

Ubiquitous Computing

Hauptseminar Medieninformatik
Sommersemester 2011

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Sven Kratz, Sebastian Löhmann, Hendrik Richter

Organisatorisches

Zielgruppe

Diplom: Hauptseminarschein

Master: P4.1 und P4.2 Seminar zu Themen der Medieninformatik und sozialen Kompetenz (6 ECTS)

Lernziel

Wissenschaftliches Arbeiten

Selbstständige Literaturrecherche

Analyse und Einordnung von Forschungsergebnissen

Präsentationstechniken

Aufgaben

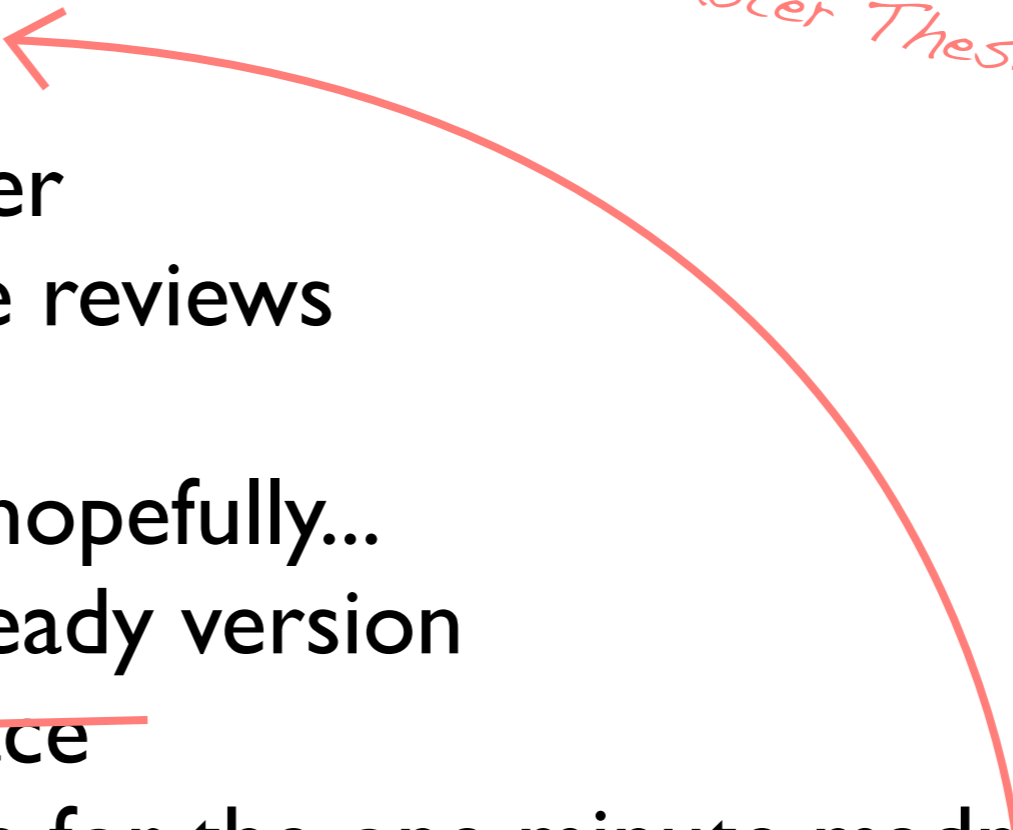
Schriftliche Ausarbeitung (6-8 Seiten, Latex, Englisch)

Präsentation (15 Minuten + 5 Minuten Diskussion)

A real conference...

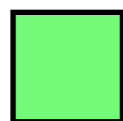
- ... researching literature
- ... doing some research ourselves
- ... writing a paper
- ... submitting the paper
- ... worrying about the reviews
- ... maybe reviewing
- ... getting accepted... hopefully...
- ... writing a camera-ready version
- ... flying to a fancy place
- ... getting up the stage for the one minute madness
- ... giving our presentation

~~A real conference...~~ *Hauptseminar*

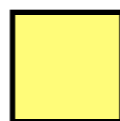
- ... researching literature
 - ~~... doing some research ourselves~~ *- > Master Thesis*
 - ... writing a paper
 - ... submitting the paper
 - ... worrying about the reviews
 - ... ~~maybe~~ reviewing
 - ... getting accepted... hopefully...
 - ... writing a camera-ready version
 - ~~... flying to a fancy place~~
 - ... getting up the stage for the one minute madness
 - ... giving our presentation
- 

Ablauf

Do, 05.05.	Einführung und Themenvergabe
	Zusammenstellung der Quellen und Besprechung mit Tutor
Do, 26.05.	90-Sekunden Vorträge
Mi, 01.06.	Abgabe der vorläufigen Ausarbeitung/kommentierten Gliederung (2-3 Seiten)
Mi, 22.06.	Abgabe der fertigen Ausarbeitung; Verteilung der Reviews per Mail
Do, 30.06.	Verteilung der Reviews, generelles Feedback
Do, 14.07.	Abgabe der überarbeiteten Ausarbeitung
	Probenvorträge in Absprache mit dem Tutor
Do, 28.07	Abgabe der endgültigen Vortragsfolien
Fr, 29.07.	Präsentationstag mit Vorträgen à 15 Minuten + 5 Minuten Diskussion



Termin mit Anwesenheitspflicht



Abgabe

Literaturrecherche

Google Scholar (<http://scholar.google.de>)

ACM Digital Library (<http://portal.acm.org/dl.cfm>)

Citeseer (<http://citeseer.ist.psu.edu/cs>)

IEEE Computer Society (<http://www.computer.org/portal/web/csdl>)

OPAC der Bibliothek (<http://opacplus.ub.uni-muenchen.de>)

Wissenschaftliche Paper:

- Orientierung für Aufbau der Arbeit
- Enthaltene Referenzen liefern weitere verwandte Literatur
- Nicht alle Quellen sind zitierfähig (Online Artikel ohne Autorenangabe, Foren, Wikipedia...)

Zugriff auf ACM & Co.

1. VPN muss verbunden sein

2. Proxy muss korrekt konfiguriert sein

<http://www.lrz.de/services/netzdienste/proxy/browser-config/>

Trick: Oft gibt es ACM & Co. Paper auch auf anderen Servern

⇒ „Alle X Versionen“ bei Google Scholar anzeigen

[PDF] [Towards a taxonomy for ambient information systems](#)

M Tomitsch, K Kappel, A Lehner... - ... [Information Systems](#), 2007 - Citeseer

ABSTRACT We propose a set of design dimensions that constitute the axes of a taxonomy for **ambient information systems**. The dimensions are based on an investigation of a wide range of research projects and related papers. We rank 19 **ambient information systems** on ...

[Zitiert durch: 21](#) - [Ähnliche Artikel](#) - [HTML-Version](#) - [Alle 18 Versionen](#)

Ausarbeitung

Abstract

Thema und Ergebnisse der vorliegenden Arbeit (ca. 150 Worte)

Einleitung

Kontext und Ziel des Forschungsgebiets; Gliederung und Vorgehensweise (als Fließtext)

Hauptteil

Forschungsgebiet skizzieren; Historie darlegen; Unterschiedliche Ansätze gegenüberstellen und analysieren (Trends, Stärken, Schwächen...)

Zusammenfassung / Diskussion

Offenen Forschungsfragen; Mögliche Lösungsansätze?

Formal

Englisch; 6-8 Seiten; Latex Template

<http://research.microsoft.com/en-us/um/people/simonpj/papers/giving-a-talk/writing-a-paper-slides.pdf>

Wissenschaftliches Schreiben

Logische nachvollziehbarer Aufbau der Arbeit

Klarer, wertneutraler Sprachstil

Grammatik, Rechtschreibung

Vermeiden:

Ungenauere Mengenangaben (high, little, almost...)

Floskeln (z.B. Based on these and various other findings)

Füllwörter (somewhat, indeed, remarkably...)

Tautologien (LCD Display → LCD = Liquid Crystal Display)

Pseudo-Argumente (of course, as expected, without doubt)

Wissenschaftliches Schreiben

ABER:

Wissenschaftliche Arbeiten müssen nicht krampfhaft langweilig sein!

Gratwanderung!
Nicht zu flapsig.

Table 1. Top-10 list of recommendations for writing consistently boring publications.

- Avoid focus
 - Avoid originality and personality
 - Write l o n g contributions
 - Remove implications and speculations
 - Leave out illustrations
 - Omit necessary steps of reasoning
 - Use many abbreviations and terms
 - Suppress humor and flowery language
 - Degrade biology to statistics
 - Quote numerous papers for trivial statements
-

Zitieren

Plagiate (!!)

Übernahme von Texten immer als direktes (wörtlich) oder indirektes (sinngemäß) Zitat kennzeichnen

Nichtbeachtung gilt als Täuschungsversuch

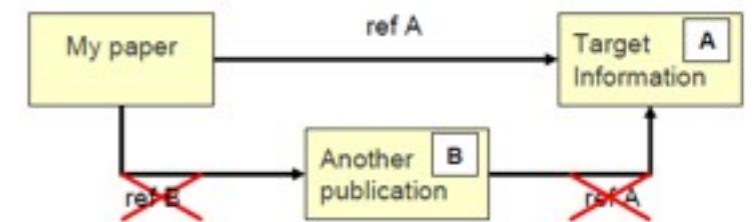
<http://www.medien.ifi.lmu.de/lehre/Plagiate-lfl.pdf>

Direkte Zitate mit Anführungszeichen

Sekundärzitate vermeiden

Zitierweise wird durch LaTeX Vorlage automatisch festgelegt

Internetquellen immer mit Autor und Datum angeben



LaTeX

Weiterentwicklung des Textsatzprogramms TeX,
einfachere Benutzung

Kein WYSIWYG

Prinzip: Trennung von Inhalt und Gestaltung

Autor kümmert sich ausschließlich um den Inhalt

Gestaltung durch Einbindung von Formatierungsklassen

Vorteile

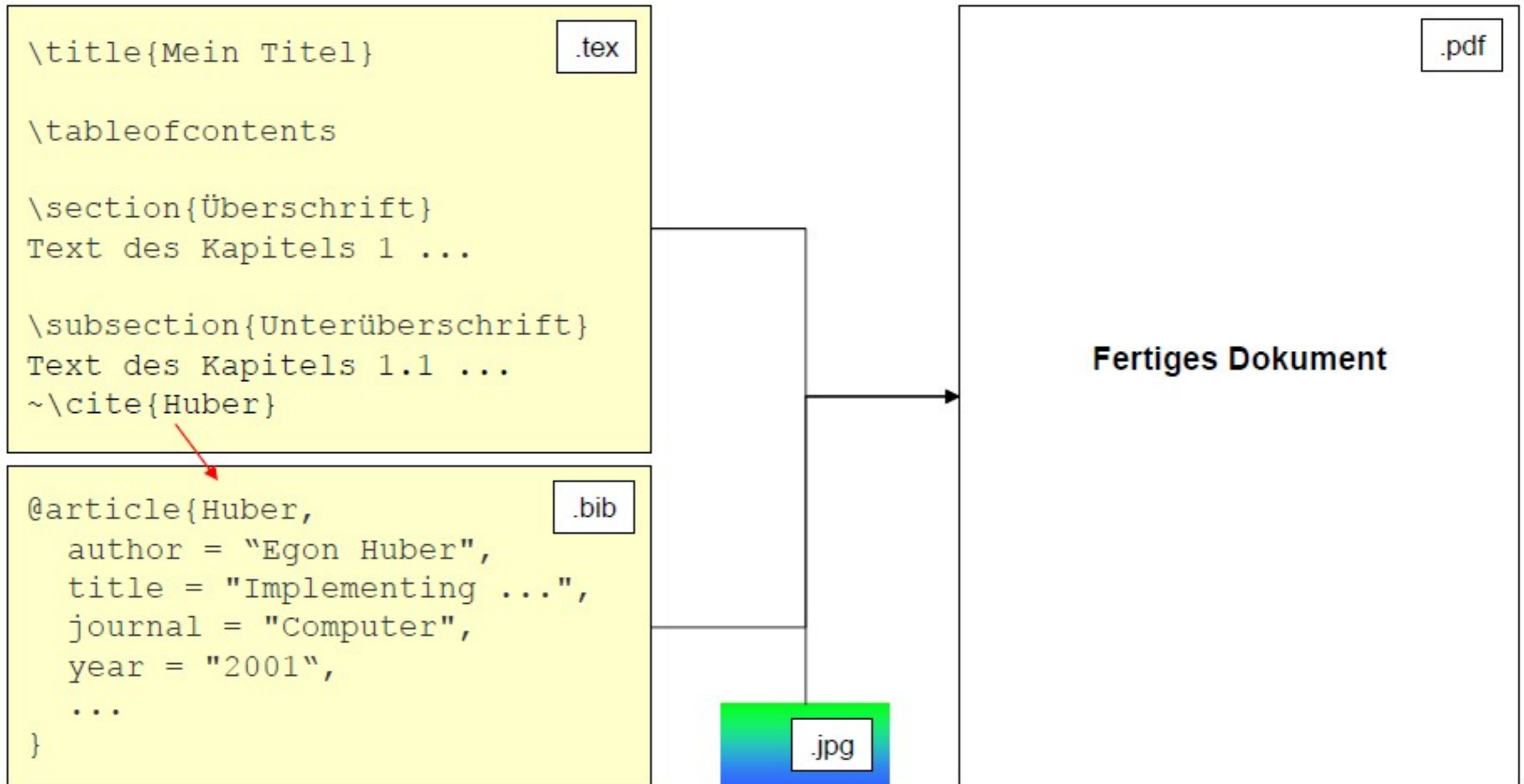
Automatische Generierung von Gliederung, Abbildungsverzeichnis, Index,
Bibliographien, etc.

Einfache Formatierung von mathematischen Formeln

Einfache Verwaltung / Einbindung von Quellenangaben

Standard für wissenschaftliche Publikationen

LaTeX



Installation

TeX Implementierung und LaTeX GUIs installieren:

Windows OS:

- MikTeX (<http://www.miktex.org>) + TeXnicCenter (<http://www.texniccenter.org/>)
- siehe auch Installation mit ProText (<http://www.tug.org/protext>)

Mac OS:

- MacTeX (<http://www.tug.org./mactex>) mit TeXShop IDE (<http://www.uoregon.edu/~koch/texshop/index.html>)
- TexMaker (<http://www.xmlmath.net/texmaker/>)

Linux:

- teTeX package (<http://www.ctan.org>) + Kile (<http://kile.sourceforge.net>)
- vorinstalliert im CIP-Pool

Download Hauptseminar LaTeX-Template

TEX und BIB Dateien mit IDE öffnen, Source anschauen und nachvollziehen

LaTeX => PDF einstellen, TEX Datei zweimal kompilieren

PDF bewundern

Text mit eigener Arbeit ersetzen

Bei Bedarf weitere LaTeX-Tutorials konsultieren

LaTeX Ressourcen

LaTeX Klassen und Dokumentationen

(Not So) Short Guide 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 LaTeX Kurzbeschreibung

<http://latex.tugraz.at/docs/l2kurz2.pdf>

Deutschsprachige FAQs

<http://www.dante.de/faq/de-tex-faq/html/de-tex-faq.html>

BibTeX-Tool und Dateiformat zur Verwaltung und Einbindung von Bibliographien

Fachliteratur-Referenzen werden online vielfach im BibTeXFormat angeboten (z.B. ACM)

How-To: <http://www.bibtex.org/Using/de>

Ubiquitous Computing

Desktop Paradigm



**„Machines that fit the human environment instead
of forcing humans to enter theirs.**











Foto: <http://www.flickr.com/photos/hnygard/4669206054/>

Ubiquitous Computing



“ Ubiquitous computing is roughly the opposite of virtual reality. Where virtual reality puts people inside a computer-generated world, ubiquitous computing forces the computer to live out here in the world with people.

- Mark Weiser, 1991

Themenvergabe

Use of Freehand Gestures for Interactions in Automobiles

Part 1

- What are gestures?
- How can gestures be used?
- Can gestures be categorized?



Part 2

- How are gestures limited while driving a car?
- Which categories of gestures make sense while driving?
- Are there scenarios in which gestures are especially helpful?



www.bmw.de

- Nehaniv, C. L.: *Classifying Types of Gesture and Inferring Intent*. In Proc. of AISB 2005.
- McNeill, D.: *Hand and Mind. What Gestures Reveal about Thought*. The University of Chicago Press. 1992.
- Zobl, M., Geiger, M., Bengler, K., & Lang, M.: *A usability study on hand gesture controlled operation of in-car devices*. In Proc. of HCI International 2001.

Interfaces for Energy Awareness

Energy Consumption Feedback

=> consume less



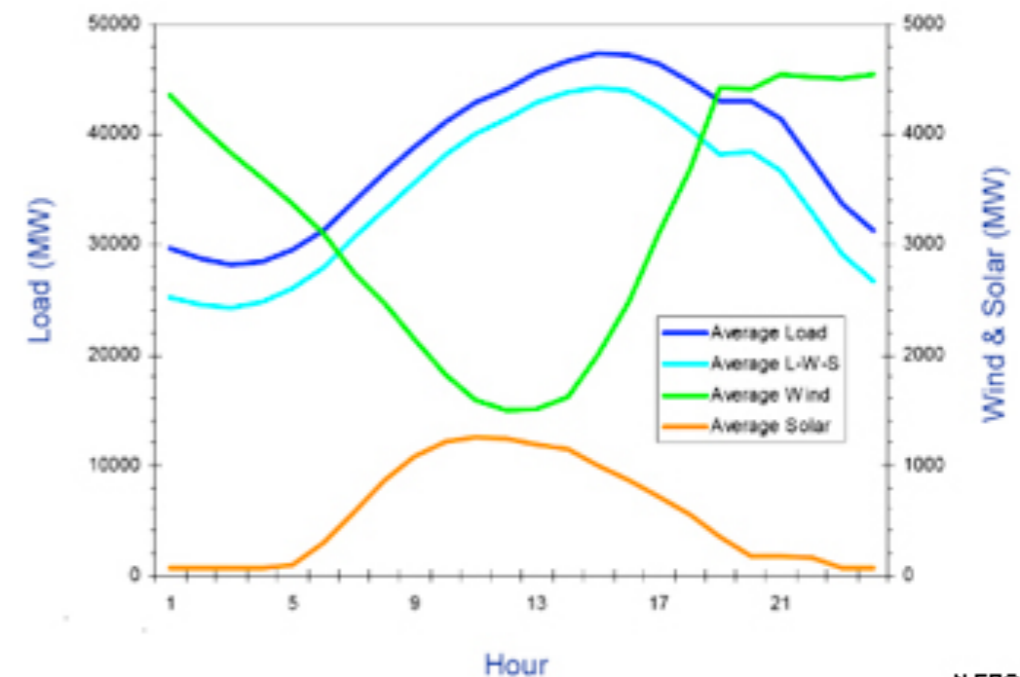
<http://thecoolgadgets.com/tio-ghost-saving-energy-while-increase-energy-awareness-of-your-kids/>



<http://inhabitat.com/power-aware-cord-by-static/>

Energy Availability Feedback

=> consume at right time



Variation in Solar & Wind Power in California
http://solarcellcentral.com/storage_page.html

NERC April, 2009



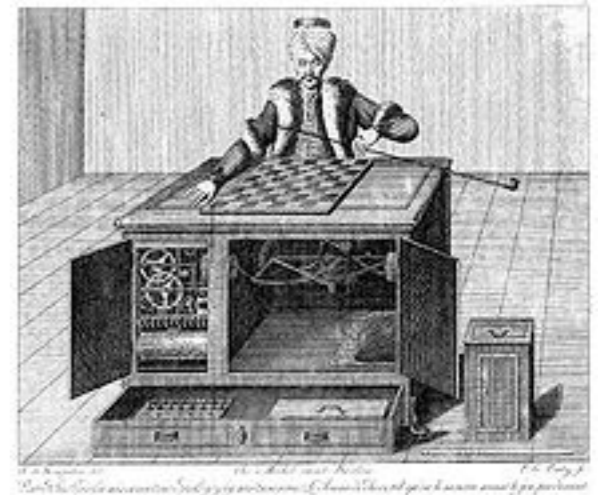
[1]

Related Work:

[1] James Pierce, Eric Paulos: *Materializing Energy*. DIS 2010

[2] Anton Gustafsson, Magnus Gyllenswärd: *The power-aware cord: energy awareness through ambient information display*. CHI EA 2005

Ubiquitous Human Computing: Programming the Mechanical Turk



- Amazon Mechanical Turk
 - outsource tasks that cannot be solved by computers to human workers
- TurKit
 - provides a scripting environment to automate task distribution
 - *crash-and-rerun* programming model allows “debugging” of programs using input from human workers
- Soylent
 - Crowd-Based Word Processing

TurKit: human computation algorithms on mechanical turk

Greg Little, Lydia B. Chilton, Max Goldman, Robert C. Miller

UIST '10: Proceedings of the 23rd annual ACM symposium on User interface software and technology

Soylent: a word processor with a crowd inside

Michael S. Bernstein, Greg Little, Robert C. Miller, Björn Hartmann, Mark S. Ackerman, David R. Karger, David Crowell, Katrina Panovich

UIST '10: Proceedings of the 23rd annual ACM symposium on User interface software and technology



Iteration 1: Lightening strike in a blue sky near a tree and a building.

Iteration 2: The image depicts a strike of fork lightning, striking a blue sky over a silhouetted building and trees. (4/5 votes)

Iteration 3: The image depicts a strike of fork lightning, against a blue sky with a few white clouds over a silhouetted building and trees. (5/5 votes)

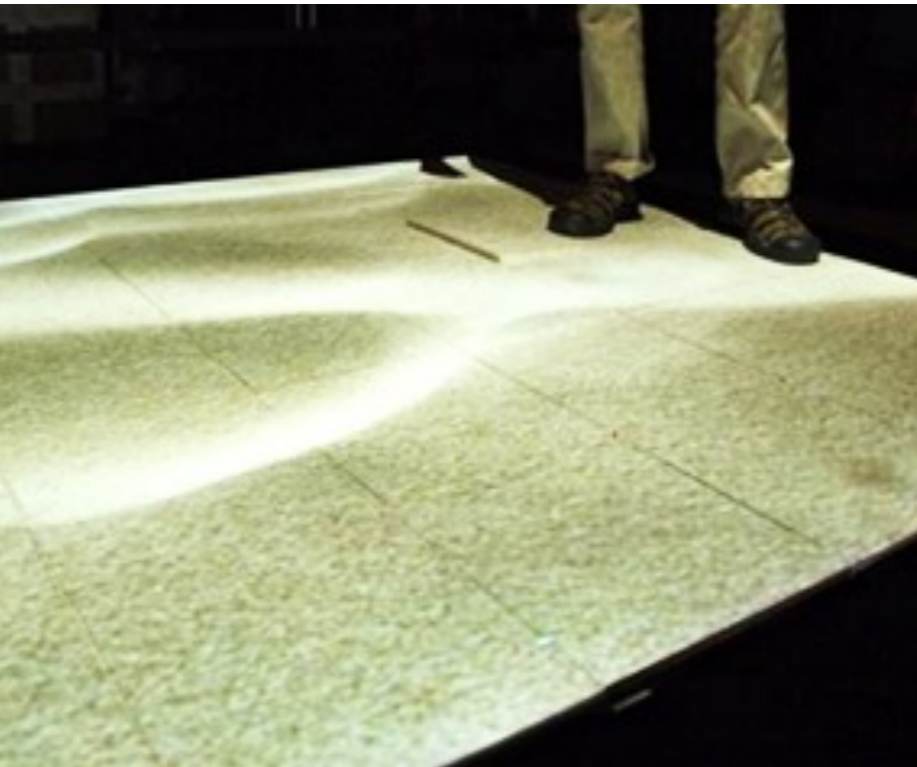
Iteration 4: ~~The image depicts a strike of fork lightning, against a blue sky~~ wonderful capture of the nature. (1/5 votes)

Iteration 5: This image shows a large white strike of lightning coming down from a blue sky with the tops of the trees and rooftop peeking from the bottom. (3/5 votes)

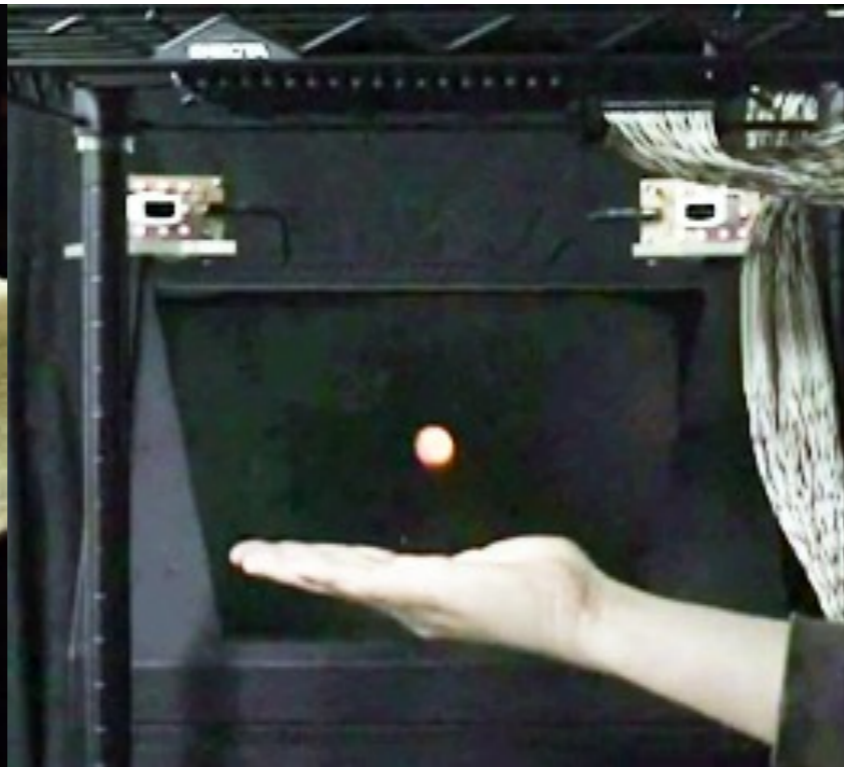
Iteration 6: This image shows a large white strike of lightning coming down from a blue sky with the silhouettes of tops of the trees and rooftop peeking from the bottom. The sky is a dark blue and the lightening is a contrasting bright white. The lightening has many arms of electricity coming off of it. (4/5 votes)

Active Haptic Environments

multimodality in ubiquitous scenarios
active exploration of environment
actuator infrastructure



<http://www.technologyreview.com/blog/editors/25114/>



<http://www.youtube.com/watch?v=Y-PIzZAcPuw>



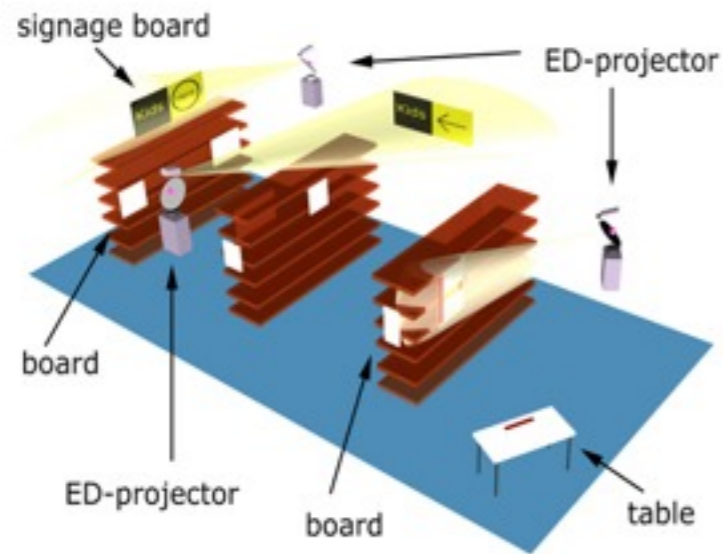
<http://www.ryerson.ca/itm/>

Systems – Technologies- Scenarios

Related Work:

- [1] Hale, K., & Stanney, K. (2004). Deriving haptic design guidelines from human physiological, psychophysical, and neurological foundations. *IEEE Computer Graphics and Applications*, 24(2), 33–39. R
- [2] Wright, A. (2011). The touchy subject of haptics. *Communications of the ACM*. Retrieved February 9, 2011
- [3] MacLean, K. E., & Hayward, V. (2008). Do It Yourself Haptics: Part II Interaction design. *IEEE Robotics and Automation Magazine*, 15(1), 104–119.
- [4] <http://ftp.rta.nato.int/public/PubFullText/RTO/TR/RTO-TR-HFM-122/TR-HFM-122-04.pdf>

Surfaces become interactive...



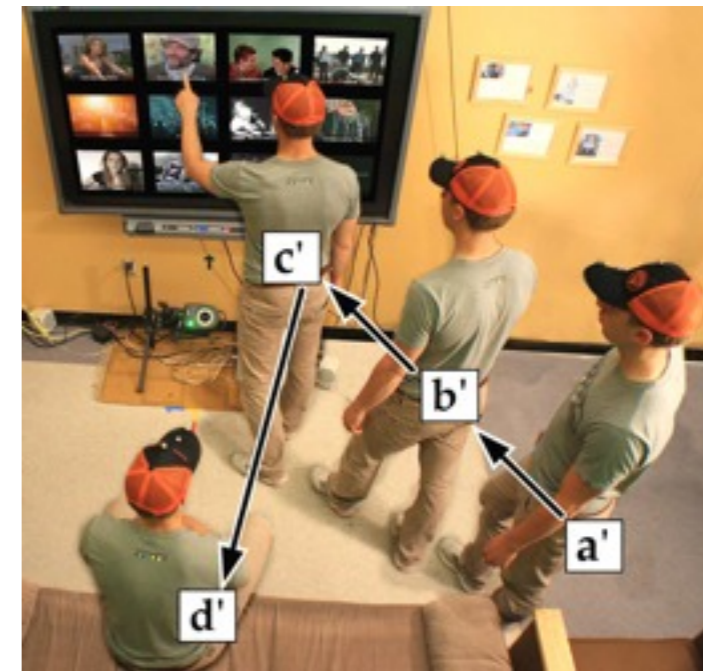
[Pinhanez et al., SIGGRAPH 2003]



[Izadi et al., UIST 2003]



[Raskar et al., SIGGRAPH 1998]



[Ballendat et al., ITS 2010]

Implicit Authentication on Mobile Devices



- We have many applications on our mobile devices that require authentication.
- But this is annoying!

How about authentication of users by actions that they carry out anyway?¹



Location-based Information



Environment / Familiarity



Behaviour



Fingerprint

¹ Jakobsson, M., Shi, E., Golle, P., and Chow, R.: Implicit Authentication for Mobile Devices. In Proc. of HotSec'09. USENIX Association (2009), 9.
² Shi, E., Niu, Y., Jakobsson, M. and Chow, R.: Implicit Authentication through Learning User Behavior. In Proc. of ISC'10. Springer (2011), 99-113.
³ Tamviruzzaman, M., Ahamed, S.H., Hasan, C.S. and O'Brien, C.: ePet: When Cellular Phone Learns to Recognize Its Owner. In Proc. of SafeConfig'09. ACM Press (2009), 13-18.

Peripheral Interaction

Real Life Scenario



Digital World



Definition: Episodic engagement [with tangibles], in which users perform fast, frequent interactions on the periphery of their workspace, to manipulate digital information which otherwise resides on the periphery of their attention [Edge, 2008]

Related Work:

[1] D. Edge, A. Blackwell: Peripheral Tangible Interaction by Analytic Design, TEI 2009

[2] S. Bakker: Talking Tangibles: Design for Peripheral Interaction, TEI 2011

Evaluation of Ambient Information Systems



Traditional Usability Evaluation

- Controlled experiments
- Error rates
- Task completion times
- ...



Ambient Information Systems

- Information in the periphery of the perception
- No designated task
- ...

Current Situation: Ambient Systems often not evaluated at all

Related Work:

[1] W. Hazlewood, K. Connelly, K. Makice, Y. Lim: Exploring Evaluation Methodes for Ambient Information Systems, CHI 2008

[2] J. Mannkoff, A. Dey, G. Hsieh, J. Kientz, S. Leder, M. Ames: Heuristic Evaluation of Ambient Displays, CHI 2003

Topics

Topic	Supervisor	Student #1	Student #2
Use of Freehand Gestures for Interactions in Automobiles	Sebastian Löhmann	Zeiser	Koelle
Energy Availability and Consumption Aware Environments	Bettina Conradi	Reitberger	Zierer
Ubiquitous Human Computing: Programming the Mechanical Turk	Sven Kratz	Hering	Bornschlegel
Active Haptic Environments	Hendrik Richter	Lamche	Tonch
Surfaces become interactive...	Fabian Hennecke	Bürger	Lins
Implicit Authentication on Mobile Devices	Alina Hang	Stockinger	Dietz
Peripheral Interaction	Doris Hausen	Nitsch	Schauer
Evaluation of Ambient Information Systems	Doris Hausen	Mang	Eumes