

Introduction

Updated: July 3, 2018

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SoSe 2018

Lab Course Media Informatics



medieninformatik

IMAI – Institut für
Mathematik und
Angewandte Informatik

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

Discussion &
Attendance

Welcome

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

Discussion &
Attendance

- Jörg Cassens
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 - Building Samelsonplatz, Office A 115
- My Background

- Deutsch oder English
 - German: Du oder Sie
- Office Hours
 - Mondays, 16:00-17:00

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

Discussion &
Attendance

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■ My Background

- Media Informatics = Human-Centred Computing + Human-Computer Interaction + Artificial Intelligence + Digital Media + Transdisciplinarity + ...

■ Deutsch oder English

- German: Du oder Sie

■ Office Hours

- Mondays, 16:00-17:00

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

What is a lab course?

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

Discussion &
Attendance

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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.

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.

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

Discussion &
Attendance

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.

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).

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

Discussion &
Attendance

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 would like to ask you to tell me about any problems with the course immediately (if needed anonymously).

Welcome

**Rules &
Regulations**

Workload

Credits

Learning Outcomes

Course Format

Regulations

Evaluation Criteria

Dates & Times

Resources

Projects

Discussion &
Attendance

Rules & Regulations

Welcome

Rules &
Regulations

Workload

Credits

Learning Outcomes

Course Format

Regulations

Evaluation Criteria

Dates & Times

Resources

Projects

Discussion &
Attendance

Workload

Workload

- 3 SWS
 - About 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 this translates to a workload of about 8 hours per week.

Welcome

Rules &
Regulations

Workload

Credits

Learning Outcomes

Course Format

Regulations

Evaluation Criteria

Dates & Times

Resources

Projects

Discussion &
Attendance

Credits

Welcome

Rules &
Regulations

Workload

Credits

Learning Outcomes

Course Format

Regulations

Evaluation Criteria

Dates & Times

Resources

Projects

Discussion &
Attendance

- **Data Analytics:**
 - Elective – Application – Media Systems
- **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
- **LA Informatik:**
 - Fachwissenschaftliche Vertiefung
- **WINF (PO \leq 2011):** Veranstaltungen Master, entweder
 - Gebiete der Informatik, Gebiet Algorithmen
 - Wahlbereich, Gebiet Medieninformatik
- **WINF (PO \geq 2014):** Wahlbereich
- **Other:** Maßgabe des zuständigen Prüfungsausschusses

Welcome

Rules &
Regulations

Workload

Credits

Learning Outcomes

Course Format

Regulations

Evaluation Criteria

Dates & Times

Resources

Projects

Discussion &
Attendance

Learning Outcomes

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* [...]

Welcome

Rules &
Regulations

Workload

Credits

Learning Outcomes

Course Format

Regulations

Evaluation Criteria

Dates & Times

Resources

Projects

Discussion &
Attendance

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 [...]

Welcome

Rules &
Regulations

Workload

Credits

Learning Outcomes

Course Format

Regulations

Evaluation Criteria

Dates & Times

Resources

Projects

Discussion &
Attendance

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

Welcome

Rules &
Regulations

Workload

Credits

Learning Outcomes

Course Format

Regulations

Evaluation Criteria

Dates & Times

Resources

Projects

Discussion &
Attendance

Course Format

Welcome

Rules &
Regulations

Workload

Credits

Learning Outcomes

Course Format

Regulations

Evaluation Criteria

Dates & Times

Resources

Projects

Discussion &
Attendance

- Problem-Based Learning
- One project from requirements analysis up to a finished (prototypical) 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)
 - Topic suggestions will be made later in this slide deck
- Voluntary task if suited for the course
 - Product demos
 - Presentation of tools, methods and processes

Team Building

Welcome

Rules &
Regulations

Workload

Credits

Learning Outcomes

Course Format

Regulations

Evaluation Criteria

Dates & Times

Resources

Projects

Discussion &
Attendance

- Between 3 and 6 students
 - You cannot work individually, in groups of two or in groups larger than six
- 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
- The convener has the last word on who is in which group
 - Groups can be split or merged so they work smoothly
 - In case of problems, the convener will act as a mediator

Welcome

Rules &
Regulations

Workload

Credits

Learning Outcomes

Course Format

Regulations

Evaluation Criteria

Dates & Times

Resources

Projects

Discussion &
Attendance

Regulations

Admission

Welcome

Rules &
Regulations

Workload

Credits

Learning Outcomes

Course Format

Regulations

Evaluation Criteria

Dates & Times

Resources

Projects

Discussion &
Attendance

- The number of slots in the seminar is limited
 - Max 20 participants
 - Max 6 groups
- Admission to the course is prioritized as follows
 - 1 Attending the kick-off meeting
 - 2 LA Informatik because of limited choice in the run-up of the programme
 - 3 Number of courses in the area of “Media Informatics” that have successfully been completed
 - 4 Special circumstance (work in the university self governance institutions, parenting, ...)
 - 5 Year of study

1 Implementation of an **artefact** in media informatics

- Generally a software artefact
- Other types of artefact if accepted by convener

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 artefact and process
 - Demonstration of the artefact

3 Written **documentation**

- Between $(15 + n * 5)$ and $(25 + n * 5)$ 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

Welcome

Rules &
Regulations

Workload

Credits

Learning Outcomes

Course Format

Regulations

Evaluation Criteria

Dates & Times

Resources

Projects

Discussion &
Attendance

Evaluation Criteria

Evaluation Criteria

Welcome

Rules &
Regulations

Workload

Credits

Learning Outcomes

Course Format

Regulations

Evaluation Criteria

Dates & Times

Resources

Projects

Discussion &
Attendance

- The exam grade takes both presentations, the development process, the documentation and the implemented artefact into account
- Active participation in course discussions is required and can be part of the grade
- Presentations are exams, you are required to attend
 - Exemptions must be arranged with the convener at least seven days before your presentation
 - If no exemptions have been arranged with the convener by that date, you will need proof for urgent circumstances (e.g. a certificate of incapacity for work)
- You are committed when you accept a topic and do not withdraw seven days before your mid-project presentation

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

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

Discussion &
Attendance

Dates & Times

- 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 and the end-project presentation in the first exam period (beginning of break)
 - 2 Make use of the autumn break for the completion of the project, giving a mid-project presentation at the end of term and the end-project presentation in the second exam period (end of break)
- Each group decides for themselves which option to choose
- A group that decides to complete the course during the summer term has to state this intention one week before the scheduled mid-term 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
 - See schedule for details
- Group meetings on individual arrangements
 - Group meetings can be cancelled by the group if a meeting is not needed

Meetings

- Two different types of meetings
 - Course meetings
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 - Mid-project presentations
 - End-project presentations
 - Group meetings
 - What have we done recently?
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 - Wednesday, 12-14 o'clock (kick-off, topic meetings) *or*
 - Wednesday, 12-18 o'clock (presentations)
 - Samelsonplatz A 102
- Course meetings during autumn break
 - See schedule for details
- Group meetings on individual arrangements
 - Group meetings can be cancelled by the group if a meeting is not needed
- Any Conflicts?

Dates: During Term

11.04. ▷ Kick-off, topics announced (12-14)

18.04. ▷ Topics assigned, tools lecture (12-14)

23./25.04. ◁ Group meetings

30.4./2.05. ◻ No meetings (labour day, group formation)

07./09.05. ◁ Group meetings

14./16.05. ◁ Group meetings

21./23.05. ◻ No meetings (project week)

30.05. ▷ Mid-project presentations (12-18) *or* (14-20)
Vollversammlung

04./06.06. ◁ Group meetings **06.06. Campusfest**

11./13.06. ◁ Group meetings

18./20.06. ◁ Group meetings

25./27.06. ◁ Group meetings

02./04.07. ◻ No meetings (conference)

09./11.07. ◻ No meetings (conference)

Dates: Autumn Break

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

Discussion &
Attendance

Groups deciding to finish during term:

02.08. ▷ End-project presentations (12-18)

Groups deciding to work during autumn break:

02.08. ▷ Mid-project presentations (12-18)

15.08. ☒ Status report (email)

29.08. ☒ Status report (email)

12.09. ☒ Status report (email)

Meetings/hangouts if needed

26.09. ▷ End-project presentations (12-18)

Dates: Deliverables

Deliverables for all groups:

- 06.04.** ☒ Outline of own project idea (email)
- 09.08.** ☒ Slides mid-project presentation (PDF, learnweb)
- 04.11.** ☒ Project documentation (PDF, learnweb)
- 04.11.** ☒ Artefact (how depends on artifact type)
- 04.11.** ☒ Slides end-project presentation (PDF, learnweb)
- 11.11.** ☒ Self-evaluation (learnweb)
- 11.11.** ☒ Project documentation (paper)

- ▷ in-person general course meetings
- ◁ in-person project group meetings
- ☒ deadlines for online or offline delivery
- ☐ no meetings

Dates subject to change

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

Discussion &
Attendance

Resources

Welcome

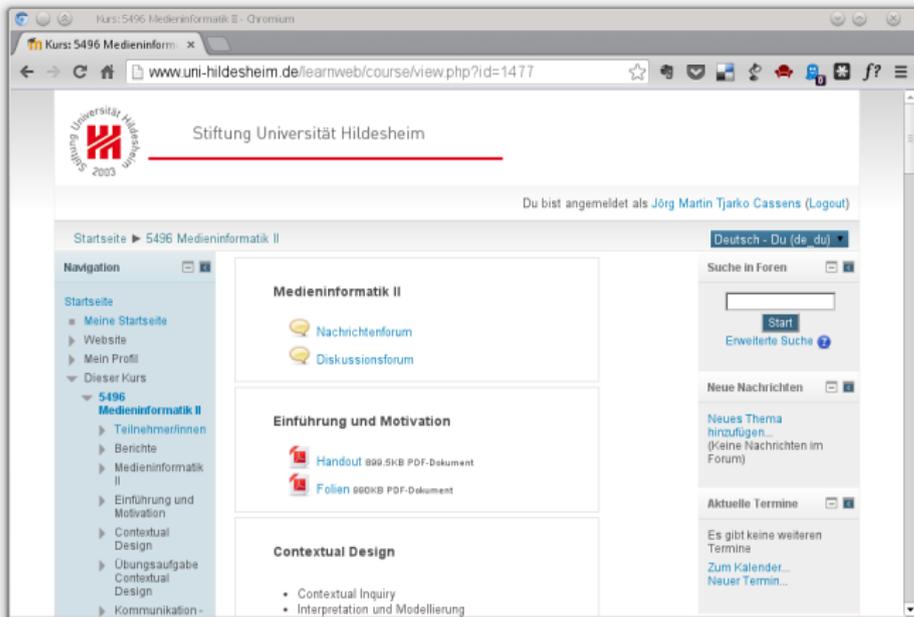
Rules &
Regulations

Dates & Times

Resources

Projects

Discussion &
Attendance



The screenshot shows a web browser window with the URL `www.uni-hildesheim.de/learnweb/course/view.php?id=1477`. The page header includes the University of Hildesheim logo and the text 'Stiftung Universität Hildesheim'. Below the header, it indicates the user is logged in as 'Jörg Martin Tjarko Cassens'. The main content area is titled '5496 Medieninformatik II' and contains three sections:

- Medieninformatik II**: Includes 'Nachrichtenforum' and 'Diskussionsforum'.
- Einführung und Motivation**: Includes 'Handout 899.5KB PDF-Dokument' and 'Folien 860KB PDF-Dokument'.
- Contextual Design**: Includes 'Contextual Inquiry' and 'Interpretation und Modellierung'.

The right sidebar contains a search box for forums, a 'Start' button, and a 'Neue Nachrichten' section with a link to 'Neues Thema hinzufügen...'. At the bottom, there is an 'Aktuelle Termine' section stating 'Es gibt keine weiteren Termine' and a link to 'Zum Kalender...'. The left navigation menu shows the current course selected under 'Dieser Kurs'.

 learnweb.uni-hildesheim.de

course: So18_5497_Pr-MedienI, password: Course Number

Welcome

Rules &
Regulations

Dates & Times

Resources

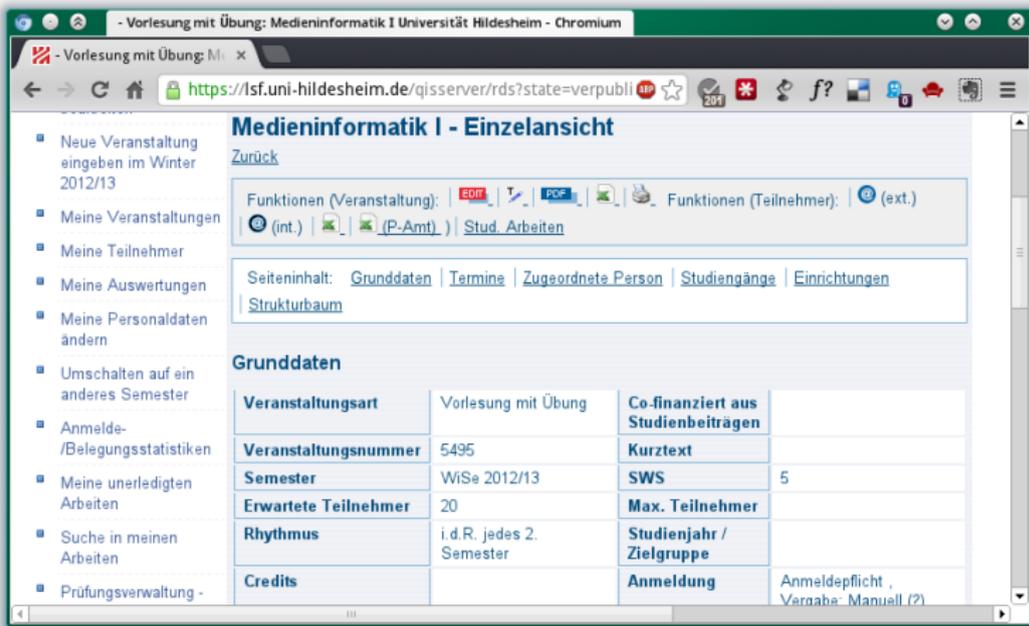
Projects

Discussion &
Attendance



 learnweb.uni-hildesheim.de

course: So18_5497_Pr-MedienI, password: Course Number



The screenshot shows a web browser window with the URL <https://lsf.uni-hildesheim.de/qisserver/rds?state=verpubli>. The page title is "Medieninformatik I - Einzelansicht".

On the left side, there is a navigation menu with the following items:

- Neue Veranstaltung eingeben im Winter 2012/13
- Meine Veranstaltungen
- Meine Teilnehmer
- Meine Auswertungen
- Meine Personaldaten ändern
- Umschalten auf ein anderes Semester
- Anmelde-/Belegungsstatistiken
- Meine unerledigten Arbeiten
- Suche in meinen Arbeiten
- Prüfungsverwaltung -

The main content area is titled "Medieninformatik I - Einzelansicht" and includes a "Zurück" link. Below the title, there are two rows of function icons:

Funktionen (Veranstaltung): Funktionen (Teilnehmer): (ext.)

Below this, there are more function icons: (int.) (P-Amt.) [Stud. Arbeiten](#)

The "Seiteninhalt" section contains the following links: [Grunddaten](#) | [Termine](#) | [Zugeordnete Person](#) | [Studiengänge](#) | [Einrichtungen](#) | [Strukturbaum](#)

The "Grunddaten" section contains a table with the following data:

| Veranstaltungsart | Vorlesung mit Übung | Co-finanziert aus Studienbeiträgen | |
|----------------------|---------------------------|------------------------------------|--------------------------------------|
| Veranstaltungsnummer | 5495 | Kurztext | |
| Semester | WiSe 2012/13 | SWS | 5 |
| Erwartete Teilnehmer | 20 | Max. Teilnehmer | |
| Rhythmus | i. d.R. jedes 2. Semester | Studienjahr / Zielgruppe | |
| Credits | | Anmeldung | Anmeldepflicht, Vergabe: Manuell (?) |

 lsf.uni-hildesheim.de

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

Discussion &
Attendance



 lsf.uni-hildesheim.de

Welcome

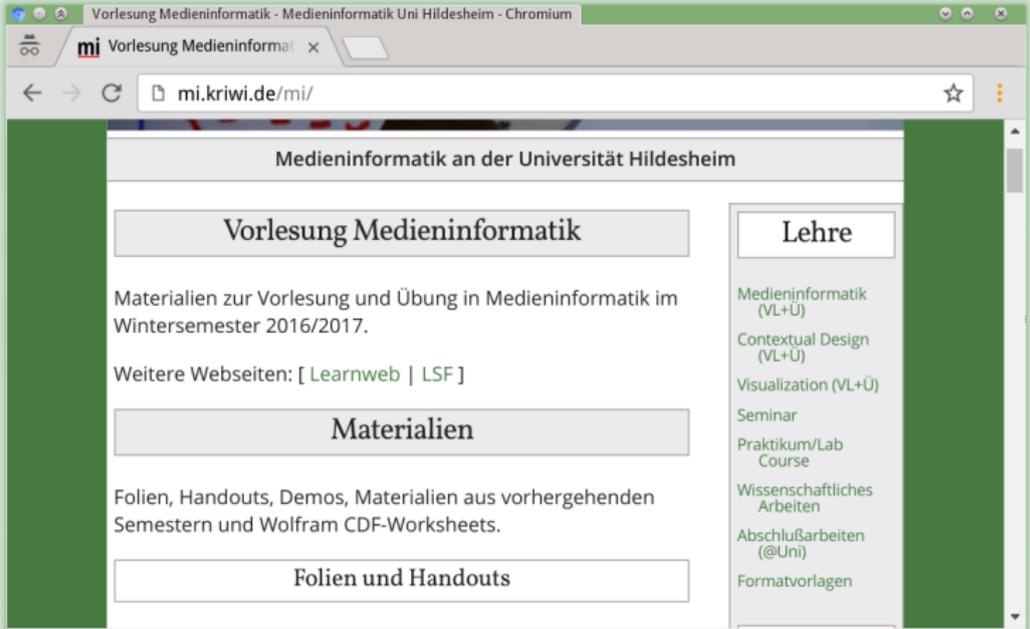
Rules &
Regulations

Dates & Times

Resources

Projects

Discussion &
Attendance



Vorlesung Medieninformatik - Medieninformatik Uni Hildesheim - Chromium

mi Vorlesung Medieninformatik x

mi.kriwi.de/mi/

Medieninformatik an der Universität Hildesheim

Vorlesung Medieninformatik

Materialien zur Vorlesung und Übung in Medieninformatik im Wintersemester 2016/2017.

Weitere Webseiten: [[Learnweb](#) | [LSF](#)]

Materialien

Folien, Handouts, Demos, Materialien aus vorhergehenden Semestern und Wolfram CDF-Worksheets.

Folien und Handouts

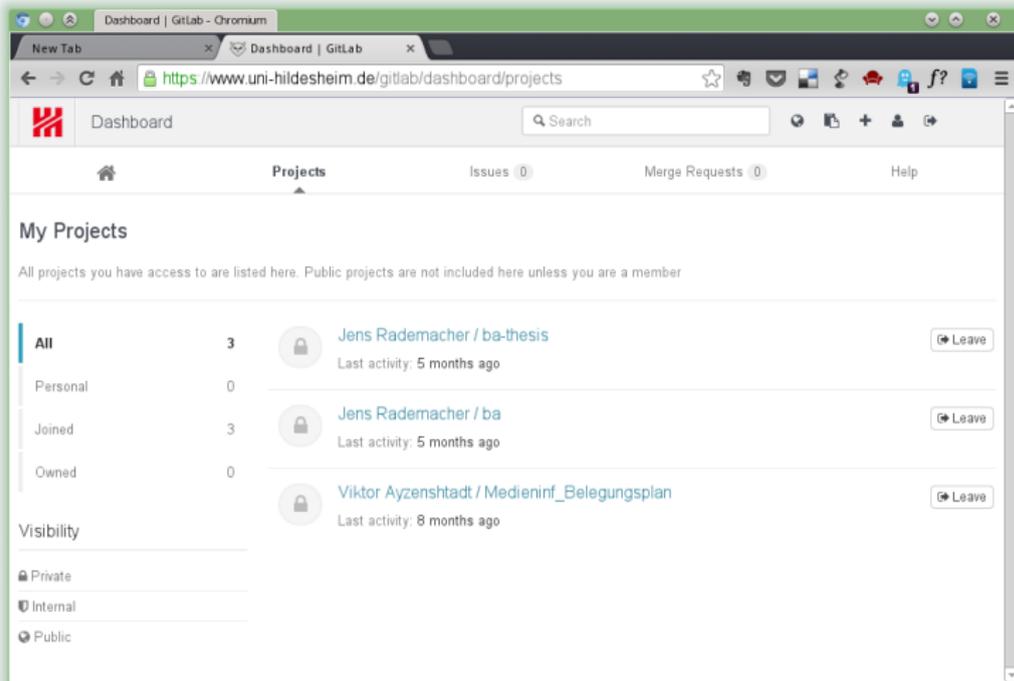
Lehre

- Medieninformatik (VL+Ü)
- Contextual Design (VL+Ü)
- Visualization (VL+Ü)
- Seminar
- Praktikum/Lab Course
- Wissenschaftliches Arbeiten
- Abschlußarbeiten (@Uni)
- Formatvorlagen

 mi.kriwi.de/pmi



 mi.kriwi.de/pmi



 [uni-hildesheim.de/gitlab](https://www.uni-hildesheim.de/gitlab)

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

Discussion &
Attendance



 uni-hildesheim.de/gitlab

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

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

Privacy-respecting
Learning Analytics

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit

BYOI

Discussion &
Attendance

Projects

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

Privacy-respecting
Learning Analytics

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit

BYOI

Discussion &
Attendance

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 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 6 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.

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

Privacy-respecting
Learning Analytics

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit

BYOI

Discussion &
Attendance

ShareBoard

ShareBoard: Examples

Existing Work

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

Privacy-respecting
Learning Analytics

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit
BYOI

Discussion &
Attendance



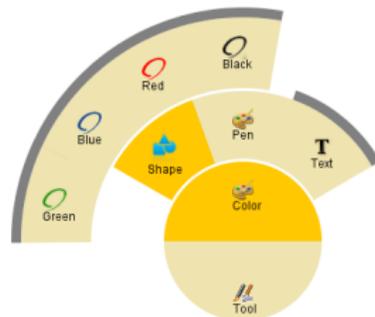
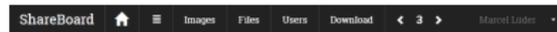
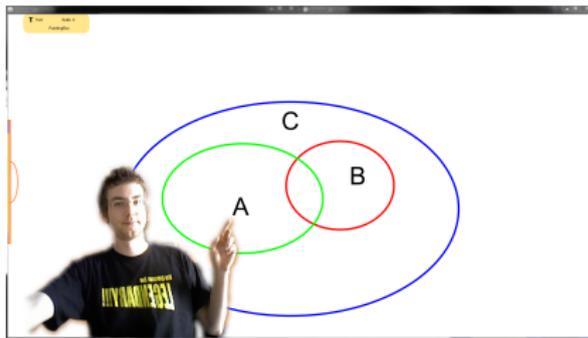
My Rooms

| # | NAME | | |
|---|---------------------------|--|-----------|
| 1 | Medieninformatik I | | OPEN ROOM |
| 2 | Canadian Shortstories | | OPEN ROOM |
| 3 | Erstsemester Orientierung | | OPEN ROOM |

Name CREATE

Invitations

| # | NAME | |
|---|--------------|-----------|
| 1 | Stochastik I | OPEN ROOM |



Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

Privacy-respecting
Learning Analytics

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit

BYOI

Discussion &
Attendance

■ **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

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

Privacy-respecting
Learning Analytics

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit

BYOI

Discussion &
Attendance

■ **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

Sensors (kinect, leap), web technologies

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

Privacy-respecting
Learning Analytics

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit

BYOI

Discussion &
Attendance

Academic Writing

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

Privacy-respecting
Learning Analytics

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit
BYOI

Discussion &
Attendance

- **What has been done before?**
- Supporting academic text production (master thesis)
 - That could be you writing your 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

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

Privacy-respecting
Learning Analytics

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit

BYOI

Discussion &
Attendance

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

Suggested technologies

Web technologies, web2py, NLP-tools, machine learning

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

Privacy-respecting
Learning Analytics

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit

BYOI

Discussion &
Attendance

Lecture Project

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

Privacy-respecting
Learning Analytics

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit
BYOI

Discussion &
Attendance

■ **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
 - 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
- Cooperation with ongoing master thesis possible

Suggested technologies

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

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

Privacy-respecting
Learning Analytics

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit
BYOI

Discussion &
Attendance

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Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

**Adaptive Learning
Platform**

Privacy-respecting
Learning Analytics

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit

BYOI

Discussion &
Attendance

Adaptive Learning Platform

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

Privacy-respecting
Learning Analytics

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit

BYOI

Discussion &
Attendance

■ **Research & develop a new adaptive learning platform**

- Not just talking heads
- Adjust to needs and preferences of users
- Use sophisticated learning analytics to support the users
 - students
 - teachers

■ **Application Area**

- Computer science curriculum for teachers
- Language learning
- Cooperation with an external partner possible

Suggested technologies

Web technologies, nlp-tools

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

Privacy-respecting
Learning Analytics

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit

BYOI

Discussion &
Attendance

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Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

**Privacy-respecting
Learning Analytics**

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit

BYOI

Discussion &
Attendance

Privacy-respecting Learning Analytics

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

Privacy-respecting
Learning Analytics

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit
BYOI

Discussion &
Attendance

- **Research & develop a anonymous learning analytics**
 - Use sophisticated learning analytics to support the users
 - students
 - teachers
 - Make it possible to do so by preserving privacy
 - Virtual IDs for students and institutions
 - Privacy-preserving attendance tracking
- **Application Area**
 - University or school courses
- Cooperation with an external partner possible

Suggested technologies

Sensors, actuators, web technologies, nlp-tools

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

Privacy-respecting
Learning Analytics

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit

BYOI

Discussion &
Attendance

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Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

Privacy-respecting
Learning Analytics

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit

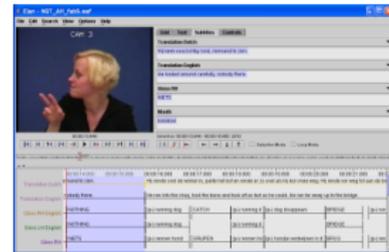
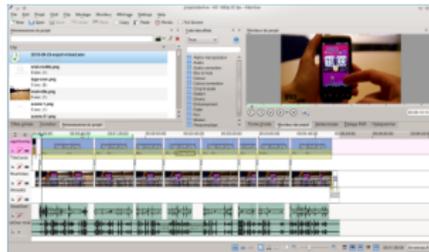
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Discussion &
Attendance

Video Concordancer

■ Video Concordancer

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

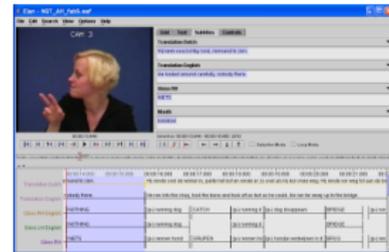
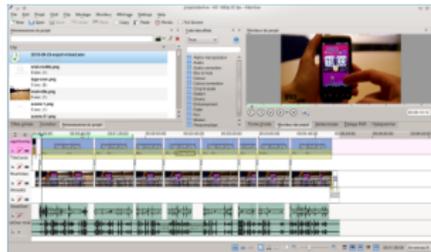


Suggested technologies

Web technologies, front-end development

■ Video Concordancer

- Several videos from field or lab studies
- Finding & comparing videos
- (Synchronous) annotation of videos
- Multi-modality
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Suggested technologies

Web technologies, front-end development

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

Privacy-respecting
Learning Analytics

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit

BYOI

Discussion &
Attendance

Behavioural Interfaces

Star Trek Doors

Existing Work

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

Privacy-respecting
Learning Analytics

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit

BYOI

Discussion &
Attendance



Our Doors

Existing Work

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

Privacy-respecting
Learning Analytics

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit
BYOI

Discussion &
Attendance



Built as part of the Masters thesis of John Sverre Solem

Behavioural Interfaces: Status

Existing Work

- **What is it?**
- Behavioural Interfaces are interfaces that recognize and model user behaviour
- Can be used for e.g. intention recognition
 - Example star trek doors: automatic doors that do not open based on proximity (alone), but because they recognize the users' intentions to walk through the door
- **What has been done before?**
 - Sliding Doors (2 Master Theses)
 - Recognition of “Wandering behaviour” with Alzheimer’s patient (Bachelor Thesis)

Technologies used

Java, reasoners, sensors (kinect)

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

Privacy-respecting
Learning Analytics

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit
BYOI

Discussion &
Attendance

Behavioural Interfaces: Topics

New Opportunities

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

Privacy-respecting
Learning Analytics

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit

BYOI

Discussion &
Attendance

- **Doors, whiteboards, lectures, Smart Rooms...**
- Possible applications
 - Star-Trek-Doors 2.0
 - Other
 - ShareBoard intention recognition
 - Connections to other topics mentioned (lecture project)
- Cooperation with an external partner possible

Suggested technologies

Embedded systems, sensors (kinect), reasoning, machine learning

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

Privacy-respecting
Learning Analytics

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit

BYOI

Discussion &
Attendance

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- Possible applications
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 - Other
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Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

Privacy-respecting
Learning Analytics

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit

BYOI

Discussion &
Attendance

Ambient Systems

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

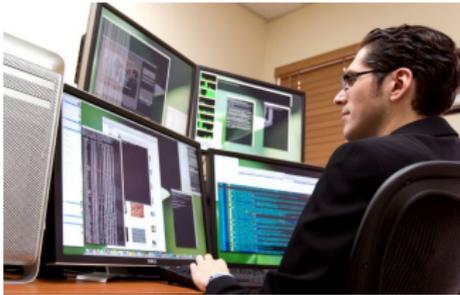
ShareBoard
Academic Writing
Lecture Project
Adaptive Learning
Platform
Privacy-respecting
Learning Analytics
Video Concordancer
Behavioural Interfaces

Ambient Systems

Interactive Exhibit
BYOI

Discussion &
Attendance

Context Awareness and Knowledge Environment Mate for Awareness in Teams



Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

Privacy-respecting
Learning Analytics

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit

BYOI

Discussion &
Attendance

■ **What has been done before**

- Server and protocols (case study)
- Different actuators and sensors (lab course)
- Simulator CASi (lab course)
- Basic version in Python (Bachelor Thesis)

Technologies used

Java, reasoning

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

Privacy-respecting
Learning Analytics

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit

BYOI

Discussion &
Attendance

■ **Architecture**

- Integration of Machine Learning and Reasoning
- PyCAKE and CAKE could act as starting point
 - or fresh start
- new sensors and actuators

■ **Applications**

- Adaptive museum guide
- Ambient assisted living (AAL)
- Privacy respecting (Py-) CAKE in a Box
- Modelling, learning and reasoning

Suggested technologies

Java, Python, embedded systems, sensors (kinect, Leap), reasoning, machine learning

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

Privacy-respecting
Learning Analytics

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit

BYOI

Discussion &
Attendance

Interactive Exhibit

Interactive Exhibit: Examples

Existing Work

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

Privacy-respecting
Learning Analytics

Video Concordancer

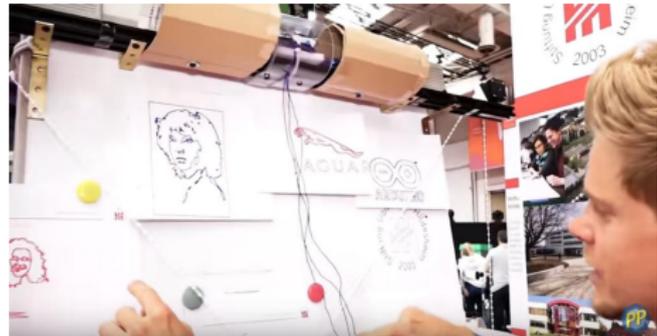
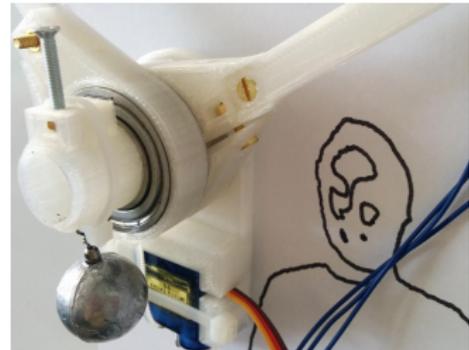
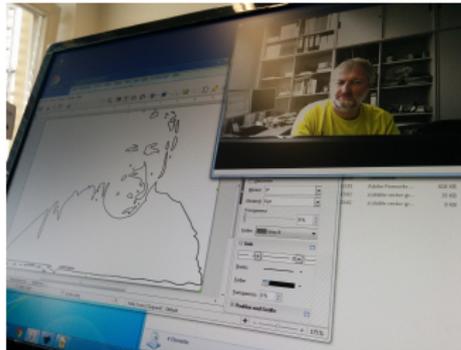
Behavioural Interfaces

Ambient Systems

Interactive Exhibit

BYOI

Discussion &
Attendance



Interactive Exhibit: Status

Existing Work

■ What has been done before?

■ Photo booth

- An application uses depth-keying to identify a person
- A raster image is saved
- This image is converted to svg

■ V-Plotter

- Plotter made of Arduino, Raspberry, motors & servos
- Can draw svg on paper

Technologies used

Java, C, sensors (kinect), embedded systems

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

Privacy-respecting
Learning Analytics

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit

BYOI

Discussion &
Attendance

Interactive Exhibit: Topics

New Opportunities

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

Privacy-respecting
Learning Analytics

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit

BYOI

Discussion &
Attendance

- **Further development of existing exhibit**
 - Automation or better support of existing workflow
 - Better plotter
 - Integration of 3D-modelling
- **Something else that is exciting**

Suggested technologies

Sensors (kinect, leap), actuators, web technologies

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

Privacy-respecting
Learning Analytics

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit

BYOI

Discussion &
Attendance

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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?
 - Does it have an appropriate size (not too big, not too small)

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Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

ShareBoard

Academic Writing

Lecture Project

Adaptive Learning
Platform

Privacy-respecting
Learning Analytics

Video Concordancer

Behavioural Interfaces

Ambient Systems

Interactive Exhibit

BYOI

Discussion &
Attendance

- 1 ShareBoard
- 2 Academic Writing
- 3 Lecture Project
- 4 Adaptive Learning Platform
- 5 Privacy-respecting Learning Analytics
- 6 Video Concordancer
- 7 Behavioural Interfaces
- 8 Ambient Systems
- 9 Interactive Exhibit
- 10 ~~BYOI (please elaborate)~~

Discussion & Attendance

Attendance List I

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

Discussion &
Attendance

Please fill in the forms that are being handed out

- If more than 20 people want to take the course the priorities defined earlier will be used
- Two types of lists
 - Several lists for groups
 - Please specify the time slots we can use for group meetings
 - You can specify up to 3 preferred time slots
 - One list for attendants without group preference yet
 - Use to mark your intent to take the course
- Groups have to be formed at the next meeting at the latest
- You can join any group where space is available
- If groups get larger than 6 they will be split

Attendance List II

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

Discussion &
Attendance

| | |
|---------|---|
| MI | Medieninformatik course taken |
| Seminar | Seminar Medieninformatik taken |
| CDIS | Contextual Design of Interactive Systems passed (previously Medieninformatik II) |
| Vis | Data & Process Visualization passed |
| Aml | Attending Contextualised Computing & Ambient Intelligent Systems |
| AI | Angewandte Informatik |
| DA | Data Analytics |
| IMIT | IMIT 😊 |
| LA Inf | Lehramt Informatik |
| WIN | Wirtschaftsinformatik |
| Other | Other program (please specify) |

Group work and Discussion

Welcome

Rules &
Regulations

Dates & Times

Resources

Projects

Discussion &
Attendance

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

- Jörg Cassens
 - Institut für Mathematik und Angewandte Informatik
 - ✉ cassens@cs.uni-hildesheim.de
 - +49 (5121) 883-40182
 - Building Samelsonplatz, Office A 115
- Office Hours
 - Mondays, 16:00-17:00
- **Important:** Register in Learnweb for email updates
- Next course meeting: Wednesday, 18.04.18, 12 o'clock

Introduction

Updated: July 3, 2018

Jörg Cassens

SoSe 2018

Lab Course Media Informatics



medieninformatik

IMAI – Institut für
Mathematik und
Angewandte Informatik