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?
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>
</tr>
</thead>
<tbody>
<tr>
<td>09.10.2017</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11.10.2017</td>
<td>Studio</td>
<td>Introduction to the course, logistics, and introduction to S01</td>
</tr>
<tr>
<td>16.10.2017</td>
<td>Lab</td>
<td>Discussion of S01, introduction to S02</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>A01: Fitts’ Law</strong> out</td>
</tr>
<tr>
<td>18.10.2017</td>
<td>Studio</td>
<td>Work on A01 in class</td>
</tr>
<tr>
<td>23.10.2017</td>
<td>Lab</td>
<td>Discussion of S02, introduction to S03</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>A01 submission &amp; discussion</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>A02: Gestalt Laws, Affordances, and Signifiers out</strong></td>
</tr>
<tr>
<td>25.10.2017</td>
<td>Studio</td>
<td>Work on A02 in class</td>
</tr>
<tr>
<td>30.10.2017</td>
<td>Lab</td>
<td>Discussion of S03, introduction to S04</td>
</tr>
<tr>
<td>01.11.2017</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>06.11.2017</td>
<td>Lab</td>
<td>In-class exercises</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>A02 submission &amp; discussion</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>A03: Seven Stages of Action, Mappings, and Constraints out</strong></td>
</tr>
<tr>
<td>08.11.2017</td>
<td>Studio</td>
<td>Work on A03 in class</td>
</tr>
<tr>
<td>13.11.2017</td>
<td>Lab</td>
<td>Discussion of S04, introduction to S05</td>
</tr>
<tr>
<td>15.11.2017</td>
<td>Studio</td>
<td>Watch and critique “Objectified” (a design documentary)</td>
</tr>
</tbody>
</table>

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
Don Norman

Recommended Read

Human–Computer Interaction
Alan Dix, Janet Finlay, Gregory D. Abowd, Russell Beale
What else?
## Our Classes

<table>
<thead>
<tr>
<th>When?</th>
<th>Type</th>
<th>Credits (ECTS)</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS, WS</td>
<td>P</td>
<td>7</td>
<td>The Media Computing Project</td>
</tr>
<tr>
<td>SS</td>
<td>S</td>
<td>4</td>
<td>Post-Desktop User Interfaces</td>
</tr>
<tr>
<td>SS</td>
<td>V/Ü</td>
<td>6</td>
<td>Current Topics in HCI</td>
</tr>
<tr>
<td>WS</td>
<td>V/Ü</td>
<td>6</td>
<td>iOS Application Development</td>
</tr>
<tr>
<td>SS</td>
<td>V/Ü</td>
<td>6</td>
<td>Designing Interactive Systems II</td>
</tr>
<tr>
<td>WS</td>
<td>V/Ü</td>
<td>6</td>
<td>Designing Interactive Systems I</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Only for B.Sc. students</td>
</tr>
<tr>
<td>WS</td>
<td>PS</td>
<td>4</td>
<td>Human-Computer Interaction</td>
</tr>
<tr>
<td>SS</td>
<td>SW-Pr</td>
<td>7</td>
<td>M3: Multimodal Media Madness</td>
</tr>
</tbody>
</table>
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/iphone](http://hci.rwth-aachen.de/iphone)
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
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
• People doing strange things with electricity in Aachen

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

• [http://www.dorkbot.de](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** (rejsmeijer@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: 0ms
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

<table>
<thead>
<tr>
<th>1cm</th>
<th>4cm</th>
<th>Same for 0.5cm and 2cm wide strips</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Tap for 10s, count taps afterwards</td>
</tr>
<tr>
<td>8cm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16cm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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)