Proseminar Medieninformatik

Sommersemester 2016

Ceenu George
Agenda

• Goals
• Orga
• Scientific literature review
• Draft
• Topic assignment
Agenda

• Goals

• Orga
• Scientific literature review
• Draft
• Topic assignment
Goal

• LEARN TO WORK SCIENTIFICALLY
• Prepare for your Bachelor Thesis
• Learn something about a new topic
• Practice your English
Agenda

• Goals

• Orga

• Scientific literature review

• Draft

• Topic assignment
Question-based Review

- Research question + paper about this question
- Start literature review (at least 3 research papers in your paper)
Deliverables

• Paper: 2 pages text in english (references on a third page)
• Interesting title (not the research question)
• Presentation in english

• Call for Paper + Presentation: **20.06.2016 (Uniworx)**
  • .zip your paper and presentation (Don’t zip the folder!)
  • Names:
    Paper: Lastname_Title_Pa.pdf
    Presentation: Lastname_Title_Pr.pdf/ .pptx
Paper

- 2 Pages in english (TWO PAGES!!)
- structure of general research papers
- LaTeX-format (see website)
- Use illustrations, diagrams, images to illustrate/ summarize
- Submission: PDF
  - Source includes .tex, .bib, images etc., but no .aux, .log, .bbl etc.
  - ZIP-archive of submission
User Preference for Smart Glass Interaction

Florian Bemmann

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 having the users aware of it, so that it would be more natural to use smart glasses in nearly every situation. Especially for on-the-go and working situations, where many tasks need to be performed simultaneously, smart glasses are appropriate. To fully exploit these possibilities, new interaction concepts are necessary. Existing smart glasses such as the Google Glass provide a limited set of interaction options. The set of available interaction concepts is still required and ongoing, so currently, impossible interaction concepts should become integrated in new versions. To turn not as providing a great user experience, we will evaluate which concepts might be preferred by users regarding comfort, acceptance, and performance. In the paper second part I will for each gesture-based concept propose views are found suitable to its methods. Therefore, my paper is based on existing studies concerning acceptance and performance of interaction concepts on head-up displays, such as smart glasses and augmented reality devices.

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 new devices with tablets and smart watches are similar unimportant on one’s daily routine, smart glasses are a completely different concept. They integrate into our daily life, what could offer some new use cases. To get the real benefit, other interaction concepts are required. In this paper, I present some possible interaction concepts for smart glasses and evaluate how they are preferred among the users. Presenting the best user experience, I will focus on gesture-based concepts.

2 Classification of Interaction Concepts for Smart Glasses

There exist several alternatives for enabling the possible interaction concepts. One is distinguishing the concepts into free forms 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 discuss 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, touch and non-touch. Touch is defined to be a basic interaction form that is often used in daily life.

1. Touch inputs

A touch-based input is using a finger to perform a gesture on the displayed object (chosen by 50% of the study participants). Its simplicity makes it easy to implement and use. The main advantage of touch input is the ease of use and intuitive behavior. It is perceived as fast and safe (chosen by 50% of the study participants). Touching a glass itself is a new technology that is not yet widespread in the general population. However, it is one of the emerging input methods for Smart Glasses. As mentioned in the previous section, many non-touch gestures are not available on the existing devices, due to their small size and touchpads. A common example of a touch input is a swipe gesture. A swipe gesture is performed by moving the palm from one side to the other. It is a very intuitive and simple gesture that can be performed with one hand.

2. Non-touch inputs

In-air gestures are the by far most preferred touch input methods (chosen by 50% of the participants). In-air gesture concepts, I will focus on in a later section. The main advantage of non-touch gestures is that they can be performed with one hand and are not affected by touchpads or touchscreens. Even though voice command is one of the emerging input methods, it is often limited to mobile phones. However, when voice commands are combined with touch input methods, it can provide a more natural interaction experience for the user. Therefore, I would regard voice command as a good input method because of its very intuitive. Its low score might be due to the low social acceptance in public contexts, where the study was conducted. Overall, non-touch interactions were rated a little bit more intuitive than touch concepts (chosen by 50% of the participants).
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 for an operation I will in the following report the concept's performance (performing time and the user exertion) and user and social acceptance. The user input is converted into a task to perform. I first separate into action and navigation tasks [1]. 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 or moving an object, e.g. a web browsers viewport.

4.1 On-body Interaction

A factor for whether an on-body interaction is suitable in the area it is performed in. An area attracting attention when touching it or where touching it is important to the user contributes to a low social acceptance [1]. The second important factor is the actions intrusiveness. Body movements which are too intrusive will not be accepted by users [1]. Aside from these limitations, on-body interaction offers less possibilities like coupling with on-body projection, and has the advantage of giving feedback through the human skin's 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 action are cheek and forehead. Due to their large area users think they can use 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 HMD's screen (chosen as direct alternative to hand-to-face input) (Fig. 11). The social acceptance is general good as well. Face contact is something natural [4]. Sometimes the social acceptance for hand-to-face interaction is worse than for HMD 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 expressions and diet on the hand [4]. Users preferred hand-to-face for navigation tasks more than for action tasks. The performance is good for the typical navigation tasks (moving and scrolling) but less for the face. The latter area [4]. Only for the navigation task "swiping" the performance on the HMD's screen is much better (Fig. 11). Moreover better than the HMD's higher acceptance, pointing tasks should be done on the HMD (provided that the HMD has an extended touchpad). Combining a non-touchable hand movement with the touch for pointing tasks. The best usable technique might be a linear motion move. The alternative concept has low social acceptance because it could be perceived as the "you are clumsy" gesture [4].

4.1.2 Palm-based interfaces

Touching the palm is the user favorite touch interaction approach [5]. As Reasons mentioned that it is less intrusive, because it requires the least physical movement moving the right hand to the left hand (palm) [5]. Scanning similar to a smartphone touch display the palm was often used as entry touch-screen or trackpad. The palms offers tactile feedback both through finger and handpads which helps navigating to the target, whereas a touchpad can guide the user by e.g. drawing a grid and offers feedback only through the finger. As expected the touchpads is of advantage, except when blindsighted. When blindnessfolded navigating on the palm is much faster, as an experiment conducted by Forrester's shows [1] (Fig. 4). To find out whether the active (fingers) or passive (palm) sense is most relevant another experiment compared performance of palms, face palms, and palms with finger cover. It came to the result that the passive tactile sense precedes the most tactile cues [1] (Fig. 5). Summarized up it can be said that using the palm has much better performance than using a real touchscreens when the user is blindfolded, what makes it suitable for on-the-go usage and impaired users. Because of the low performance score of hand-based devices mentioned in chapter "comparison among categories", the palm might be the better solution is not blindfolded use cases as well.

Most suitable to be performed on the palm might be moving or swiping tasks using the palm's larger surface [5]. E.g. moving an object to a specific position or pan and tilt, or swiping a path [5] (Figure 3). For action tasks which are quite simple the palm is suitable too, according to a user preference study. Nonetheless, if the palm is still used for more complex tasks, I think it makes sense to perform the interaction tasks on other surfaces to prevent occluding the palmb with various different action types. Other input methods were performed action tasks as well [5].

4.1.3 In-air gestures

Due to the limited attentional area users are only performing in front of the chest. Also the exertion using the hands to the chest is low. The around most chosen areas are in front of the face, therefore comes the area in front of the eyes [7] (Figure 9). The main reason for this performance order might be the social acceptance, which is as high when performing gestures in front of the face or the body because it could look natural. Additionally I can imagine air gestures for lists of tasks, but I've not seen assigning navigation and selection in returns to in-air tasks. No other concept has shown suitable for this by now, according to the study Daut et al. approved this in connection with a Augmented and head-up system. The authors examined performance and users acceptance with a gesture interaction system used for navigating to a menu item (a maximum menu depth of 4 levels) and came to the conclusion that spatial interaction is appropriate for AR [1]. Users were able to adapt gesture interaction fast and only 25% of feel inaccurate, discounted, initiated, or arranged while performing the menu tasks [2].

4.1.4 Hard-to-body input: other body parts

Most the body they can be considered body areas there are the arms, fingers, leg, hand, breast, forearm and ring left. These areas could be used for action tasks requiring just one up, each task or group of similar tasks divided to another area, like users did in the study of Tang et al. [1]. The concrete area usage is very demanding. Large surfaces like the chest can be used for lower precision requirements, such as selecting a single icon (Fig. 4). Performed by a single or a group of the area of the chest, a good performance can be reached [2]. The touch area dependencies performance and acceptance might behave similar to the results examined for non-touch inputs. Areas which are hand much less used areas like lower leg, face or high areas on the hands have low performance scores due to the effort moving a hand towards this area. The acceptance might be as well, because it looks weird showing a hand to a reachable area.

5. CONCLUSION

This paper explored possible interaction concepts for smart glasses, regardless of current smart glass version's lacking capabilities. The main factors for whether a action is successful in its performance, consist of performing time and the user exertion, and the user acceptation, especially in a public environment. In air gestures in front of the chest and intrusiveness is no blindfolded turned out as the most suitable concepts. They allow blindsighted on-the-go usage and hands-free interaction, two big advantages of smart glasses against other devices. Both aren't 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 ensuing guidance that touchscreens and buttons interaction offer. User guidance and learning concepts should be constructed and proved.
Presentation

• 15 min presentation + 5 min discussion (English)
• Slide template see website
• Presentation on your Laptop or on Ceenus
• Mainly pictures!
• Interest the audience! Do not make us fall asleep!
  (References: https://www.ted.com/)
• Anticipate questions and prepare answer slides (backup-slides)
Evaluation sheet

**Bewertungsbogen für Proseminararbeiten**

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75% 25%
General

- Absence <= 1 Day (2 Sessions on 1 day count as „2days“)
- Participate
- Questions?
  - Extra Session for questions?
  - Contact me by Mail, let me know your phone number (if you want to)
Agenda

• Goals
• Orga
• Scientific literature review
• Draft
• Topic assignment
Research in general

- Starting Point for your work: given related scientific work
  - First Orientation
  - Includes references in the “References” chapter
  - Includes first Keywords
  - Not every source can be used (e.g. Online-Articles without author, contributions in online communities)
  - Safe Online-Sources and write down the date of access!
  - References: Papers, Conferences, Journals, Books
Finding literature

• Almost all the 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)
  • OPAC der Universitätsbibliothek (http://opacplus.ub.uni-muenchen.de)
• For the full functionality Login at „LMU E-Medien-Login/Datenbanken“ and find the needed Library (e.g. ACM)
Finding literature

Judgment of natural perspective projections in head-mounted display environments

Full Text: PDF Get this Article

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 Willemse  University of Minnesota Duluth

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

Switch to single page view (no tabs)

6 Citations

Agenda

- Goals
- Orga
- Scientific literature review

Draft

- Topic assignment
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)

• Wikipedia: not citeable (but good for quick research)
# Citations

## In-Text Reference

### BOOKS

<table>
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<th>In-Text Reference</th>
<th>Reference List</th>
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**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...

- ‘Author prominent’ *(the author’s name is outside the parentheses)*: Cochrane (2007) concluded that...

### Chapter in edited book

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- Richards (1997) proposed that...

## JOURNAL, NEWSPAPER & NEWSLETTER ARTICLES

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

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

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

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LFE Medieninformatik | Proseminar Medieninformatik  SS 2016
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 „z.B.“, „i.d.R.“, “e.g.“
• Don‘ts:
  • Unprecise quantities („high“, „slightly“, „almost“, „a little bit“)
  • Fillers (z.B. „now“, „well“, „quasi“)
  • Pseudo-Arguments (z.B. „naturally“, „as expected to“)
Citavi

- literature administration

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

- literature administration

http://www.ub.uni-muenchen.de/schreiben/literaturverwaltung/endnote/index.html
LaTeX

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

\title{Mein Titel}
\tableofcontents
\section{Überschrift}
Text des Kapitels 1 ...
\subsection{Unterüberschrift}
Text des Kapitels 1.1 ...
\cite{Huber}

@article{Huber,
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  title = "Implementing ...",
  journal = "Computer",
  year = "2001",
  ...
Process

Today: Topic assignment
Today: Topic assignment

Your work

11.01.16 Call for papers
Process

Today: Topic assignment

Your work

20.06.16 Call for papers

Your Presentations

23.06.16

21.07.16
Agenda

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• Orga
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• Topic assignment
### Topic assignment

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Topic List

• See „ps_questions_SS16.pdf"
BackUp
Vorgehensweise

• Wenn noch nicht vorhanden: TeX-Implementierung und LaTeX-GUIs/-IDE installieren, z.B.:
  • Windows: MikTeX (http://www.miktex.org/) + TeXnicCenter (http://www.toolscenter.org/)
  • Mac OS: MacTex (http://tug.org/mactex/), beinhaltet TeXShop IDE (http://www.uoregon.edu/~koch/texshop/index.html) oder TexMaker (http://www.xm1math.net/texmaker/)
  • Linux: teTeX-package (www.ctan.org/) + Kile (http://kile.sourceforge.net/), vorinstalliert auf Pool-Rechnern

• Download des LaTeX-Templates
  • .tex- und .bib-Dateien mit IDE öffnen, Source anschauen und nachvollziehen
  • LaTeX => PDF einstellen, .tex-Datei zweimal kompilieren
  • Bei Bedarf weitere LaTeX-Tutorials, Foren etc. konsultieren
LaTeX-Ressourcen

• LaTeX-Klassen und Dokumentation (http://www.ctan.org)
• A (Not So) Short Introduction to LaTeX2e (http://www.ctan.org/tex-archive/info/lshort/english/)
• LaTeX Symbols List (http://www.ctan.org/tex-archive/info/symbols/comprehensive/)
• Grafiken importieren und formatieren (http://tug.ctan.org/tex-archive/info/epslatex/english/epslatex.pdf)
• Deutschsprachige FAQs (http://www.dante.de/faq/de-tex-faq/html/de-tex-faq.html)
• BibTeX-Tool und Dateiformat zur Verwaltung von Bibliographien und deren Einbindung in LaTeX
  • Fachliteratur-Referenzen werden online bereits vielfach im BibTeX-Format angeboten (z.B. ACM, IEEE)
  • How-To: http://www.bibtex.org/Using/de/