction
  - How do people interact with whiteboards?
  - e.g. recognizing different situations and adaptation of the ShareBoard (context)

Suggested technologies

(Java), Sensors (kinect), web technologies

Learning and Teaching Technologies

Academic Writing: Status

Existing Work

- **What has been done before?**
- Supporting academic text production (master thesis)
  - That could be you writing you next assignment, documentation, thesis
- Web-based system
  - Text-repository
  - Upload your own text in different formats
  - Preliminary analysis
    - Categorization, keywords
    - Statistics (Wordcount)

Technologies used

Web technologies, web2py, NLP-tools

Academic Writing: Topics

New Opportunities

- **Supporting academic text production and reception**
- Building on top of the existing pipeline
  - Text-repository
  - Upload own text
    - Further analysis
  - Upload and analyze text you work with (references etc.)
  - Comparison with other texts
  - Visualization of key aspects
  - Support the writing process
    - Finding other relevant texts
    - Support for citations
    - Citation management

Suggested technologies

Web technologies, web2py, NLP-tools, machine learning

Lecture Project

New Opportunities

- **The Lecture Project**
  - Suppose you have a system helping you understand lectures…
  - Automatic recognition of important aspects of lectures from video
  - Contextualised query-based summarization
- **Early stages of project, big opportunities**
  - You might like to look at live behaviour tracking, maybe myself lecturing
    - or the corpus of videos
  - or you might like to look at acoustic cues for importance
    - Emotion detection, affective computing
  - or you might like to look at language modelling
    - linguistic models, NLP

Suggested technologies

Web technologies, multi-modal analysis, NLP-tools, machine learning

Linguistic Tools

Visual Annotator: Example

IMPRESSION:
Interval resolution of left frontal subdural fluid collection since previous exam of 3/27/13.
Subtle right occipital non-displaced skull fracture.

Findings consistent with resolving right cerebellar contusion with small underlying focal cerebellar chronic infraction.

Supratentorial white matter disease consistent with chronic white matter ischemic changes.

Cerebral atrophy
Minor mucosal inflammatory disease in the ethmoid air cells.

Resolution of the acute left sphenoid sinusitis.

- An annotator allows to mark, classify and annotate segments of texts (sentences, words, groups of words)
- Annotators are a basic tool for linguistic research

Visual Annotator: Topics

New Opportunities

- **Build *the* collaborative online annotator**
- Existing systems are restricted in the models that can be used and in usability
- In particular, there is a need for a web-based tool that allows for group collaboration
- The envisioned tool should also make it easy to annotate large corpora of texts
- Combination with machine learning tools is possible
- Cooperation with an external partner possible

Suggested technologies

Web technologies, front-end development

Visual Annotator: Topics

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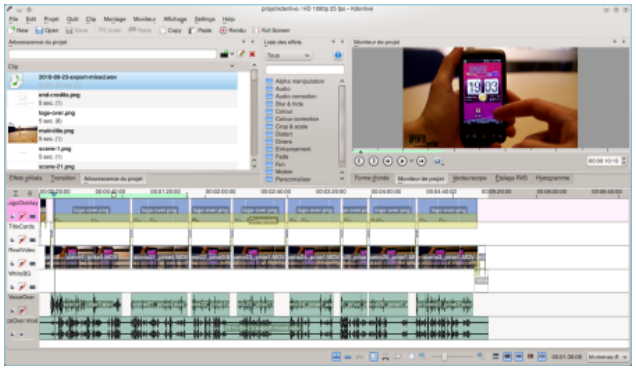
Suggested technologies

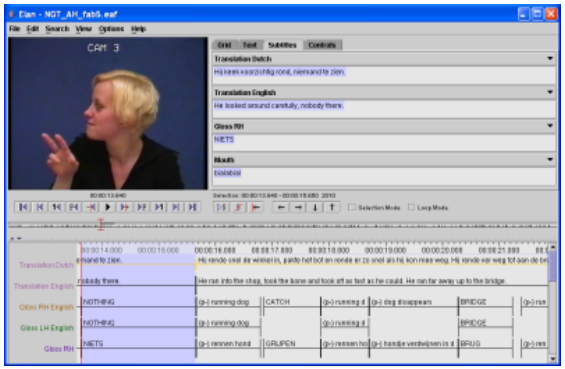
Web technologies, front-end development

Video Concordancer

New Opportunities

- Video Concordancer
  - Several videos from field or lab studies
  - Finding & comparing videos
  - (Synchronous) annotation of videos
  - Multi-modality
  - Cooperation with an external partner possible





Suggested technologies

Web technologies, front-end development

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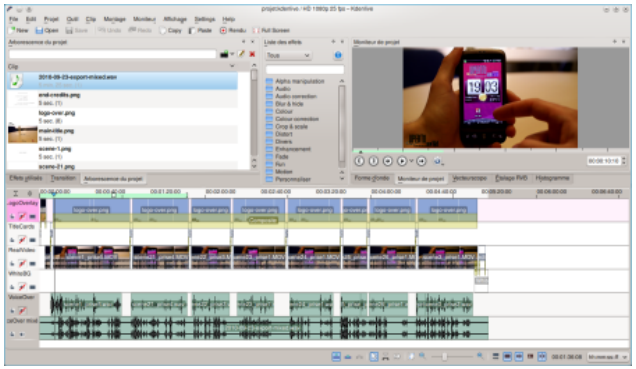
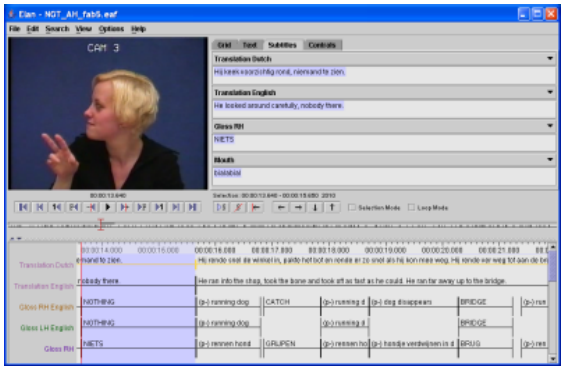




Suggested technologies

Web technologies, front-end development

PerGamEn

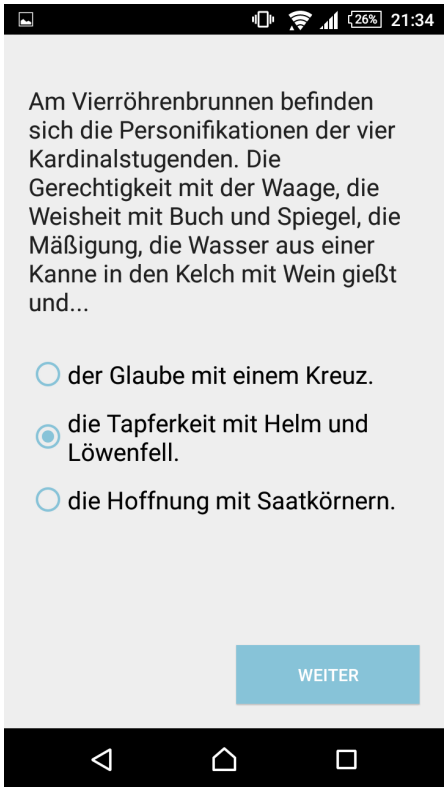
Pervasive Games and Environments: Status

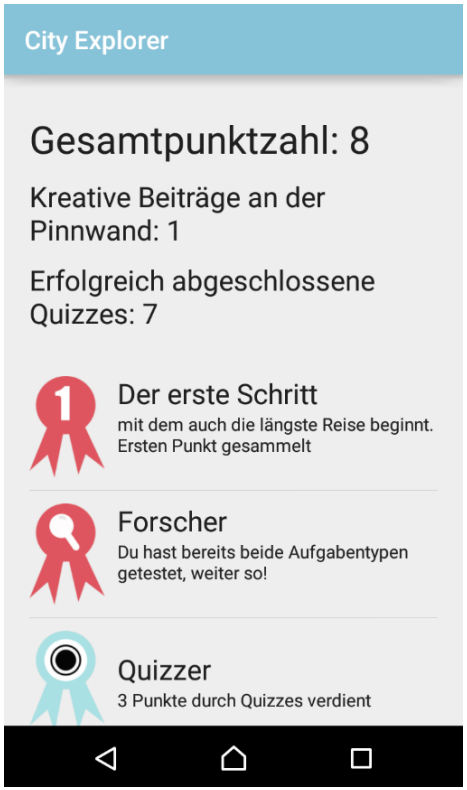
Existing Work

- **Pervasive Games: Breaking the magic circle**
  - Spatial extension
  - Temporal extension
  - Social extension
- **What has been done before?**
  - Find It – Learning by Caching (bachelor thesis)
  - City Explorer – Discover Würzburg (bachelor thesis)
  - Uburzis – competitive location-based game for school teams (bachelor thesis)

Technologies used
Android SDK, Livecode

Example City Explorer





Pervasive Games and Environments: Topics

New Opportunities

- **Develop your own game (framework)**
- "Like Ingress"
  - Virtual worlds and real places
  - location- and context-based gaming
- **Possible use in learning and teaching (serious games)**
  - History
  - Languages
- Collaborative aspects important

Suggested technologies

Mobiles

Behavioural Interfaces

Beispiel Star Trek Doors

Unsere Türen

Built as part of the Masters thesis of John Sverre Solem

Behavioural Interfaces: Status

Existing Work

- **Was ist das?**
- Behavioural Interfaces sind solche Interfaces, bei denen das Verhalten von Benutzern erkannt und modelliert wird
- Diese können z.B. zur Intentionserkennung dienen
  - Beispiel Star-Trek-Doors: automatische Türen, die sich nicht einfach aufgrund der räumlichen Nähe einer Person öffnen, sondern deswegen, weil sie die Intention des Benutzers erkennen, durch die Tür gehen zu wollen
- **Abgeschlossene Arbeiten zum Thema**
  - Sliding Doors (2 Masterarbeiten)
  - Erkennung von “Wandern” bei Alzheimer (Bachelorarbeit)

Technologies used
Java, Künstliche Intelligenz, Sensoren

Behavioural Interfaces: Topics

New Opportunities

- **Türen, Whiteboards, Vorlesungen, Smart Rooms...**
- Mögliche Themen
  - Star-Trek-Doors 2.0
  - Weitere Anwendungsgebiete
    - ShareBoard Erkennung von Intentionen
    - Aufbauend auf den Arbeiten zu Alzheimer
    - Auch in den anderen hier genannten Gebieten
- Cooperation with an external partner possible

Suggested technologies

Embedded Systems, Sensoren (kinect), Künstliche Intelligenz, Maschinelles Lernen

Behavioural Interfaces: Topics

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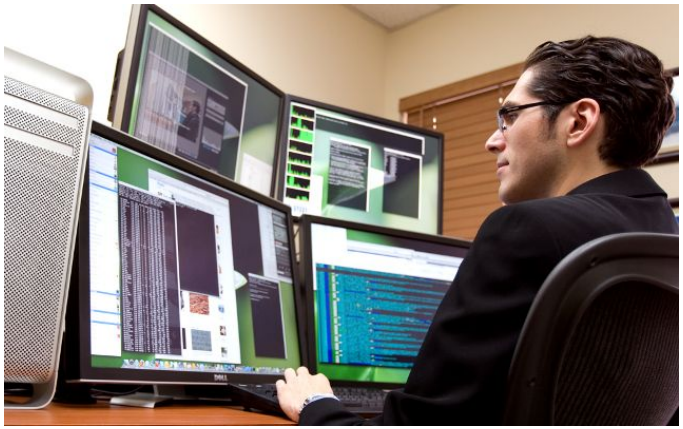
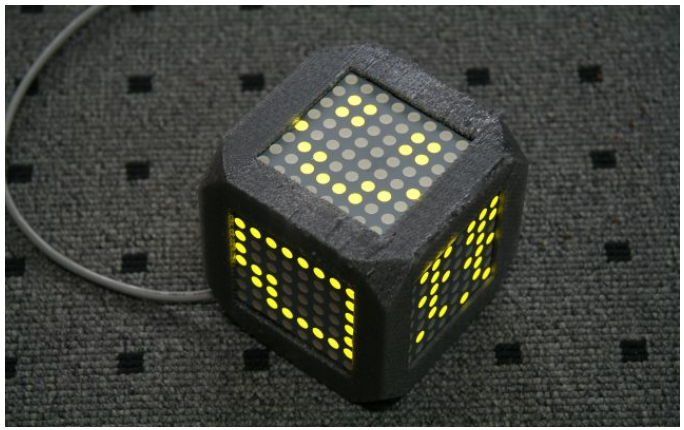
CAKE

CAKE: Übersicht

Context Awareness and Knowledge Environment

Mate for Awareness in Teams



CAKE: Status

Bearbeitete CAKE-Themen

- **Abgeschlossene Arbeiten zum Thema**
  - Server und Protokolle (Fallstudie)
  - Diverse Aktoren und Sensoren (Praktikum)
  - Simulator CASi (Praktikum)
  - Basisversion in Python (Bachelorarbeit)

Primär eingesetzte Technologien

Java, Künstliche Intelligenz

CAKE: Topics

Neue CAKE-Themen

- **Intelligent (Py-) CAKE**
  - Integration von Machine Learning und Reasoning
  - Sowohl PyCAKE als auch CAKE als Basis möglich
  - ggf. Sensorik und Aktorik
- Neuer Anwendungsfall
  - Adaptiver Museumsführer
  - Ambient Assisted Living (AAL)
  - (Py-) CAKE in a Box
  - Sensorik/Aktorik
  - Intelligenz
- (Py-) CAKE in a Box
  - CAKE auf dem Raspberry Pi
  - Reasoning, Sensorik und Aktorik

Mögliche Technologien

Java, Python, Embedded Systems, Sensoren (kinect, Leap Motion), Künstliche Intelligenz, Maschinelles Lernen

BYOI

Bring Your Own Idea

- New applications based on your interests and competencies
- From requirements analysis to finished prototype
- Challenges:
  - Find and express ideas
  - Match my own competencies to ensure sufficient supervision
  - Choosing appropriate tools
- How to do it
  - You think about your project idea in a group
  - You write a one-page outline with a scenario on what the application will look like and send it to me next Monday evening at the latest
  - I will evaluate your proposal
    - Does it fit this course?
    - Am I able to supervise it?
    - Has it an appropriate size (not too big, not too small)

Individualisierte Rezepte

Eigener Projektvorschlag

- Rezepte haben eine breite Zielgruppe, da jeder Mensch Berührungspunkte mit Kochen und Essen hat
- Die Darstellung in klassischen Rezeptbüchern ist jedoch einheitlich, obwohl das Buch von einem breiten Zielpublikum verwendet wird
- Im digitalen Zeitalter werden Rezepte häufig über diverse Websites konsumiert, die dabei jedoch stets nur eine Darstellungsform bieten
- Durch Verwendung von Techniken aus dem Bereich des NLP soll in diesem Projekt eine Lösung geschaffen werden, die gegebene Zubereitungstexte entsprechend verschiedener Eingabeparameter individuell an eine Zielgruppe anpassen kann

Gruppe

...

Tools

- ☞ Tools

Discussion & Attendance

Loan of Hardware

- You can get different types of devices from different sources
- Media Informatics
  - Embedded systems
    - Raspberry Pi, Arduino, Intel Galileo
    - Different sensors and actuators
  - Natural User Interfaces
    - 3D depth-imaging (kinect)
    - Hand gesture sensors (leap motion controller)
    - Webcams
    - Wii Remote and IR-pens
  - Mobile devices
    - Android-Tablets, Mobile phones
    - Windows Mobile, Blackberry OS
- Media technology by the University
  - Camera
  - Tripods
  - Microphones
- To a limited amount, we can purchase new devices

You

- Introduction
  - Who am I?
  - What do I study?
    - Programme, version of “Prüfungsordnung”
    - Master or Bachelor
  - Where did I obtain my Bachelor’s degree?
  - Which other course in Media Informatics have I taken so far?
  - Why am I here?
  - What do I expect from the course?
  - Am I “in” (yes, no, maybe)

Buzzword Bingo

Technologies, Tools, Frameworks

- Associations, no Test

Buzzword Bingo

Technologies, Tools, Frameworks

- Associations, no Test
- HTML5

Buzzword Bingo

Technologies, Tools, Frameworks

- Associations, no Test
- HTML5
- Livecode

Buzzword Bingo

Technologies, Tools, Frameworks

- Associations, no Test
- HTML5
- Livecode
- Android

Buzzword Bingo

Technologies, Tools, Frameworks

- Associations, no Test
- HTML5
- Livecode
- Android
- Dalvik VM

Buzzword Bingo

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- iOS

Buzzword Bingo

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- Android
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- iOS
- Node.js

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- meteor

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- ember.js

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- Bootstrap

Buzzword Bingo

Technologies, Tools, Frameworks

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- Dalvik VM
- iOS
- Node.js
- jQuery
- meteor
- angular.js
- ember.js
- Bootstrap
- PhoneGap/Apache Cordova

Buzzword Bingo

Technologies, Tools, Frameworks

- Scratch

Buzzword Bingo

Technologies, Tools, Frameworks

- Scratch
- Non-linear video editor

Buzzword Bingo

Technologies, Tools, Frameworks

- Scratch
- Non-linear video editor
- Infrastructure as a Service, Plattform as a Service

Buzzword Bingo

Technologies, Tools, Frameworks

- Scratch
- Non-linear video editor
- Infrastructure as a Service, Plattform as a Service
- AWS

Buzzword Bingo

Technologies, Tools, Frameworks

- Scratch
- Non-linear video editor
- Infrastructure as a Service, Plattform as a Service
- AWS
- Openshift

Buzzword Bingo

Technologies, Tools, Frameworks

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- Infrastructure as a Service, Plattform as a Service
- AWS
- Openshift
- Arduino

Buzzword Bingo

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- Arduino
- Raspberry Pi

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Technologies, Tools, Frameworks

- Scratch
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- Openshift
- Arduino
- Raspberry Pi
- kinect

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- Openshift
- Arduino
- Raspberry Pi
- kinect
- Leap Motion Controller

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- Web2py

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- Arduino
- Raspberry Pi
- kinect
- Leap Motion Controller
- Wii Remote Controller
- Django
- Web2py
- Processing

Group work and Discussion

- Questions and answers
- Team building
- Deficits that need to be addressed

Attendance List I

Please fill in the forms that are being handed out.

- MI done = Medieninformatik course passed
- CDIS done = Contextual Design of Interactive Systems passed (Medieninformatik II)
- Seminar done = Seminar Medieninformatik passed
- Vis now = Attending Data & Process Visualization

- IMIT = IMIT ☺
- AInf = Angewandte Informatik
- DA = Data Analytics
- WIN = Wirtschaftsinformatik
- Other = Other program (please specify)

Attendance List II

Possible time slots for group meetings (any group or individual who cannot attend any of those?)

- Tuesdays or Wednesday, 11-12
- Tuesdays or Wednesday, 12-13
- Tuesdays or Wednesday, 13-14
- Tuesdays or Wednesday, 14-15
- Tuesdays or Wednesday, 15-16
- Tuesdays or Wednesday, 16-17
- Tuesdays or Wednesday, 17-18
- Tuesdays 18-19

- Time slot OK/preferred (please max 3 preferred)

Introduction

Updated: 12. April 2017

Jörg Cassens

Lab Course Media Informatics
SoSe 2017

medieninformatik
IMAI – Institut für Mathematik und Angewandte Informatik