

Proseminar Medieninformatik

Wintersemester 2016/17

Prof. Andreas Butz

Malin Eiband (malin.eiband@ifi.lmu.de)

20.10.2016



Agenda

- Goals
- Orga
- Scientific literature review
- Topic assignment

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Goals

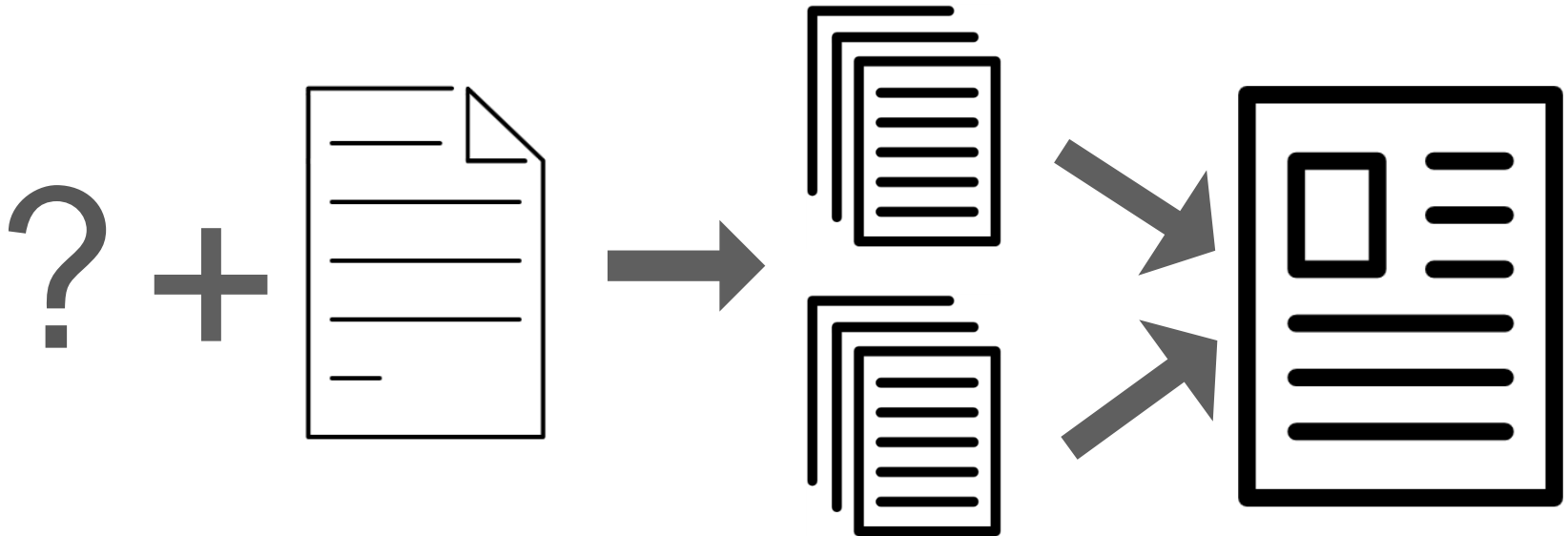
- LEARN TO WORK SCIENTIFICALLY
- Prepare for your Bachelor thesis
- Learn something about a new topic
- Practise your English

Agenda

- Goals
- Orga
- Scientific literature review
- Topic assignment

Question-based Review

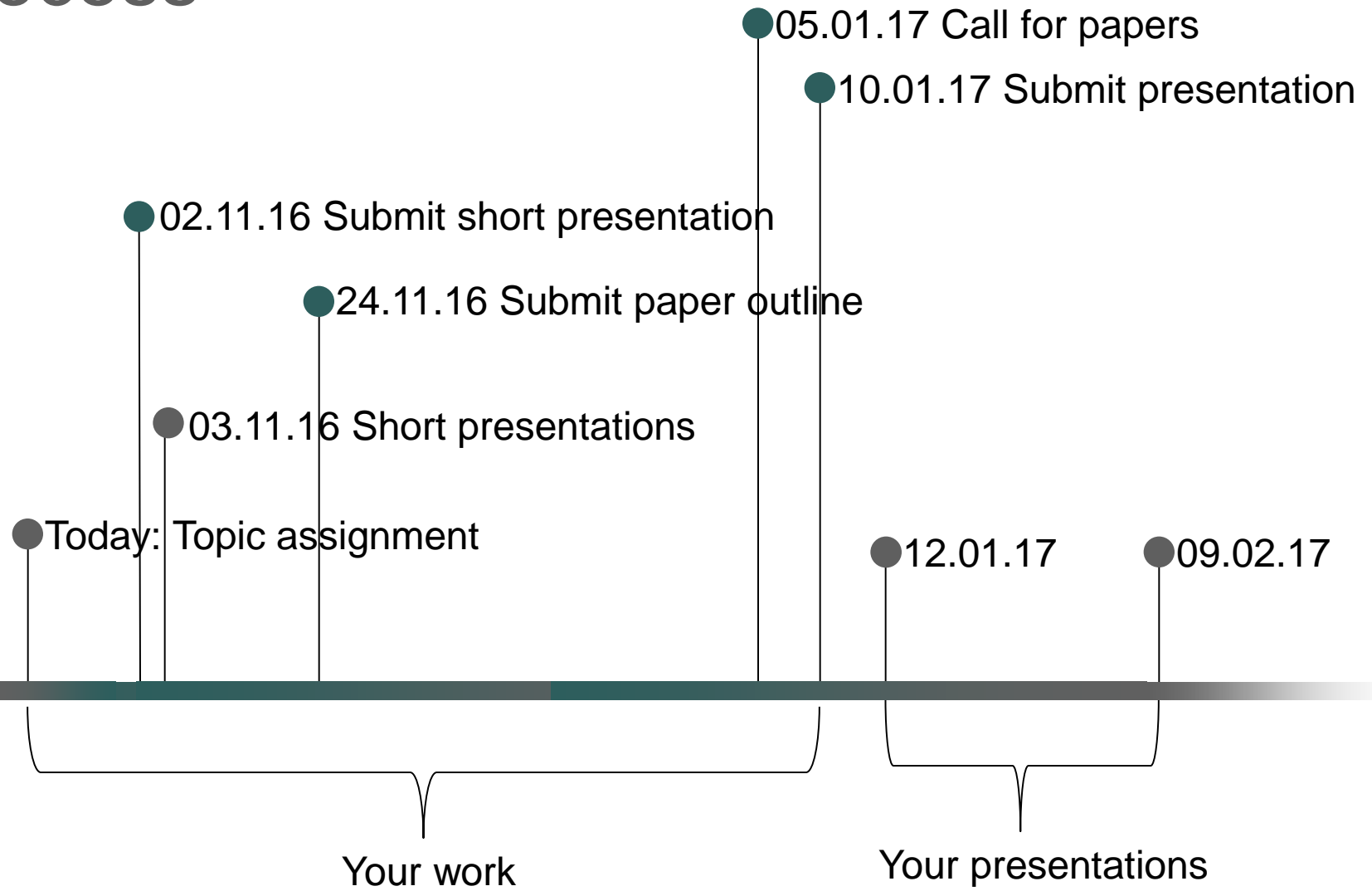
- Research question + paper about this question



Deliverables

- Paper: two pages text in English
- Presentation in English

Process



Deadlines

- **All submissions via UniWorX, zipped**
- Short presentation submission (**one** introductory slide): **02.11.2016**
 - Lastname_Title_Spr.pdf/ .pptx
- Paper outline submission: **24.11.2016**
 - Lastname_Title_Ou.pdf
- Call for papers: **05.01.2017**
 - Lastname_Title_Pa.pdf
- Presentation submission: **10.01.2017**
 - Lastname_Title_Pr.pdf/ .pptx

Dates

- Short presentations (90 seconds): **03.11.2016**
- Presentation sessions:
 - **12.01.2017**
 - **19.01.2017**
 - **26.01.2017**
 - **02.02.2017**
 - **09.02.2017**

General

- Absence \leq 1 day
- Meet **all** deadlines
- Participate!
- Questions?
 - Preferred communication tool: Mattermost, not E-Mail
 - Address:
<https://chat.medien.ifi.lmu.de/mimuc/channels/ps-wise-201617>
 - Desktop client available: <https://about.mattermost.com/download/>
 - Extra session for questions?

MI Chatterbox

All team communication in one place,
searchable and accessible anywhere

Sign in



Short Presentation

- Introduce your topic and research question in 90 seconds (in English)
 - Sounds easier than it is – think carefully about what you want to say
 - One single slide

Paper Outline

- An optimal outline already contains everything you want to write as ordered bullet points
- The basis for your paper – investing time here pays off!
- Template on the webpage

Paper

- Two pages in English (TWO PAGES!!!)
- References on a third page! At least three references
- Interesting title (not the research question)
- LaTeX-format (template on webpage)
- Use illustrations, diagrams, images to illustrate/ summarize
- Submission: **PDF**
- Structure of general research papers

Paper

User Preference for Smart Glass Interaction

Florian Benmann

Abstract— Smart glasses are wearable devices providing the user always with information, using augmented reality techniques. In contrast to other devices such as smartphones they can be used without hiding the scene the user is in, so that it would be possible to use smart glasses in nearly every situation. Especially for on-the-go and working situations where smartphones can't be used, smart glasses are appropriate. To fully exploit these possibilities, new interaction concepts are needed. This paper's aim is to first provide an overview of possible interaction concepts for smart glasses, independent of their technical feasibility of the currently available smart glass devices. Improving current devices is still required and ongoing, so currently impossible interaction concepts could become integrated in next versions if they turn out as providing a great user experience. I will evaluate which concepts might be preferred by users regarding (social) acceptance and performance. In the paper's second part I will for each gesture-based concept propose a use case suitable to its methods. Therefore my paper is based on existing studies examining acceptance and performance of interaction concepts on head worn displays, such as smart glasses and augmented reality devices.

Index Terms—Smart glasses, Head-worn displays, HWD, interaction, input techniques, body interaction, mobile interfaces, Wearable, Augmented Reality

1 INTRODUCTION

After smartphones have revolutionized most people's everyday life within the last 10 years, the fast developing market of mobile computing devices offers more and more options. Tablets and smart watches are similar inappropriate on-the-go as smartphones. Smart glasses are a completely different concept. They integrate in the user's life different, what could offer some new use cases. To gain the most benefit, other interaction concepts are required. In this paper I present some possible interaction concepts for smartglasses and evaluate how they are preferred among the users. Promising the best user experience, I will focus on gesture based concepts.

2 CLASSIFICATION OF INTERACTION CONCEPTS FOR SMART GLASSES

There exist several alternatives for structuring the possible interaction concepts. One is distinguishing the concepts into: free form and others. The former is defined as not requiring any extra device other than the smart glass to be performed and detected. Out of this group can further be selected a group of gesture based concepts, which I will focus on in the second part of this paper. For the first part, considering all possible interaction concepts for smart glasses, I will divide concepts into the groups touch, non-touch and handheld [5].

- **handheld:** interactions with any device that has to be held in hands, e.g. smartphone, controller, joystick
- **touch:** tapping and gesturing on body surfaces or wearable devices, providing tactile feedback. In the following are mentioned the target areas face, hand/palm, wearable devices, the smart glass itself and at least other body parts
- **non-touch:** other movements or gestures. Mainly gestures performed with hands, also voice recognition, eye tracking, wink detection

3 INTERACTION CONCEPT'S PREFERENCE AMONG USERS

This section I based on a user-elicitation study [5] where users was shown a effect of a game task and they were asked to perform a input action of their choice to cause that effect. Based on the percentages

- Florian Benmann is studying Media Informatics at the University of Munich, Germany. E-mail: Florian.Benmann@campus.lmu.de
- This research paper was written for the Media Informatics Proseminar, 2015.

of which actions the user had chosen and a rating and interview afterwards, I determined which interaction concepts are the most preferred in each group.

3.1 Touch inputs

The most preferred touch input is using a finger to perform a gesture on the hand palm (chosen by 50% of the study participants [5]). Its similarity to touchscreens and trackpads leads to the same input actions as on both aforementioned. Other on-body actions are on the leg, hand/back and forearm. Interaction with the face had a quite low portion in this study (1%), but examining another study by Bertarini I would nevertheless recommend hand-to-face input. It promises a good level of acceptance and low intrusiveness [1]. Touching on the smart glass itself reached a 2% portion only in the study of Tung et al., even though it is one of the two primary input methods of Google Glass. As mentioned for hand-to-face input I would rate touching on the HWD a bit better as well. Especially its social acceptance is good (better than on face) [1] which is not a consequence of appearance, but of hygienic issues and meaning of face gestures in other ethnic groups [1]. On the other hand the performance on-device is lower than on-face, due to its small touching area [1]. A common wearable, the smart watch, was preferred by only 5% [5]. Interestingly 12% preferred a ring [5], a rather uncommon wearable. Another interesting concept is a digital belt, promising a good performance. Its quick and easy reachability is seen as benefit by the users. The social acceptance on the belt depends on the interaction length. For short interactions users did not feel very uncomfortable using all areas around the belt. When performing longer tasks, areas other than the front pockets were perceived as less suitable [3]. Although users aren't user preference scores comparing the belt with the other input concepts, belt is a promising one.

3.2 Non-touch inputs

In-air gestures are the by far most preferred non-touch input methods. 89% of the non-touch actions chosen were in-air gestures [5]. In-air gesture concepts, I will focus on in a later section. The methods eye tracking, wink detection and voice command are less preferred by users [5]. Even though voice command is one of both Google Glass primary input methods, it reached only a 2% portion [5]. Anyway I would regard voice command as a good input method because its very intuitive. Its low score's reason might be a low social acceptance in public contexts, where the study was conducted in. Overall non-touch interaction was rated a little bit better than touch concepts [5].

3.3 Inputs using handheld devices

Handheld devices should only be a compromise solution. Their preference score was the lowest compared to the groups touch and non-touch

- **Abstract**
Topic, problem statement, work, result (ca. 150 words)
- **Introduction**
What is the problem?
Why should I read it?
- **Main Part**

Paper

inputs [5], because users don't like that the device is not always available, it has to be taken out of the pocket first [5]. The worst fact in my opinion is that the interaction is not hands-free anymore, what destroys a main advantage of head-worn displays.

4 USE CASES FOR GESTURE BASED CONCEPTS

To assure a great user experience [1] I will now focus on gesture-based interaction. To evaluate whether a interaction concept is suitable to an operation I will in the following regard the concept's performance (performing time and the user exertion) and (user and social) acceptance. To find operations suiting to a task to be performed, I first separate into action and navigation tasks [4]. A action task can usually be performed by one action (e.g. answer a phone call, pause music player), whereas a navigation task can be more complex like navigating through a menu oder moving an object, e.g. a web browsers viewport.

4.1 On-body interaction

A factor for whether an on-body interaction is suitable is the area it is performed on. An area attracting attention when touching it or where touching is human unnatural has a low social acceptance [4]. The second important factor is the actions intrusiveness. Body movements which are to intrusive will not be accepted by users [4]. Aside from these limitations, on-body interaction offers lots of possibilities like coupling with on-body projection, and has the advantage of giving feedback through the human skins proprioception [4].

4.1.1 Hand-to-face

Hand-to-face input has an overall good performance. The most preferred areas for hand-to-face actions are cheek and forehead. Due to their large area users think they are the best parts of the face, especially the cheek which is perceived as a touchpad [4]. Performing actions on the cheek turned out as significantly faster and less exerting than the same action on the forehead and on the HWDs temple (chosen as direct alternative to hand-to-face input) [4] (figure 11). The social acceptance in general is good as well, face contact is something natural [4]. Nevertheless the social acceptance for hand-to-face interaction is worse than for HWD interaction, especially in public context, but still on a good level and most people don't mind using the face. Some users show lower acceptance because of issues with facial cosmetics and dirt on the hands [4]. Users preferred hand-to-face for navigation tasks more than for action tasks. The performance is good for the typical navigation tasks panning and zooming due to the face' large areas [4]. Only for the navigation task "panning" the performance on the HWDs temple (oversized) is slightly better [4]. Moreover because of the HWDs higher acceptance, panning tasks should better be done on the HWD (provided that the HWD has an oversized temple). Coming to a conclusion I would recommend using the cheek for zooming tasks. The best suitable technique might be a linear zooming move. The alternative cyclo has low social acceptance because it could be perceived as the "you are crazy" gesture [4].

4.1.2 Palm based imaginary interfaces

Touching the palm is the users favorite touch interaction approach [5]. As reasons users mentioned that it is less intrusive, because it requires the least physical movement moving the right hand to the left hand palm [5]. Seaming similar to a smartphone touch display, the palm was often used as proxy touch-screen or trackpad. The palm offers haptical feedback both through finger and hand/palm which helps navigating to the target, whereas a touchscreen can guide the user by e.g. drawing a grid and offers feedback only through the finger. As expected the touchscreen is of advantage, except when blindfolded. When blindfolded navigating on the palm is much faster, as an experiment conducted by Bertarini's shows [1] (figure 4). To find out whether the active (finger) or passive (palm) sense is most relevant, another experiment compared performance of palm, fake palm, and palm with finger cover. It came to the result that the passive tactile sense produces the most tactile cues [1] (figure 5). Summing up it can be said that using the palm has much better performance than using a real

touchscreen when the user is blindfolded, what makes it suitable for on-the-go use-cases and impaired users. Because of the low preference score of handheld-devices mentioned in chapter "comparison among categories", the palm might be the better solution in not-blindfolded use cases as well.

Most suitable to be performed on the palm might be moving or drawing tasks using the palm's large surface [5]. E.g. moving an object to a specific position or just left and right; or drawing a path [5] (figure 7). For action tasks which are quite simpler the palm is suitable too, according to a user preference study. Nonetheless, if the palm is still used for sophisticated tasks, I think it makes more sense to perform the action tasks on other surfaces to prevent occluding the palm with various different action types. Other input methods were preferred for action tasks as well [5].

4.1.3 In-air gestures

Due to the least attracted attention users prefer gestures performed in front of the chest. Also the exertion moving the hands to the chest is low. The second most chosen gestures are in front of the face, thereafter comes the area in front of the belly [5] (figure 9). The main reason for this preference order might be the social acceptance, which isn't as high when performing gestures in front of the face or the belly because it could look weird, theoretically I can imagine in-air gestures for lots of tasks, but I suppose assigning navigation and selection in menus to in-air gestures. No other concept has shown suitable for this by now, and in a study Datcu et al. approved this in connection with a Augmented Reality system. The authors examined performance and users appreciation with a gesture interaction system used for navigating to a menu item (at a maximum menu depth of 4 levels) and came to the conclusion that spatial interaction is appropriate for AR [2]. Users were able to adapt to gesture interaction fast and only 20% did feel insecure, discouraged, irritated, stressed or annoyed while performing the menu task. [2]

4.1.4 Hand-to-body input: other body parts

Minus the so far considered body areas there are the areas finger, leg, handback, forearm and ring left. These areas could be used for action tasks requiring just one tap, each task or group of similar tasks dispersed to another area, like users did in the study of Tung et al. [5]. The concrete surface usually is irrelevant. Large surfaces like the chest can be used for lower precision requirements, such as selecting a single option from 4. Performed by a tap on one of 4 areas of the chest, a good performance can be reached [5]. The touch-area depending performance and acceptance might behave similar to the results examined for non-touch inputs. Areas which are hard to reach (very low areas like lower leg / foot or high areas on the head) have low performance scores due to the effort moving a hand towards this area. The acceptance might be low as well because it looks weird touching these hard reachable areas.

5 CONCLUSION

This paper explored possible interaction concepts for smart glasses, regardless of current smart glass version or technical capabilities. The main factors for whether a action is suitable are its performance, which consists of performing time and the user's exertion, and the user acceptance, especially in a public social context. In-air gestures in front of the chest and imaginary interfaces on the hand-palm turned out as the most suitable concepts. They allow blindfolded on-the-go use cases and hand-free interaction, two big advantages of smart glasses against other devices. Both areas' too intrusive to the user and attract little attention when performing in a public context. Future work has to focus on user studies in more realistic use cases in a real environment and with a real application. In addition it should be examined how much effort is required of the user when learning how to use the smart glasses. I think that might be harder than learning how to deal with a smartphone because of the huge variety of possible inputs and the missing guidance that touchscreen and button interaction offer. User guidance and learning concepts should be constructed and proved.

• Main Part
Design Space, deep discussion
of related work. *Don't only tell
what is in the paper, think beyond!*

• Conclusion
Short summary + your opinion,
which is based on your main
section

REFERENCES

Presentation

- 15 min presentation (in English) + 5 min discussion (in English or German)
- No slide template – get creative!
 - Many tips on the web, e.g. <http://lifehacker.com/5810271/how-to-create-presentations-that-dont-suck>
- Mainly pictures!
- Interest the audience! Do not make us fall asleep! (<https://www.ted.com/>)
- Anticipate questions and prepare answer slides (backup-slides)

Evaluation sheet

Bewertungsbogen für Proseminararbeiten

Bitte nur die grünen Felder editieren!

Thema:	
Student:	
Seminar:	Proseminar Sommersemester 2012
Betreuer:	Christian Mai

Aspekt	Gewicht	Note
Schriftliche Ausarbeitung		
1 Formale Kriterien	9	0,0
1.1 Angemessenheit des Umfangs	2	
1.2 Gliederung und Aufbau	3	
1.3 Korrekte Zitierweise	2	
1.4 Gestaltung / Verwendung von Anschauungsmaterialien	1	
1.5 Sprache	1	
2 Inhaltliche Kriterien	12	0,0
2.1 Beschreibung der Problemstellung / Zielsetzung	2	
2.2 Bibliographie / Berücksichtigung des Forschungsstandes	4	
2.3 Logische inhaltliche Konsistenz / Roter Faden	4	
2.4 Innovation / Einbringen eigener Gedanken	2	
Gesamtnote der schriftlichen Ausarbeitung	21	0,0

75%

Aspekt	Gewicht	Note
Präsentation		
1 Folien	4	0,0
1.1 Aufbau	2	
1.2 Bildmaterial	2	
2 Vortrag	4	0,0
2.1 Sprachlicher Ausdruck	3	
2.2 Einhaltung der zeitlichen Vorgaben	1	
Gesamtnote der Präsentation	8	0,0

25%

Agenda

- Goals
- Orga
- Scientific literature review
- Topic assignment

Research in General

- Starting point for your work: given related scientific work
 - First orientation
 - Contains references in the “References” chapter
 - Contains first keywords
 - Not every source can be used (e.g. online articles without author, contributions in online communities)
 - References: Papers, conferences, journals, books, online sources with author and date of access

Finding Literature

- Almost all literature is available online!
 - Google/Google Scholar (<http://scholar.google.com>)
 - ACM Digital Library (<http://portal.acm.org>)
 - Citeseer (<http://citeseer.ist.psu.edu>)
 - IEEE Xplore (<http://ieeexplore.ieee.org>)
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- For the full functionality log in at „LMU E-Medien-Login/Datenbanken“ and find the needed library (e.g. ACM)

E-Medien-Login der Universitätsbibliothek
Der Zugang zu den elektronischen Medien für Mitglieder der LMU

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Finding literature

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SIGN IN SIGN UP

SEARCH

Judgment of natural perspective projections in head-mounted display environments

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Authors: [Frank Steinicke](#) [University of Münster](#)
[Gerd Bruder](#) [University of Münster](#)
[Klaus Hinrichs](#) [University of Münster](#)
[Scott Kuhl](#) [Michigan Technological University](#)
[Markus Lappe](#) [University of Münster](#)
[Pete Willemsen](#) [University of Minnesota Duluth](#)

2009 Article

Bibliometrics

- Downloads (6 Weeks): 4
- Downloads (12 Months): 36
- Downloads (cumulative): 313
- Citation Count: 6

Published in:

- Proceeding
- VRST '09 Proceedings of the 16th ACM Symposium on Virtual Reality Software and Technology
- Pages 35-42
- ACM New York, NY, USA ©2009
- [table of contents](#) ISBN: 978-1-60558-869-8 doi>[10.1145/1643928.1643940](#)

Recent authors with related interests Concepts in this article powered by IBM Watson™

Switch to single page view (no tabs)

Abstract Authors References Cited By Index Terms Publication Reviews Comments Table of Contents

6 Citations

- [Frank Steinicke, Gerd Bruder, Scott Kuhl, Perception of perspective distortions of man-made virtual objects, ACM SIGGRAPH 2010 Posters, July 26-30, 2010, Los Angeles, California](#)
- [Gerd Bruder, Frank Steinicke, Carolin Walter, Mathias Moehring, Evaluation of field of view calibration techniques for head-mounted displays, Proceedings of the ACM SIGGRAPH Symposium on Applied Perception in Graphics and Visualization, August 27-28, 2011, Toulouse, France](#)

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Feedback

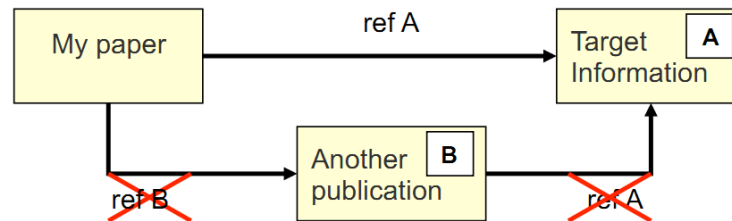
Why should I care about citations?

- Copyright/ intellectual property
- Foundation of scientific work
- Citations links belonging work together
- Reader needs all the information you had to check if you are correct

Citations

- Quotation
 - Direct (in quotation marks)
 - **Indirect**

- No secondary citation



- Citation style: APA 6 (for this work):

see <http://www.edu.lmu.de/apb/dokumente-und-materialien/dokumente-bachelor/hinweise-zur-apa.pdf>

- Wikipedia: not citeable (but good for quick research)

Citations

IN-TEXT REFERENCE

REFERENCE LIST

BOOKS

One author – in-text reference placement

Note: There are two main ways to use in-text references. Firstly, to focus on the information from your source – 'information prominent'. Secondly, to focus on the author – 'author prominent'.

'Information prominent' (the author's name is within parentheses):

The conclusion reached in a recent study (Cochrane, 2007) was that...

OR

'Author prominent' (the author's name is outside the parentheses):

Cochrane (2007) concluded that...

Cochrane, A. (2007). *Understanding urban policy: A critical approach*. Malden, MA: Blackwell Publishing.

Chapter in edited book

A discussion about Australia's place in today's world (Richards, 1997) included reference to...

OR

Richards (1997) proposed that...

Richards, K. C. (1997). Views on globalization. In H. L. Vivaldi (Ed.), *Australia in a global world* (pp. 29-43). North Ryde, Australia: Century.

JOURNAL, NEWSPAPER & NEWSLETTER ARTICLES

Journal article with one author – separated paging (paginated by issue)

If each issue of a journal begins on page 1, include the issue number in parenthesis immediately after the volume number in the Reference List.

In an earlier article, it was proposed (Jackson, 2007)...

Jackson, A. (2007). New approaches to drug therapy. *Psychology Today and Tomorrow*, 27(1), 54-59.

Journal article with two authors – continuous paging throughout a volume.

If the journal volume page numbers run continuously throughout the year, regardless of issue number, do **not** include the issue number in your Reference List entry.

Kramer and Bloggs (2002) stipulated in their latest article...

OR

This article on art (Kramer & Bloggs, 2002) stipulated that...

Kramer, E., & Bloggs, T. (2002). On quality in art and art therapy. *American Journal of Art Therapy*, 40, 218-231.

Plagiarism

- No plagiarism, NO plagiarism, not even a little!
- Plagiarism
 - Material of third parties, without reference
 - Direct quotations, without reference
 - copied pictures, diagrams or graphics without reference
- Your work will be checked automatically
- Work with plagiarism will fail the course!
- <http://www.medien.ifi.lmu.de/lehre/Plagiate-lfl.pdf>

Writing style

- Everything you write in your paper must be supported by literature!
- Think about a logical structure of your arguments
- Scientific writing is: objective, precise and neutral
- CHECK: Grammar, **SPELLING**
- Numbers from zero to twelve are written as text
- Spell out abbreviations like “i.e.”, “e.g.”
- DON'TS:
 - Unprecise quantities (“high”, “slightly”, “almost”, “a little bit”)
 - Fillers (“now”, “well”, “quasi”)
 - Pseudo-Arguments (“naturally”, “as expected”)

Citavi

- literature administration

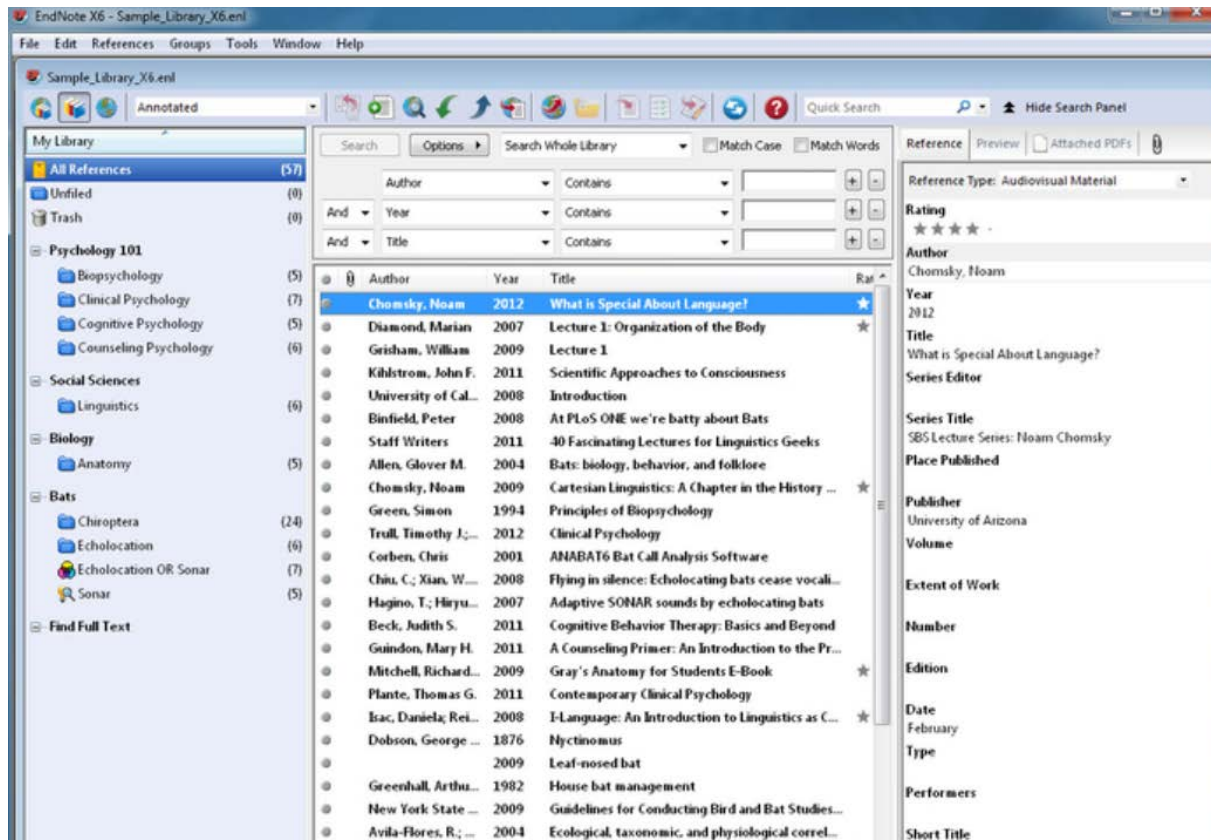
The screenshot shows the Citavi software interface for literature management. The window title is "DEMO Information Literacy: Literaturverwaltung - Citavi". The main area displays a list of literature entries, including "Weber, Max: Wissenschaft als Beruf [1919]". The right pane shows the text of the selected entry, "WISSENSCHAFT ALS BERUF [1919, Auszug]". The interface includes a menu bar, a toolbar, and a search bar.

Übersicht	Titel	Inhalt	Zusammenhang	Zitate, Kommentare	Aufgaben, Orte
5-6	Ohne Spezialisierung keine wissenschaftliche Leistung				
5-6	Kleiner interner Widerspruch?				
6-8	Der Zusammenhang von Leidenschaft, Arbeit, Eingebung, "Gabe" und Hingabe an die Sache bei der wissenschaftlichen Arbeit				
6	Der Einfall ersetzt nicht die Arbeit ...				
7	"Sache" und "Persönlichkeit"				
8	Fortschritt in Wissenschaft und Kunst				
8	Wissenschaft veraltet				
8-9	Praktische und technische Zwecke der Wissenschaft				
9	Wissenschaft als zentraler Teil des historischen Intellektualisierungsprozesses				
9	Die zunehmende Intellektualisierung und Rationalisierung führt zur "Entzauberung der Welt"				
10	Die Frage nach dem Sinn wissenschaftlicher Arbeit				
10-13	Illusionen über den Sinn der Wissenschaft				
13	Was kann Wissenschaft leisten?				
13	Voraussetzung wissenschaftlicher Arbeit ist etwas wissenschaftlich nicht Beweisbares: ihre Wichtigkeit				

<http://www.ub.uni-muenchen.de/schreiben/literaturverwaltung/citavi/index.html>

EndNote

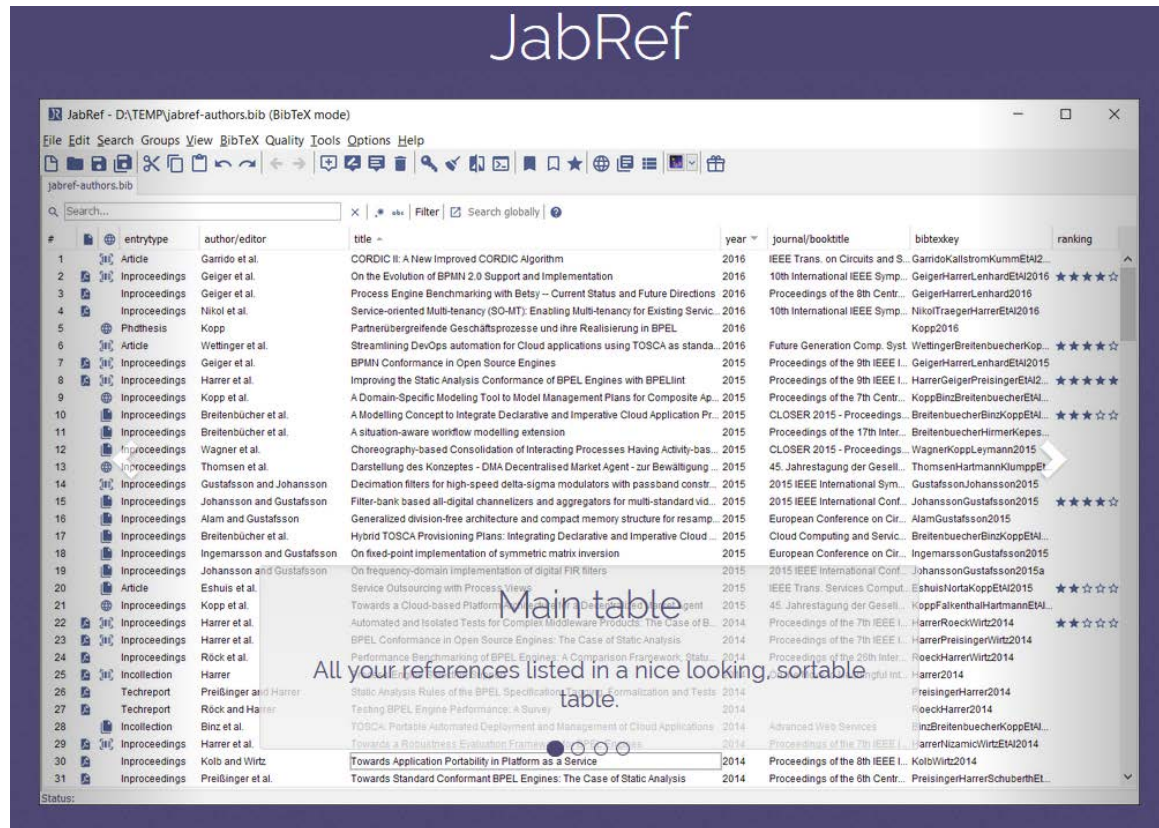
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JabRef

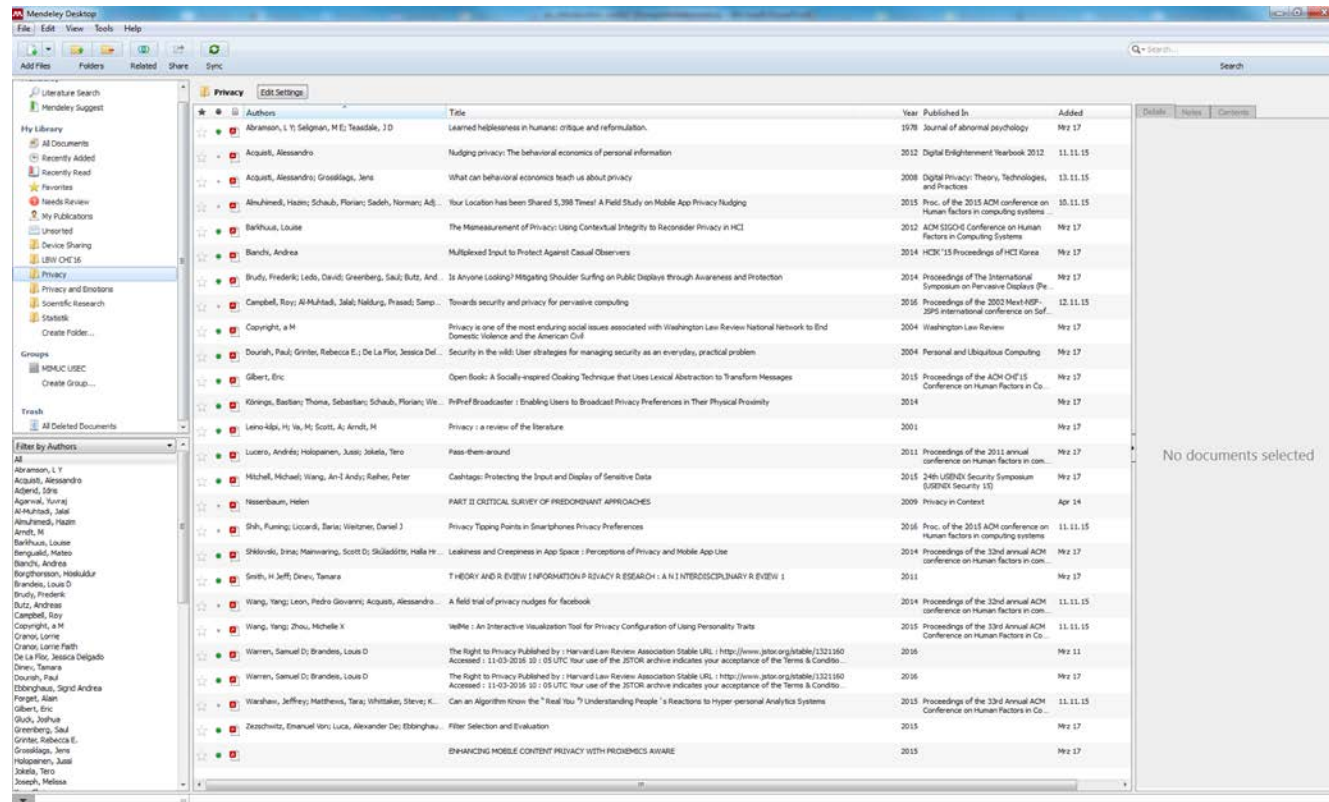
- literature administration



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Mendeley

- literature administration

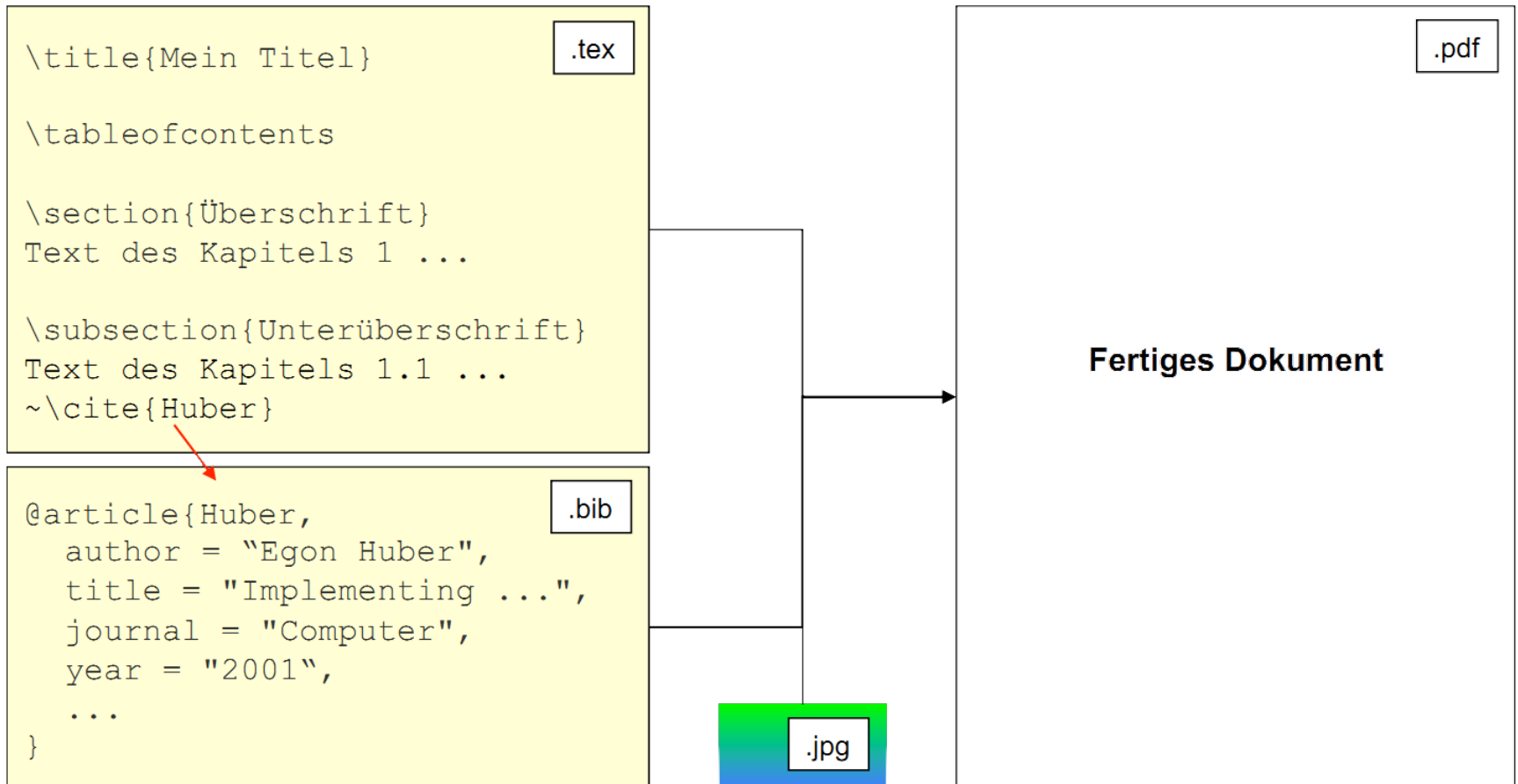


<https://www.mendeley.com/>

LaTeX

- Text formatting
- No WYSIWYG, instead creation of source code
- Integration of pictures and diagrams in the final document
- Integration of references (with linkage to Citavi, EndNote, BibTex...)
- Very nice typography
- No formatting mistakes when creating the text
- Huge number of online tutorials available

Example creation of a document



Agenda

- Goals
- Orga
- Scientific literature review
- Topic assignment

Privacy

in a mobile, connected world

Topic Assignment

Frage	Vorname	Nachname
5	Philipp	Altmann
7	Bill	Bapisch
17	Claudia	Decher
16	Julia	Dörner
8	Laura	Ehresmann
14	Felix	Engelhardt-Schott
10	Lisa	Görtz
9	Filip	Hristov
11	David	Klein
1	Adina	Klink
20	Cornelia	Kratzer
19	Paul	Lejko
12	Aline	Neumann
13	Andrea	Ngao
15	Nicolai	Schork
3	Patrick	Suchostawski
6	Michael	Thanei
18	Niklas	Thiem
2	Phuong	Tran
4	Yvonne	Irber

Topic List

- See „ps_questions_ws1617.pdf“
- Research question can be changed (with my agreement)