Advanced Seminar Media Informatics

Sarah Theres Völkel | Matthias Schmidmaier | Prof. Dr. Heinrich Hußmann
Summer 2019
**Information**

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**What you need**
- master student in Media Informatics, Computer Science, HCI
- English skills

**What you get**
- 2 SWS / 6 ECTS
- experience in scientific writing and research

**Website**  
[https://www.medien.ifi.lmu.de/lehre/ss19/hs](https://www.medien.ifi.lmu.de/lehre/ss19/hs)
Contents

What you will do

→ select / be assigned to a research topic today
→ work *independently* on your topic over the next weeks
→ write a *scientific paper* (6-8 pages)
→ review two fellow students’ papers
→ give a *60s pitch* and a final *presentation* (15min talk + 5min discussion)
## Schedule (preliminary)

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>30.04.19</td>
<td>Kick-Off</td>
<td>session - compulsory attendance</td>
</tr>
<tr>
<td>28.05.19</td>
<td>1st draft paper submission</td>
<td>get feedback meet your supervisor before!</td>
</tr>
<tr>
<td>02.06.19</td>
<td>60s pitch slides submission</td>
<td></td>
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<tr>
<td>04.06.19</td>
<td>60s pitches</td>
<td>session - compulsory attendance</td>
</tr>
<tr>
<td>18.06.19</td>
<td>Review-ready paper submission</td>
<td></td>
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<tr>
<td>28.06.19</td>
<td>Review submission</td>
<td></td>
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<tr>
<td>12.07.19</td>
<td>Final paper submission</td>
<td>get feedback meet your supervisor before!</td>
</tr>
<tr>
<td>14.07.19</td>
<td>1st draft slides submission</td>
<td></td>
</tr>
<tr>
<td>21.07.19</td>
<td>Final slides submission</td>
<td>practice talk with your supervisor!</td>
</tr>
<tr>
<td>23.07.19</td>
<td>Presentation</td>
<td>session - compulsory attendance, about ~5 hours!</td>
</tr>
</tbody>
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Scientific publishing
Why we write papers and how we spread them
Aim of scientific research

“Research is a **process of steps** used to collect and analyze **information** to **increase** our **understanding** of a topic or issue” (Creswel 2008)

**Systematic process of steps**

- Pose a **question** (research question & research gap)
- **Collect data** to answer the question
- **Present** an answer to the question
Distributing knowledge

- Books
- Articles in journals
- Articles in conferences
- Thesis (Bachelor, Master, PhD)
- Internet sources (e.g. blogs, Wikipedia)
- Talks and lectures
- Personal communication
- Patents
Distributing knowledge

- Books
- **Articles in journals**
- **Articles in conferences**
- Thesis (Bachelor, Master, PhD)
- Internet sources (e.g. blogs, Wikipedia)
- Talks and lectures
- Personal communication
- Patents
Peer review
Peer review
Peer review

Double Blind Peer Review
Books in HCI

Methodology

Basic Research
Scientific conferences in HCI

- Human Factors in Computing Systems (CHI)
- ACM Conference on Computer-Supported Collaborative Work & Social Computing (CSCW)
- ACM Conference on Pervasive and Ubiquitous Computing (UbiComp)
- ACM Symposium on User Interfaces Software and Technology (UIST)
- ACM/IEEE International Conference on Human Robot Interaction (HRI)
- Conference on Designing Interactive Systems (DIS)
- International Conference on Multimodal Interfaces (ICMI)
- MobileHCI
- International Conference on Intelligent User Interfaces (IUI)
- ....
Scientific conferences in HCI (specific topics)

- IEEE Conference on **Virtual Reality and 3D User Interfaces** (IEEE VR)
- International Conference on **Tangible, Embedded and Embodied Interaction** (TEI)
- International ACM Conference on **Automotive User Interfaces** and Interactive Vehicular Applications (AutoUI)
- ACM International Symposium on **Pervasive Displays** (PerDis)
- Symposium on **Usable Privacy and Security** (SOUPS)
Scientific conferences in HCI
Conference publication formats in HCI

Full Paper

Late Breaking Work

Demos
Scientific journals in HCI

- ACM Transactions on Computer-Human Interaction (ToCHI)
- IEEE Transactions on Affective Computing
- Behaviour & Information Technology
- International Journal of Human-Computer Interaction
- ACM Transactions on Interactive Intelligent Systems (TiiS)
- IEEE Transactions on Human-Machine Systems
- ...
How to research a topic
Search, read and organize scientific literature
How to research a topic - Search

Search literature (papers, articles, books, ...)
→ Libraries
→ ACM, IEEE digital libraries
→ Google Scholar, CiteSeer
→ researcher’s / university’s website
→ classic web search
→ LMU OPAC
How to research a topic - Search

**define keywords**

- Avocados crossing borders: the missing common information infrastructure for international trade
  - T Jensen, N Bjørn-Andersen, R Varathra - Proceedings of the 5th ACM ..., 2014 - dl.acm.org
  - Theory has been applied in multiple academic domains such as developmental psychology, learning sciences, human-computer interaction, and... A farmer located 70 km from Nairobi with ten avocado trees: “Avocados are more ...

  - Zitiert von: 16 Ähnliche Artikel Alle 4 Versionen

- A Flexible Prototyping Tool for 3D Real-Time User-Interaction
  - Obvious examples are human users, external simulation programs, hardware devices, etc. In classical virtual reality systems the user is surrounded by computer generated environments...

  - The Avocado system of GMD [3] follows an approach similar to our system ...

  - Zitiert von: 39 Ähnliche Artikel Alle 7 Versionen

- Research commentary—Digital infrastructures: The missing IS research agenda
  - D. Tilson, K. Lytinen - Information Systems ..., 2010 - pubsonline.informs.org
  - Design challenges for CPS-based service systems in industrial production and logistics. 6 December 2018 | International Journal of Computer Integrated Manufacturing ... 16 November 2018 | The Computer Games Journal, Vol ...

  - Zitiert von: 689 Ähnliche Artikel Alle 14 Versionen

- A highly flexible virtual reality system
  - The Avocado system of GMD [7] follows an approach similar to our system... feature of the system is the user representation by a realistic virtual human called VirtualAnthropos... the assembly process,
How to research a topic - Search

- Limit publication date
- # citations (click to search within citations)

“refine keywords”

avocados "human computer interaction"
How to research a topic - Search

advanced search

focus on specific conference
How to research a topic - Get a paper

Publications are usually not freely available (especially on ACM, IEEE). Therefore try:

1. ACM, IEEE, ... from within university network (LMU has subscriptions)
2. Use LMU University Library: OPAC (Online catalogue)
3. Google Scholar [PDF] link
5. author’s website, https://arxiv.org, ...
6. ask people with access to ACM etc.
7. polite email to author
How to research a topic - Read

Read in multiple steps
1. skim over abstract and images → worth reading?
2. read complete → get it
3. read en detail → detailed understanding

While reading
→ take notes
→ mark text passages
→ what were they doing? how? why? results?

Finally
→ see referenced papers
How to research a topic - Literature management

Tools
→ JabRef, Zotero, Mendeley, Paperpile, ...

Why?
→ search and retrieve
→ labeling (‘nice’, ‘bullshit’, …)
→ notes, citations, …
How to write a paper
About storylines, citations and Tex
How to write a paper - Story

**Classic** paper

→ what problem did you solve?
→ why and how?

**Survey** (in this seminar)

→ introduce research topic
→ state of the art
How to write a paper - Example structure

**Abstract**
Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.

**Introduction**
Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.

**Main part**
Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.

**Conclusion**
Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.

**Short, appealing summary** of this paper.

Context and **aims** in the research field.
Structure and approach of this paper.

Historical development.
**Definitions**, **terminology**, **background**.
Different **approaches** (strengths, weaknesses, ...).
(Own) **categorization**.

**Discussion**: problems, unsolved challenges.

**Conclusion**, **outro**.
Future **outlook**
How to write a paper - Style

Consider
→ logical structure
→ clear and neutral language
→ correct grammar, no typos
→ short and simple sentences
→ introduce abbreviations (e.g. ‘Virtual Reality (VR)’)
→ use active voice (e.g. ‘we conducted a literature survey’ / ‘authors et al. found out...’)}
How to write a paper - Style

Avoid

→ fuzzy descriptions (e.g. ‘high’, ‘low’, ‘almost’)
→ empty phrases (e.g. ‘Based on these and various other findings...’)
→ fill words (e.g. ‘indeed’, ‘remarkably’)
→ tautologies (e.g. ‘LCD Display’ = ‘Liquid Crystal Display Display’)
→ pseudo-arguments (e.g. ‘of course’, ‘as expected’, ‘without doubt’)
→ unverifiable / overclaims (e.g. ‘This is the best seminar ever!’)
→ passive voice (e.g. ‘This work was conducted by Authors et al.’)
→ long complex sentences (e.g. ‘First they did this, then they this, this led to this, and l...’)
→ tempus changes (e.g. ‘they find out [...], they did this!’)
How to write a paper - Style

Avoid

→ fuzzy descriptions (e.g. ‘high’, ‘low’, ‘almost’)
→ empty phrases (e.g. ‘Based on these and various other findings...’)
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→ long complex sentences (e.g. ‘First they did this, then they this, this led to this, and I...’)
→ tempus changes (e.g. ‘they find out [...], they did this.’)

But don’t be boring!

K. San-Jensen, 2007 ‘How to write consistently boring scientific literature’
How to write a paper - Citations

Plagiarism
→ any reuse of text has to be clearly marked (direct / indirect citations)
→ plagiarism counts as attempt to deceive, resulting in failure of class

https://www.medien.ifl.lmu.de/lehre/Plagiate-Ifl.pdf
How to write a paper - Citations

Sources
→ always reference the primary source

Indirect
→ Lorem ipsum dolor sit amet [1].
→ Authors et al. [2] found out that [...]
→ put references always before the dot [2].
→ multiple sources: [1, 2, 3]

Direct
→ only use direct quotes sparsely, e.g. for definitions
→ use correct English quotation marks for direct quotes: “This is a direct quote” [5].
How to write a paper - Requirements

→ ACM Conference Proceedings Format

→ 6-8 pages incl. references, 2 columns

→ English

→ abstract ~150 words

→ add illustrations

(no picture book, no wall-of-text)
How to write a paper - Tools

ACM Conference Proceedings LaTeX template (incl. Overleaf integration)
→ https://www.acm.org/publications/proceedings-template
→ Open template directly in Overleaf
How to write a paper - Formatting

Best practice (which we expect)

→ add text after section headings
→ having section x.1 requires at least a section x.2
→ section headings should not exceed one line
→ avoid footnotes
→ use \input{} to distribute text to multiple .tex files
→ reference \cite{} literature in the bibliography
→ reference \ref{} figures and tables

2 TEMPLATE OVERVIEW

As noted in the introduction, the “acmart” document class can be used to prepare many different kinds of documentation—a double-blind initial submission of a full-length technical paper, a two-page SIGGRAPH Emerging Technologies abstract, a “camera-ready” journal article, a SIGCHI Extended Abstract, and more—all by selecting the appropriate template style and template parameters.

2.1 Template Styles

The primary parameter given to the “acmart” document class is the template style which corresponds to the kind of publication or SIG publishing the work. This parameter is enclosed in square brackets and is a part of the documentclass command:

\documentclass[STYLE]{acmart}

2.2 Template Parameters

In addition to specifying the template style to be used in formatting your work, there are a number of template parameters which modify some part of the applied template style. A complete list of these parameters can be found in the B\LaTeX User’s Guide.

Frequently-used parameters, or combinations of parameters, include:

- anonymous, review: Suitable for a "double-blind" conference
How to write a paper - Submissions

Final paper
→ LaTeX sources (.zip)
→ .pdf file

Presentation slides
→ .pdf file

Upload via Uniworx

Watch the deadlines!
Topic Assignment

Choose wisely
A growing body of research shows that personality traits can be automatically inferred from users’ digital texts. For example, these systems are used for personalised advertisements or job interview chatbots. These systems are extremely powerful as Cambridge Analytica has shown.

How much do users already know about personality-based personalisation? What is user’s attitude towards personality-based personalization?

An investigation of concepts for Pedestrian & Automated Vehicle interaction.

A focus is put on the interaction between multiple pedestrians and multiple vehicles.


- What are the differences?
- What are drawbacks / advantages?
- How do results differ?
- For which types of research questions is which methodology best suited?


An increasing number of critical decisions are supported by machine learning-based intelligent systems. This raises concerns about discrimination and fairness issues of those systems (e.g. in hiring, medical, and criminal justice).

A growing body of research centers around the design of human-in-the-loop processes that leverage human contextual knowledge to identify and eliminate those fairness issues.

What is the current state of the art of communicating and visualizing fairness issues to developers and end users? What research opportunities can be derived for the HCI community?

**STARTING POINTS**

- Explaining models: an empirical study of how explanations impact fairness judgment (2019)
Interactive Explanations from Intelligent Systems

- There is a growing social, ethical, and legal call that intelligent systems need to be capable of explaining their behavior and decisions to human users. This field is referred to as XAI (eXplainable artificial intelligence).
- Explanations are interactive conversations. Thus, practical and effective explanation interfaces must result in interactions between a human and a system.
- What interactive explanation interfaces were envisioned that support follow-up and drill-down actions after presenting an initial explanation? How could different methods be combined to achieve more powerful explanations?

STARTING POINTS

- **Trends and Trajectories for Explainable, Accountable and Intelligible Systems** (2018)
- **Peeking Inside the Black-Box: A Survey on Explainable Artificial Intelligence** (2018)
- **Designs for explaining intelligent agents** (2009)
Emotion detection is making its way into consumer products, enabling affective UIs.

The goal of this paper is to review the existing literature on emotion-aware UIs within the automotive domain.

Tools and Visualizations for Developer-Communication

- What tools exist to support developers in communicating about their software?
- What aspects of software can be communicated by visualization?
- What are the benefits for the development process, team communication, etc.
- Who is the target group?

Human-Centered ML Engineering Tools

- What tools exist that support developing data-driven applications?
- What areas of the development cycle do they support?
- Who is the target group?
- How do they take their users needs into account?

[2] Fei-Fei Li, Jia Li: Cloud AutoML.
https://www.blog.google/products/google-cloud/cloud-automl-making-ai-accessible-every-business/ 2018
The impact of transition types on user experience in VR

Provide an overview on human trust into artificial systems.
→ Definition, see ‘classic’ human 2 human trust
→ How can trust be influenced / generated (in HCI, with multimodality)?
→ How can trust be measured?
→ Historical development of trust in technology.
→ What are common (mis) trustful applications and why (e.g. autonomous driving)?
→ What is trustful design?

[→] https://designshack.net/articles/ux-design/create-a-ui-that-users-can-trust/
Provide an overview on how content is presented and visually perceived in Augmented Reality.

→ Information visualization in AR? How and why?
→ Compare to other, established interface design spaces (smartphone, ...).
→ What design guidelines (may) apply in AR?
→ Limitations of human perception in AR.

[→] https://designguidelines.withgoogle.com/ar-design/augmented-reality-design-guidelines/introduction.html
[→] https://hackernoon.com/silent-augmented-reality-f0f7614cab32
Threats and Countermeasures when using Biometrics

Physiological biometrics (e.g., fingerprint) become more and more common nowadays, and there is also a lot of research towards using behavioural features as biometrics (e.g., typing).

Similar to current authentication mechanisms (e.g., passwords), biometrics cannot provide absolute security. The tasks for this topic are to

- collect known attack vectors against biometric systems and countermeasures against those attacks from literature
- find and discuss areas, where attacks would be possible but either none have been shown or no countermeasures have been proposed

Starting Points:

- Overview of attack vectors in biometric systems [1]
- Some recent attacks proposed in the literature [2, 3]

The quality of 3D model is a function of input size versus realism it provides.

- In video games: Model quality refers to low poly count and high believability.
- In animation: Model quality refers to the bone structure, number of joints and ease of configuring the kinematics.
- ...

Literature review on assessing quality of 3D polygonal-based models:

- What are the current practical experiences when measuring 3D model quality?
- What are the quantitative factors/properties leverage the quality of a 3D model?
- What are the existing quantitative approaches for the assessment of 3D model quality?
- Does the evaluated objects influence the assessments? Why? How?
- ...


https://cs.nyu.edu/~yap/classes/visual/01f/lect/l4/
Domain expert sometimes have different cognition and preference than ordinary people while assessing the visual quality in 3D modeling.

- Experts are conscious of the texture, illumination and viewport of 3D models
- Non-experts are confined to the first impression of 3D models and even could not differentiate two discrepant models sometimes

Literature review on subjective perception and preference in 3D modeling:

- What are the differences in the visual performance of the evaluation between experts and non-experts?
- What are the factors influence human perception and preference in 3D modeling?
- How experts progressively evaluate the process of 3D modeling?
- Can non-experts properly evaluate the quality of 3D model? Why? How?
- ...

Your task is to provide an overview of technical systems that are designed to support self-reflection and self-awareness.

Example Questions:
- Which types of such systems or applications exist? How can they be classified?
- How can self-reflection be defined, measured and evaluated?
- What are common design goals for technical systems to better support self-reflection and self-awareness?

Tangible Autonomous Interfaces in Automated Driving

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Tangible Autonomous Interfaces (TAIs)
• autonomous behaviors in tangible user interfaces
• life-like behaviors

Goals
• Collect automotive user interfaces research and prototypes, related to the idea of TAIs
• Set up the TAI framework in automated vehicle context

Literature survey comparing VR locomotion techniques under consideration of the continuity of movement (walking vs. teleporting techniques).

“Smart” devices are increasingly present in users’ homes. However, such devices do oftentimes not provide feasible authentication mechanisms. To understand authentication challenges in the smart home, this topic may comprise

- reviewing related research on authentication and privacy mechanisms in the smart home (starting points below)
- analysing (a sample set of) current „smart“ devices with regards to existing authentication mechanisms (and/or a lack thereof)
- collecting and analysing real-world stories of authentication (fails) on „smart“ devices (e.g., from product reviews)

... and many more.


Emotion recognition plays a significant role in affective computing and adds value to machine intelligence [1,2].

How spoken expressions of emotions (anger, sad, happiness and neutral...) varied in different language will be benefit for the Human-Machine Interaction research [3,4].

Next steps

write your supervisor this week!
meet your supervisor and discuss the structure of your paper
write and submit your first draft (until May 28)
See you at your 60s pitch!
(mandatory attendance)