User Experience Design I
(Interaction Design)
Day 9 - (20.01.2022 9-12 a.m.)

Interaction Beyond the Desktop
Shareable, Tangible and Embodied Interactions
Lecture Overview:

III UX Beyond the Desktop

First Part

Second Part

Third Part
This lecture is focusing on four types of interaction “beyond the desktop”:

- (1) Shareable interfaces
- (2) Wearable interfaces
- (3) Robotic interfaces
- ...

Tangible, Embedded and Embodied Interaction (TEI)
(1) Shareable interfaces

• Shareable interfaces are designed for more than one person to use
  • provide multiple inputs and sometimes allow simultaneous input by co-located groups
  • large wall displays where people use their own pens or gestures
  • interactive tabletops where small groups interact with information using their fingertips

source: [8]
Advantages

• Provide a large interactional space that can support flexible group working
• Can be used by multiple users
  • can point to and touch information being displayed
  • simultaneously view the interactions and have same shared point of reference as others
• Can support more equitable participation compared with groups using single Laptops/Mobile Devices

source: [8]
Research and design issues

• More fluid and direct styles of interaction involving freehand gestures
• Core design concerns include whether size, orientation, and shape of the display have an effect on collaboration
• Horizontal surfaces compared with vertical ones support more turn-taking and collaborative working in co-located groups
• Providing larger-sized tabletops/displays does not improve group working but encourages more division of labor
(2) Tangible interfaces (TUI)

- Type of sensor-based interaction, where physical objects, e.g., bricks, are coupled with digital representations
- When a person manipulates the physical object/s it causes a digital effect to occur, e.g. an animation
- Digital effects can take place in a number of media and places or can be embedded in the physical object

source: [8]
SIMON & IMOGEN'S HOUSE
**Urp**

- physical models of buildings moved around on tabletop
- used in combination with tokens for wind and shadows -> digital shadows surrounding them to change over time
Benefits

- Can be held in both hands and combined and manipulated in ways not possible using other interfaces
  - allows for more than one person to explore the interface together
  - objects can be placed on top of each other, beside each other, and inside each other
- encourages different ways of representing and exploring a problem space
- People are able to see and understand situations differently
  - can lead to greater insight, learning, and problem-solving than with other kinds of interfaces
- can facilitate creativity and reflection

source: [8]
Research and design issues

- Develop new conceptual frameworks that identify novel and specific features
- The kind of coupling to use between the physical action and digital effect
  - If it is to support learning then an explicit mapping between action and effect is critical
  - If it is for entertainment then can be better to design it to be more implicit and unexpected
- What kind of physical artefact to use
  - Bricks, cubes, and other component sets are most commonly used because of flexibility and simplicity
  - Stickies and cardboard tokens can also be used for placing material onto a surface

source: [8]
(2) Wearable interfaces

- First developments were head- and eyewear-mounted cameras that enabled users to record what they saw and to access digital information.
- Since then, jewelry, head-mounted caps, smart fabrics, glasses, shoes, and jackets have all been used.
  - To provide users with a means of interacting with digital information while on the move.
- Applications include automatic diaries and tour guides.

source: [8]
"If history is any indication, we should assume that any technology that is going to have a significant impact over the next 10 years is already 10 years old!"

Bill Buxton
Steve Mann - pioneer of wearables

Steve Mann’s "wearable computer" and "reality mediator" inventions of the 1970s have evolved into what looks like ordinary eyeglasses.
Research and design issues

• **Comfort**
  • needs to be light, small, not get in the way, fashionable, and preferably hidden in the clothing

• **Hygiene**
  • is it possible to wash or clean the clothing once worn?

• **Ease of wear**
  • how easy is it to remove the electronic gadgetry and replace it?

• **Usability**
  • how does the user control the devices that are embedded in the clothing?

source: [8]
(3) Robotic interfaces

Five types

• remote robots used in hazardous settings
• domestic robots helping around the house
• delivery and city cleaning
• pet robots as human companions
• sociable robots that work collaboratively with humans, and communicate and socialize with them – as if they were our peers
Research and design issues

• How do humans react to physical robots designed to exhibit behaviours (e.g., making facial expressions) compared with virtual ones?

• Should robots be designed to be human-like or look like and behave like robots that serve a clearly defined purpose?

• Should the interaction be designed to enable people to interact with the robot as if it was another human being or more human-computer-like (e.g., pressing buttons to issue commands)?

source: [8]
Summary: Which interface?

• Is multimedia better than tangible interfaces for learning?
• Is speech as effective as a command-based interface?
• Is a multimodal interface more effective than a monomodal interface?
• Will wearable interfaces be better than mobile interfaces for helping people find information in foreign cities?
• Are virtual environments the ultimate interface for playing games?
• Will shareable interfaces be better at supporting communication and collaboration compared with using networked desktop PCs?

source: [8]
Summary: Which interface?

- Will depend on task, users, context, cost, robustness, etc.
- Much system development will continue for the PC platform, using advanced GUIs, in the form of multimedia, web-based interfaces, and virtual 3D environments
  - Increasing number of applications and software toolkits available
  - Speech interfaces also being used much more for a variety of commercial services
- **Appliance and vehicle interfaces becoming more important**
  - Shareable and tangible interfaces entering our homes, schools, public places, and workplaces

source: [8]
General Summary

• Many innovative interfaces have emerged post the WIMP/GUI era, including speech, wearable, mobile, VR/AR and tangible UI’s

• Many new design and research questions need to be considered to decide which one to use

• Web interfaces are becoming more like multimedia-based interfaces

• An important concern that underlies the design of any kind of interface is how information is represented to the user so they can carry out ongoing activity or task
References: