Designing User Interfaces – a Recap

TIE-13100

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Contents

- UI design: some principles and aspects to consider
- Methods for UI & system design
- Standards, styleguides and other tools
Visibility and feedback

- Make all needed options for a given task **visible**, however **without distracting** the user with too much information
  - Communicate the **affordances** and the outcome of using them
  - Natural links between controls and outcomes
  - *Designed elements should look like how they behave*

- Keep **users informed** of actions, changes of state or condition, and errors or exceptions that are relevant to the user
  - Clear, concise, and unambiguous language familiar to users
  - Consider different sensory modalities
Visibility
All functions vs. main functions

Simplicity

• Make frequent tasks as simple as possible
  – Design them first & minimize the interactions
  – Also: language, visual decorations, instructions...

• Does the user really need this?
  – “Everything should be made as simple as possible, but not simpler”
    – Albert Einstein
  – Helps prioritizing the implemented features
  – Good examples of bad design: http://www.baddesigns.com/

• Consider the visual “signal-noise ratio”

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Consistency

- Language and layout are just a few interface elements that need consistency. Also consider:
  - ...shortcuts, error handling & confirmations, navigation, information visualization
  - ...conceptual model, used metaphors
  - ...data formats, platform standards, earlier versions of the product (or similar), ...
  - **Internal & external consistency**

- Consistency leads to predictability
Forgiveness & error recovery

- People will make mistakes
- Helping prevent errors and minimize the negative consequences
  - Confirmations of critical actions
  - Undo/redo
  - Use your error messages as a teaching situation: show what action was wrong, and ensure that she/he knows how to prevent the error from occurring again
  - A clearly marked "emergency exit" to leave the unwanted state
Focus on user’s action

Help the users do their tasks
- Great design is transparent: focus on the action rather than the interface
- Recognition rather than recall: learnability and memorizability
- Reduce memory load
- The user will probably do something if he is asked to do it
- The user will be more inclined to perform a complex action if it’s broken down into smaller steps

http://99designs.com/designer-blog/2014/01/15/7-unbreakable-laws-of-user-interface-design/
The structure principle

- Organize the user interface purposefully, based on clear and consistent models that are apparent and recognizable to users
  - Put related things together and separate unrelated things
  - The structure principle is concerned with overall user interface architecture

- E.g. the Gestalt Principles of Grouping

- Proximity
- Similarity
- Continuity
- Closure
- Area
- Symmetry
- Common fate
And most importantly:

**Know your user and his/her context!**

- Any of the previous can be radically affected by
  - The user’s characteristics, skills and knowledge
  - Habits, norms and organizational rules
  - The physical and social environment
  - Tasks, goals and general needs & values

- Search for specific principles about designing for children, handicapped users, elderly, specific work contexts etc.
  - Also PC vs. mobile, leisure vs. work etc.
Common Interactive Tasks
What to at least support in your UIs

- Overview
  - Get an overview of the collection

- Zoom
  - Zoom in on items of interest

- Filter
  - Remove uninteresting items

- Details on demand
  - Select items and get details

- Relate
  - View relationships between items

- History
  - Keep a history of actions for undo, replay, refinement

- Extract
  - Make subcollections
More about how to design usable and pleasurable UIs

- Nielsen’s 10 usability heuristics:

- Norman’s design principles:
  - Visibility, Feedback, Consistency, Mapping, Affordances...

- Shneiderman’s 8 golden rules
  - E.g. enable shortcuts, simple error handling, reduce memory-load
  - [http://faculty.washington.edu/jtenenbg/courses/360/f04/sessions/shneidermanGoldenRules.html](http://faculty.washington.edu/jtenenbg/courses/360/f04/sessions/shneidermanGoldenRules.html)

- Use of colors:
  - Marcus Aaron: Graphic Design for Electronic Documents and User Interfaces

- ISO standard 9241-10: *Ergonomic requirements for office work with visual display terminals (VDTs) -- Part 10: Dialogue principles*
Methods for UI- & system design

Conceptual model [käsitemalli]

Before detailed UI-design, investigate:

1. What the users know and understand + what they (would) do with the system
2. Main concepts and their interrelations
3. Terms, objects
4. Functions with which to handle these

Create a conceptual model based on this:

- A basis for the product specification
- Hierarchies and abstraction levels
- Various ways to describe: sequential models, interaction models, mind maps, flow models
- Also helps in creating the software architecture and class models
Modeling the sequences & workflows

• In addition to identifying what concepts there are, you need to understand the workflow (processes, sequences)
  – What are the activities that the system should support and who are doing them?
  – How does a specific task proceed with our system?

• Can be identified from, e.g.:
  – The conceptual model
  – Customer / user requirements
  – OR designed based on abstract design goals/reqs

• A wide array of models and notations exist!
User stories, scenarios, storyboards

**User story:**

Actor: NHP member

Goal: Execute a search that displays, on a map, the areas where the species overlap with highly ranked invasive species.

Sequence models

**Sequence model 1:**

- Trigger: School of Education Admission to Graduation Process
- Undergraduates complete Early Field Experience
- Students apply for Student Teaching
- Student is eligible for student teaching
- Student is not eligible for teaching
- Student completes requirements

**Sequence model 2:**

- Trigger: Communication to student on their status
- Is placed in school for student teaching semester
- Student completes requirements

Use case diagrams

**Use case 1:**

- Manage User Groups (abstract)
- Manage Users (abstract)
- Manage User Sessions (abstract)
- Manage Logs (abstract)

**Use case 2:**

- Admin Website
- Website Administrator
- Help Desk

UML sequence diagrams

- Customer
- Dinner Now System
- Restaurant

**Sequence diagram 1:**

- Loop: [until complete]
- Add Order Item
- Confirm Order
- Send Order
- Payment detail
- OK
- OK
- OK
- OK
- OK
- OK
- OK
- OK
- Process Paym

**Sequence diagram 2:**

- Trigger: Students are admitted into SOE programs
- Undergraduates complete Early Field Experience
- Students apply for Student Teaching
- Student is eligible for student teaching
- Student is not eligible for teaching
- Student completes requirements
Methods for UI-design

Navigation model / View map

- Displays different views/states and transitions between them
- Describes the big picture; leave the details for later
- Remember the workflows → optimize the structure to support them
Methods for UI-design
UED model

- UED: User Environment Design
- A model from Contextual Design
  "ground plan of the UI"
  - Views/states/places and links between them
  - Different activities, links and information in each of them
UED’s simple notation
A simple example from an e-mail application

1. Manage inbox
- Manage the message
  Functions
  - Notification about a new message
  - Print
  - Show status
  - Sort messages
  - Delete
  - Give attributes
  Links
  - Read message
  - Create message/reply

2. Read message
- See the contents of the message
  Functions
  - View
  - Comment
  - Delete
  - Read next message
  - Open attachment
  Links
  - Reply
  - Forward

Objects
- Message
- Person
- Person details
- Group

3. Address book
- Maintain a list of frequently contacted persons
  Functions
  - Browse the addresses
  - Add a person
  - Add person details and addresses
  - Add and maintain groups
  Links
  - Send email to a person or a group

Objects
- Message

4. Create a message
- Create a new message
  Functions
  - Edit text content
  - Choose respondent
  - Add attachments
  Links
  - Add recipient to address book
  - Browse files to attach

Objects
- Message
- Other recipients
- Subject
- Message text
- Attachments
UED-models

- UED is based on earlier, less detailed plans and aim at specifying the structure of the system

- However, does not yet go to details (e.g. placement of UI elements, graphics, detailed terminology)
  - Makes sense to identify problems or missing/excess actions as early as possible
  - Focus on the workflow, simplicity of the overall system

- After this, wireframes and view templates should be designed
  - Feel free to apply the different methods and phases case by case
UI templates

- Creating templates for views:
  - first fixing the stable parts
  - placing the functions, objects and links to the screens and sketching the overview
  - Identifying common elements in different views → templates
  - More detailed than UED, however the amount of detail depends on the case...
  - ... and the tools available
  - Remember to follow standards and guidelines

Don’t start planning the UI views before you know the main functions!
Designing individual views – wireframes

- When templates are ready
  ➔ detailed design of individual views
- Wireframes = sketches of individual views
- Helps maintaining consistency
  - Also helps later adding new functions and views
- Now, at the latest, is the time to review general UI design principles
- ...and call the graphical designer and your software architect
  - ➔ also the first prototype tests
And then what?

- Detailed design of
  - Visual “looks”: colors, icons, symbols, typography...
  - Terminology
  - Audio elements, animations, other outputs
  - Menus, configurations
  - Error handling and error messages
  - User guide and other guidance

+ design of many other things that cannot be covered in one lecture
+ evaluation of how the design supports the design targets & requirements (validation & verification)

Constant iteration and refinement, as usual
Reuse

• Feel free to reuse internal and external components and behaviors
  – Reduce the need for users to rethink and remember
  – UI design patterns – make users feel like at home
  – Norms in user manuals

"Consider legacy not only in coding but also in design"
Standards, style guides, guidelines, links

- **Standards:** e.g. ISO, ITU, W3C
  - More often help in technical design, not much help in concept design

- **Platform-specific style guides, e.g.:**
  - Google: [http://googlesystem.blogspot.com/2008/03/googles-design-guidelines.html](http://googlesystem.blogspot.com/2008/03/googles-design-guidelines.html)
  - W3C mobile web: [http://www.w3.org/Mobile/](http://www.w3.org/Mobile/)

- **Other aspects about which there are guidelines:**
  - Specific input/output techniques, multimodal interfaces
  - Mobile & ubicomp (e.g. smart environments, context-awareness)
  - Social media & online communities, privacy, personal information management
  - Special user groups, accessibility
  - Internationalization & localization, culture-specific guidelines
Design guidelines and style guides
What aspects are often defined

• Visual structure and style
  – Placeholders for graphics / text
  – Heading and text styles
  – Graphical design principles, color palettes
  – Remember also general design principles about colors

• Consistency in different views/pages

• Typography
  – Usually: sans serif for displays; aligning text

• NB! The customer might have their own restrictions or guidelines
Some references
(might be outdated…)

- Style guides (and other general guides):
  - About Face: The Essentials of User Interface Design, Alan Cooper. IDG Books
  - GUI Design for Dummies, Laura Arlov. IDG Books

- WWW-style guides:

- Other miscellaneous links
  - http://www.usability.gov/guidelines/
  - http://www.mobilexweb.com/blog/guidelines-mobile-web-design
Tools for UI design & prototyping

- Free wireframing and prototyping tools that are “good enough” for this course

- For mobile:
  http://www.developer.nokia.com/Resources/Tools_and_downloads/Other/Flowella/

- + commercial options:
  - Photoshop/Illustrator etc. Adobe products
  - Flash Catalyst (Adobe)
  - MS Visio, MS Powerpoint & the same in OpenOffice / MacOS
  - Design tools as part of IDE’s (Eclipse, MS Visual Studio etc.)
  - Axure RP Pro: http://www.youtube.com/watch?v=pjUeWOB-9RY
  - Silverback for recording a desktop session: http://silverbackapp.com/

- Also, HTML5 is rather easy to prototype with...