ADVANCED DESIGN OF INTERACTIVE SYSTEMS

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LECTURES & TOPICS

1

Introduction

Introduction of Goals and Topic

Exercise: DOIS Quiz & Choose groups

Homework: Story Interviews

2

Understanding Humans

Understand underlying cognitive effects:

Alignment, Theory of Mind, Mental Models

Exercise: Concept Development

Homework: Initial Design

3

Agency in HAI

Explainability, Ironies of Automation

How to design for Error, Feedback and Control?

Exercise: Build Prototype

Homework: Storyboard

4

Iterating on Design

Socio-Technical Systems

Exercise: Prototype + Generative Walkthrough

Homework: Revise Concept

5

Evaluating interactive systems

Overview of evaluation methods

Exercise: Revise Prototype

Homework: Evaluation protocol

6

Reflection on HAI

Social, legal, sustainability impact of AI

Discuss the role of designers for HAI interaction

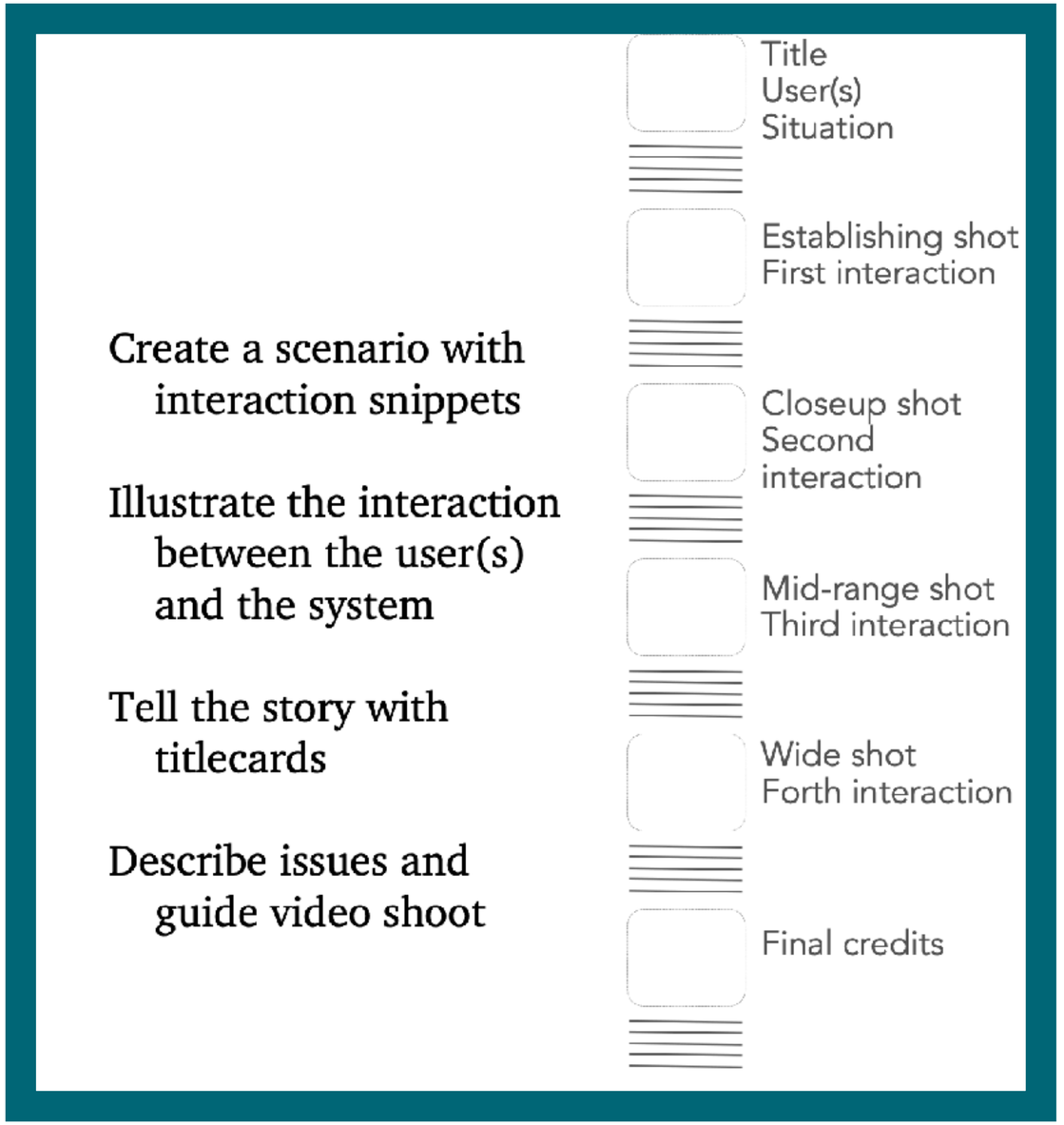
Exercise: Poster, Presentation

FINISH

STORYBOARD ___

Make a Storyboard:

- Develop a final scenario showing **a common task**
- Note down the interactions in the scenario
- It should show the **whole interaction process**
- Outline a storyboard for the first video prototype
- If several ways of interaction are possible, show them



EXERCISE

PROTOTYPING

- Translate your Storyboard into a paper prototype
- Consider how a user would interact with it
- Aim for consistency — in interaction and layout
- Consider feedback and error notifications
- Does the user feel in control?

REFLECT

How the user can express and control this expression with the system?
How the system can provide useful feedback ?
What happens when errors appear?

EXERCISE

VIDEO PROTOTYPE

- Shoot a 3-5 minute video
- This is not a “how-to” video
- One user is conducting the whole task
- Reveal how your system works by showing how your target user interacts with it
- Use title cards to help the viewer understand the task and user intention
- If you make a mistake, delete and reshoot

SOCIO-TECHNICAL PRINCIPLES

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1. Rhythms & Routines
2. Selective Attention
3. Situated Action
4. Distributed Cognition
5. Reciprocal Co-adaptation
6. Upskill users
7. Explainability

1 Rhythms & Routines

SOCIO-TECHNICAL PRINCIPLES

How can we help users take advantage of existing rhythms and routines?

- People are strongly influenced by biological rhythms (Waking or eating time)
  - Temporal rhythms
- People also establish regular routines (habits)
  - Spatial rhythms

Lena Palen & Stinne Aaløkke, 2006

1. Rhythms & Routines
2. Selective Attention

SOCIO-TECHNICAL PRINCIPLES

Human perception involves both focused and peripheral vision

Most interactive system designers assume they have the user's full attention but users multi-task and live in a complex world

How can we design using the periphery, e.g. to track progress, without distracting users?

Michael Posner, 1988

1. Rhythms & Routines
2. Selective Attention
3. Situated Action

SOCIO-TECHNICAL PRINCIPLES

Design user interfaces that give users the flexibility to adapt their plans as the context changes

Emergent action

- Identify which actions emerge when the user is in a specific situation
- Consider relevant properties of the object or the environment

Lucy Suchman, 1986

1. Rhythms & Routines
2. Selective Attention
3. Situated Action
4. Distributed Cognition

SOCIO-TECHNICAL PRINCIPLES

Not all cognition is located in the brain

We take advantage of the physical environment and other people

- Memory aid (Writing it down lets us forget until we need it)
- Boundary object (Different people interpret objects differently)

Ed Hutchins, 1995

SOCIO-TECHNICAL PRINCIPLES

How can we make interactive systems easier to learn and easier to appropriate?

- Designers assume users will use systems “correctly”
- Users adapt systems to meet personal needs
- Enable systems to adapt to personal needs

5 Reciprocal Co-adaptation

Mackay, 2000
Beaudouin-Lafon et al., 2022

Automation increases efficiency and lowers costs, but it also deskills workers, who lose valuable skills from their daily work.

Upskilling (and Reskilling) instead of Deskilling:

- Allow users to make central decisions with the help of systems
- Support skill learning if the skill is central to the task
- Enable development of new skills using the system

Rafner et al., 2021

5 Reciprocal Co-adaptation

6 Upskill users

SOCIO-TECHNICAL PRINCIPLES

Explainability is crucial to support understanding and alignment in human-AI interactions.

- Provide enough information for the user to predict the system reaction
- Support users to interpret system feedback
- Provide enough information for the user to act upon the system reaction

5 Reciprocal Co-adaptation

6 Upskill users

7 Explainability

RECAP

GENERATIVE WALKTHROUGH

Generative Walkthrough is a systematic:

a) critique of a design artifact;

b) brainstorming to generate new ideas

How to:

1. Look at each interaction snippet in the video
2. Identify what works and what doesn't and reflect on:
    1. Do you understand the interaction (mental model of the user)?
    2. Does it follow the socio-technical principles
    3. Does it follow the 8 golden rules of design?
3. Brainstorm new ways to apply these principles/ rules if relevant.

EXERCISE

GENERATIVE WALKTHROUGH

For each interaction (snippet): Analyze, critique, then generate ideas

Three roles:

Moderator: Shows video, stops discussion

Scribe: Takes notes

Everyone: Contribute!

HOMEWORK

PREPARE REDESIGN ___

- Reassess your **users**
- Reassess your **ideas**
- Reassess your **design**
- Reassess your **system**

1) Gen. Walkthrough results:

- Summarize in an overview 1) interaction, 2) identified problem, 3) feedback/suggestion
- Make a list and provide improvements for each

2) Prepare Redesign: Reflect on your designs and consider context!

Decide on **at least** 3 new interaction snippets informed by the walkthrough to integrate!

Adapt your future scenario accordingly:

- Is it an interactive tool?
- How does your concept empower the user?
- What are the advantages and disadvantages of using your tool?
- Maybe consider potential other users - how would it change the interaction?

UNDERSTANDING SYSTEM IMPACT ___

Consider the impact on the user

- How does the user interact with the AI?
- Does it “deskill” the user over time?

Consider errors

- What happens when the AI is not correct?
- Is the user aware of AI errors?

Can the user correct the errors easily?

- Do not assume the system fully understands user needs
- Design for real-world interaction and errors

HOMEWORK

REDESIGN ___

3) Technological Feasibility:

- Look at your baseline system/AI—would it support your use case?
- Go through your user interaction:
  - What do you need to translate to the system/user?
  - What other information would you need to collect or present?
- Make a list and suggest technical solutions.

4) Update your prototype based on these insights:

- Paper prototype
- Interactive prototype (optional)

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