Designing Interactive Systems I

Introduction to the Course

Prof. Dr. Jan Borchers
Media Computing Group
RWTH Aachen University

Winter term 2017/2018

http://hci.rwth-aachen.de/dis
Who am I?

• Studied CS at Karlsruhe (& Imperial)
  • Human-Computer Interaction
• PhD CS, TU Darmstadt (& Linz, Ulm)
  • Interaction with multimedia
  • HCI design patterns
• Assistant professor at Stanford & ETH Zurich
  • Interactive rooms
  • Ubicomp user interfaces
• Full professor at RWTH since Oct. 2003
  • Interaction with audio & video
  • Wearable & Tangible UIs, Personal Fabrication, IDEs,…
Our Team

Krishna Subramanian, M. Sc.
krishna@cs.rwth-aachen.de

Paulina Reijsmeijer, M. Sc.
reijsmeijer@cs.rwth-aachen.de

They answer all your questions!

Please add this subject line to your mail: “[DIS1]”
Human–Computer Interaction?
Emergency Exit

Press on bar for 3 seconds
Door lock will release in 15 seconds

Sortie de secours

Appuyer sur la barre pendant 3 secondes
Le dispositif de verrouillage se déclenchera dans 15 secondes
Usability Sells!

- DVD Player (1996)
- iPhone (1st Q’07)
- iPad (1st 80d ’10)
What is HCI?

U1 Social Organization and Work
U2 Application Areas
U3 Human-Machine Fit and Adaptation

Use and Context

Human

H1 Human Information Processing
H2 Language, Communication and Interaction
H3 Ergonomics

Computer

C1 Input and Output Devices
C2 Dialogue Techniques
C3 Dialogue Genre
C4 Computer Graphics
C5 Dialogue Architecture

Development Process

D1 Design Approaches
D2 Implementation Techniques and Tools
D3 Evaluation Techniques
D4 Example Systems and Case Studies

ACM SIGCHI Curriculum 1992
Class Topics

Cognition
- Performance
- Models of interaction
  - Affordances
  - Mappings
  - Constraints
  - Types of knowledge
- Errors
- Design principles

History
- History of HCI
- Visions
- Phases of Technology

Design Process
- Iterative design
- User observation
- Ideation
- Prototyping
- User studies and evaluation
- Interaction design notation
<table>
<thead>
<tr>
<th>Date</th>
<th>Type</th>
<th>Content for the Studio/Lab</th>
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<tbody>
<tr>
<td>09.10.2017</td>
<td>-</td>
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<tr>
<td>11.10.2017</td>
<td>Studio</td>
<td>Introduction to the course, logistics, and introduction to S01</td>
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<tr>
<td>16.10.2017</td>
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<td><strong>A01: Fitts' Law out</strong></td>
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<td>23.10.2017</td>
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<td><strong>A01 submission &amp; discussion</strong></td>
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<td><strong>A02: Gestalt Laws, Affordances, and Signifiers out</strong></td>
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<td>30.10.2017</td>
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<td><strong>A02 submission &amp; discussion</strong></td>
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<td><strong>A03: Seven Stages of Action, Mappings, and Constraints out</strong></td>
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<td>13.11.2017</td>
<td>Lab</td>
<td>Discussion of S04, introduction to S05</td>
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<td><strong>A03 submission &amp; discussion</strong></td>
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<td>15.11.2017</td>
<td>Studio</td>
<td>Watch and critique “Objectified” (a design documentary)</td>
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Find the entire schedule on the class landing page: [http://hci.rwth-aachen.de/dis](http://hci.rwth-aachen.de/dis)
Textbooks

Required Read

The Design of Everyday Things

Recommended Read

Human–Computer Interaction
What else?
## Our Classes

<table>
<thead>
<tr>
<th>When?</th>
<th>Type</th>
<th>Credits (ECTS)</th>
<th>Name</th>
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<tbody>
<tr>
<td>SS, WS</td>
<td>P</td>
<td>7</td>
<td>The Media Computing Project</td>
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<tr>
<td>SS</td>
<td>S</td>
<td>4</td>
<td>Post-Desktop User Interfaces</td>
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<tr>
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<td>V/Ü</td>
<td>6</td>
<td>Current Topics in HCI</td>
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<tr>
<td>WS</td>
<td>V/Ü</td>
<td>6</td>
<td>iOS Application Development</td>
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<td>SS</td>
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<tr>
<td>WS</td>
<td>V/Ü</td>
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<td>Designing Interactive Systems I</td>
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<tr>
<td>WS</td>
<td>PS</td>
<td>4</td>
<td>Human-Computer Interaction</td>
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<tr>
<td>SS</td>
<td>SW-Pr</td>
<td>7</td>
<td>M3: Multimodal Media Madness</td>
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*Only for B.Sc. students*
Course: iOS Application Development

- Dates
  - **Lecture**: Tue. 09:15 – 11:45 (Room 2222)
  - **Lab**: Mon. 14:15 – 15:45 (Room 2222; max. 36 students)
- Credits: 6 ECTS
- Lecture (5 weeks) + Seminar (4 weeks) + Project (6 weeks)
  - http://hci.rwth-aachen.de/ios
iOS Application Development: Topics

• Mobile application design principles
• iOS development basics
• Swift 4
• View Controllers & Dialogs
• Input techniques
• Networking
• Multimedia
• Performance tweaking
• tvOS & watchOS
• iPad programming
PowerSocket
Smart Outlets

Florian
Tabletop Tower Defense
http://hci.rwth-aachen.de/moellers
Madgets
http://hci.rwth-aachen.de/madgets
Silhouettes at EXPO 2010, Shanghai
http://hci.rwth-aachen.de/expo
The vest has a depth camera facing forward to record

**HaptiVest**
http://hci.rwth-aachen.de/haptivest

640x480 Depth Image
• People doing strange things with electricity in Aachen

• Monthly — next meeting: Wednesday, Oct. 18, 18:30 (Room 2222)

• http://www.dorkbot.de
CocoaHeads Aachen

- CocoaHeads: International meet-ups about Apple’s Cocoa Framework for macOS and iOS
- Next local meeting: Thursday, **Oct. 26, 19:00** (Room 2222)
- [http://www.cocoaheads.de](http://www.cocoaheads.de)
DIS1: Class Structure
Flipped Classroom

• New format for DIS 1 this year

• At **Home**: Learn from videos with slides at your own pace (**2.5 h/wk**), work on group assignments and project (**6 h/wk**)

• In **Studio**: Work on group assignments and final project with one-on-one feedback (**1 h/wk**)

• In **Lab**: Discuss solutions and new assignments, in-class exercises (**1.5 h/wk**)
Credits and Grading

- Group-oriented, project-centered
- **6 ECTS Credits**
  - 15% assignments, 25% project
  - 25% midterm: **Nov. 23, 2017, 14:00–16:30** (for 60 minutes)
  - 35% final exam: **Feb. 22, 2018, 08:00–10:30** (for 60 minutes)
- To pass the course,
  - You need to pass the final exam (at least 4.0), **and**
  - Overall, you need an average grade of at least 4.0
- Further details in the lab starting on Monday, **Oct. 16, 2017** at **12:15** in **5053.2a/b**
Registering for this Class

- Limited to **100 seats** (already >135 registrations)
  - Register via Campus Office **by the end of tomorrow (Thursday)**
  - We will announce who’s in the next day (Friday)
  - DIS1 mandatory students (e.g., TK) get priority, rest will be randomized
  - B.Sc. students can take this class as elective, or for their future M.Sc. (then don’t register, send us an email!)
  - Erasmus students: Email **Paulina** (reijsmeijer@cs.rwth-aachen.de) your TIM user ID
Registering for the Final Exam

• No need to register for the midterm
• No second chance midterm (unless you have a valid reason)

• You can register for just the second chance final exam directly (not recommended)
• Deadline to register: **Friday, Nov. 24 17, 2017, 23:59** (for both final exam dates)
  • If you fail the first final exam, there will be a short period to register for the second chance
  • B.Sc. students: you won’t be registered for the second final exam automatically!
In-Class Experiment 1

• Work in pairs of 2
  • Read the paragraph handed out
  • Have your friend observe your eye movements while you’re reading
Read the text on the next slide.

Afterwards you will be asked a question about the information in the text.

Press the SPACE bar once you have finished reading the text and are ready to answer the question.
Delay: 50ms
Delay: 100ms
In-Class Experiment 2

• Digit experiment

  • Choose 5 digits secretly from your sheet, then read them to your neighbor.
  • Have her count backwards aloud from 50.
  • Have her answer some other question (like what she had for dinner 3 days ago).
  • Does she still remember the entire 5-digit sequence correctly?

• Switch roles, repeat with 9 digits.

• Finally, switching roles again, read the long sequence of numbers to your neighbor, stopping somewhere suddenly. See how many of the last numbers she can repeat immediately.
In-Class Experiment 3

1cm | Same for 0.5cm and 2cm wide strips
4cm
Tap for 10s, count taps afterwards
8cm
16cm
Tapping Task Results

• Doubling the distance adds roughly a constant to execution time
  ⇒ indicates logarithmic nature

• Doubling the target width (W) gives about same results as halving the distance (D)
  ⇒ indicates connection of D/W in formula
Summary

• HCI is about people, technology, and design.

• This class is your ticket to our other classes, cool thesis projects, and HiWi jobs.

• You’ve experienced that mathematical laws seem to govern your perception, memory, and movement—watch the videos for answers!
Class Videos are on iTunes U & L2P

Links to iTunes U for both DIS 1 and iOS Application Development are on the class landing pages.

Note: For the first week, please access videos and slides via Gigamove (link is on the class landing page).
What to Do Now

• **By end of tomorrow, register** for the course on Campus—selection results will be announced this Friday.

• Also check out other classes this week—please deregister if you’re not taking DIS 1

• **Before coming to the Lab on Monday** (Oct. 16, 12:15-13:45, 5053.2a/b):
  
  • **Watch** videos for the first week on iTunes U (see the class landing page)
  
  • **Read** Dix’ *Human-Computer Interaction*, ch. “The Human” (pp. 11–59) (see the class landing page)
  
  • **Buy** Don Norman’s *The Design of Everyday Things* (**required**)

• **Come to next Studio: Wednesday** (Oct. 18, 10:00–11:45, Room 5053.2a/b)