

User Experience Design I (Interaction Design)

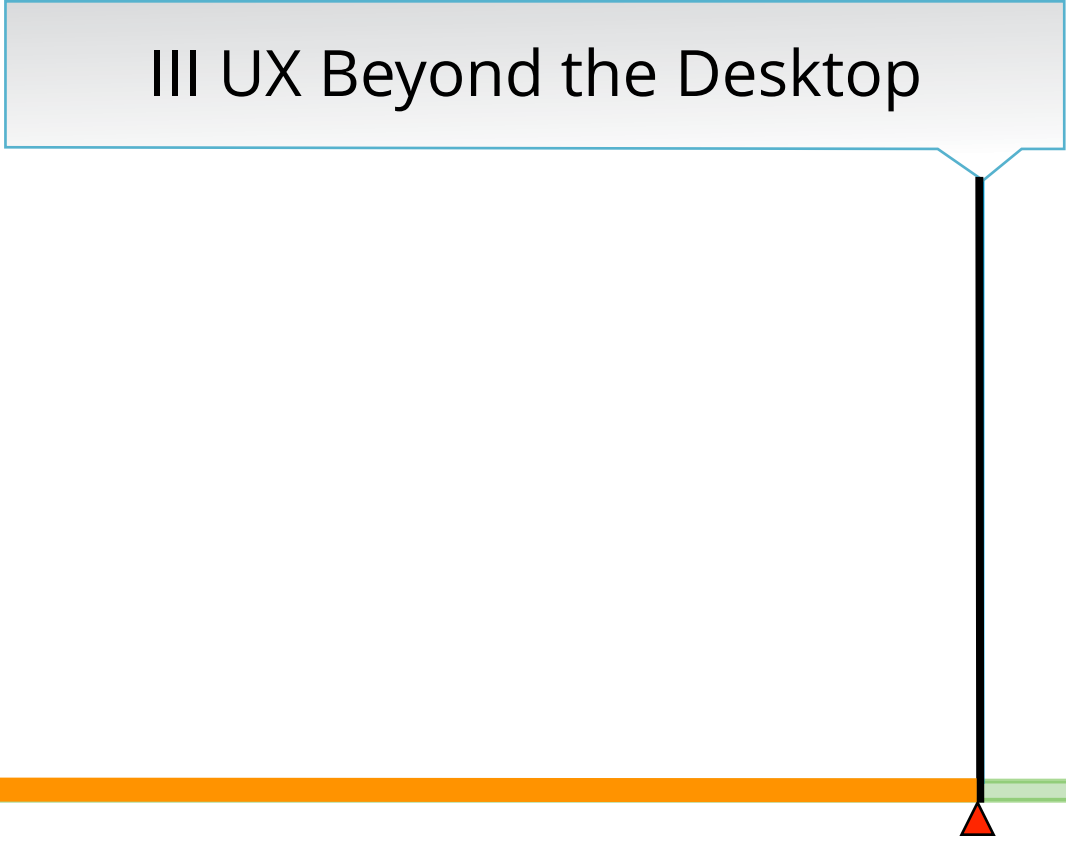
Day 9 - (20.01.2022 9-12 a.m.)

Interaction Beyond the Desktop

Shareable, Tangible and Embodied Interactions

Lecture Overview:

III UX Beyond the Desktop



The diagram consists of a horizontal bar at the bottom divided into three segments: a grey segment on the left labeled 'First Part', a green segment in the middle labeled 'Second Part', and an orange segment on the right labeled 'Third Part'. A vertical black line with a red triangle at its base points from the orange segment up to a grey callout box containing the text '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)

source: [8]

(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

Saint Luke's Hospital OF KANSAS CITY



<https://float4.com/en/projects/saint-lukes-hospital-media-wall/>

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

source: [8]

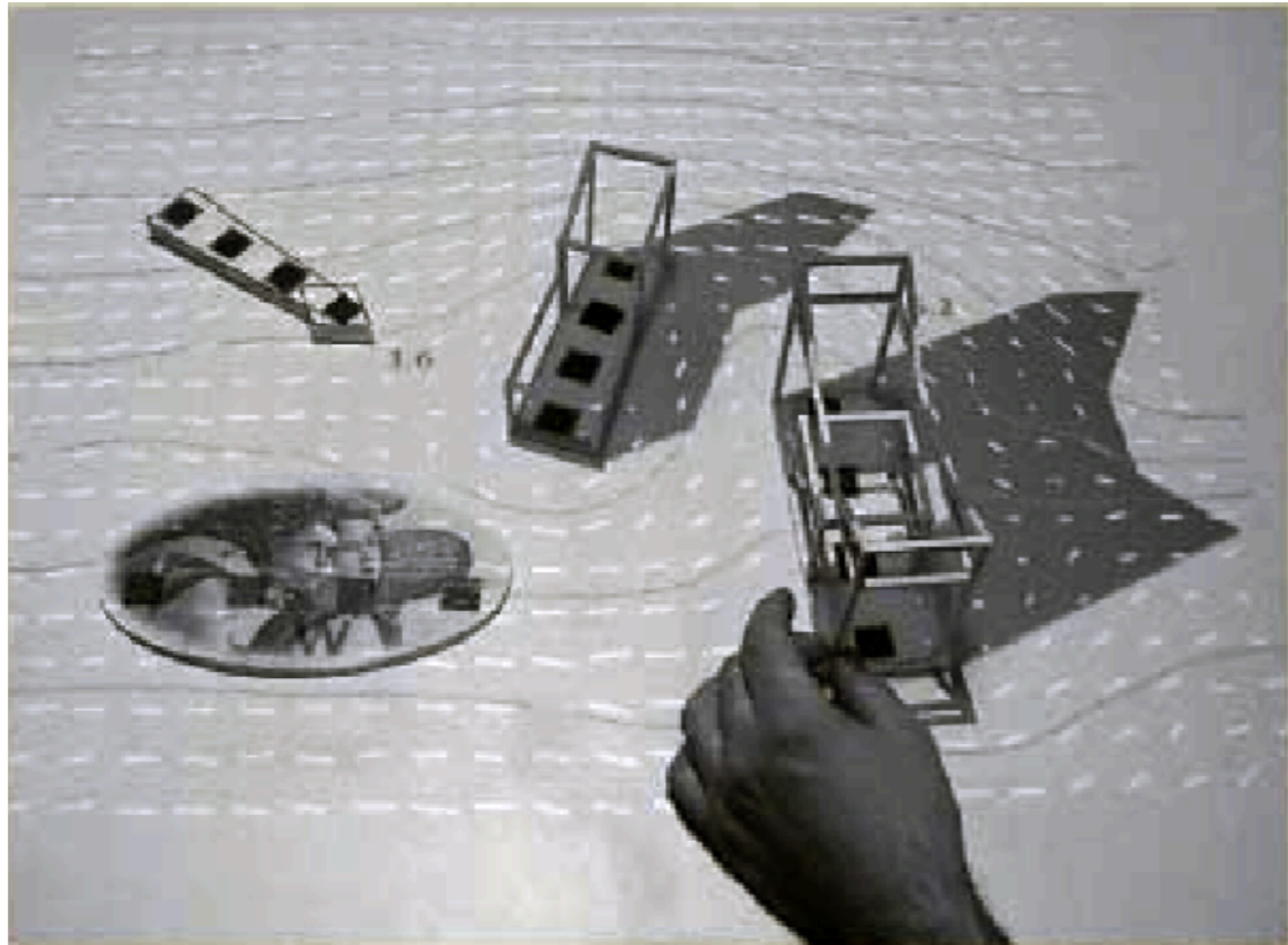
(2) Tangible interfaces (TUI)

- 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

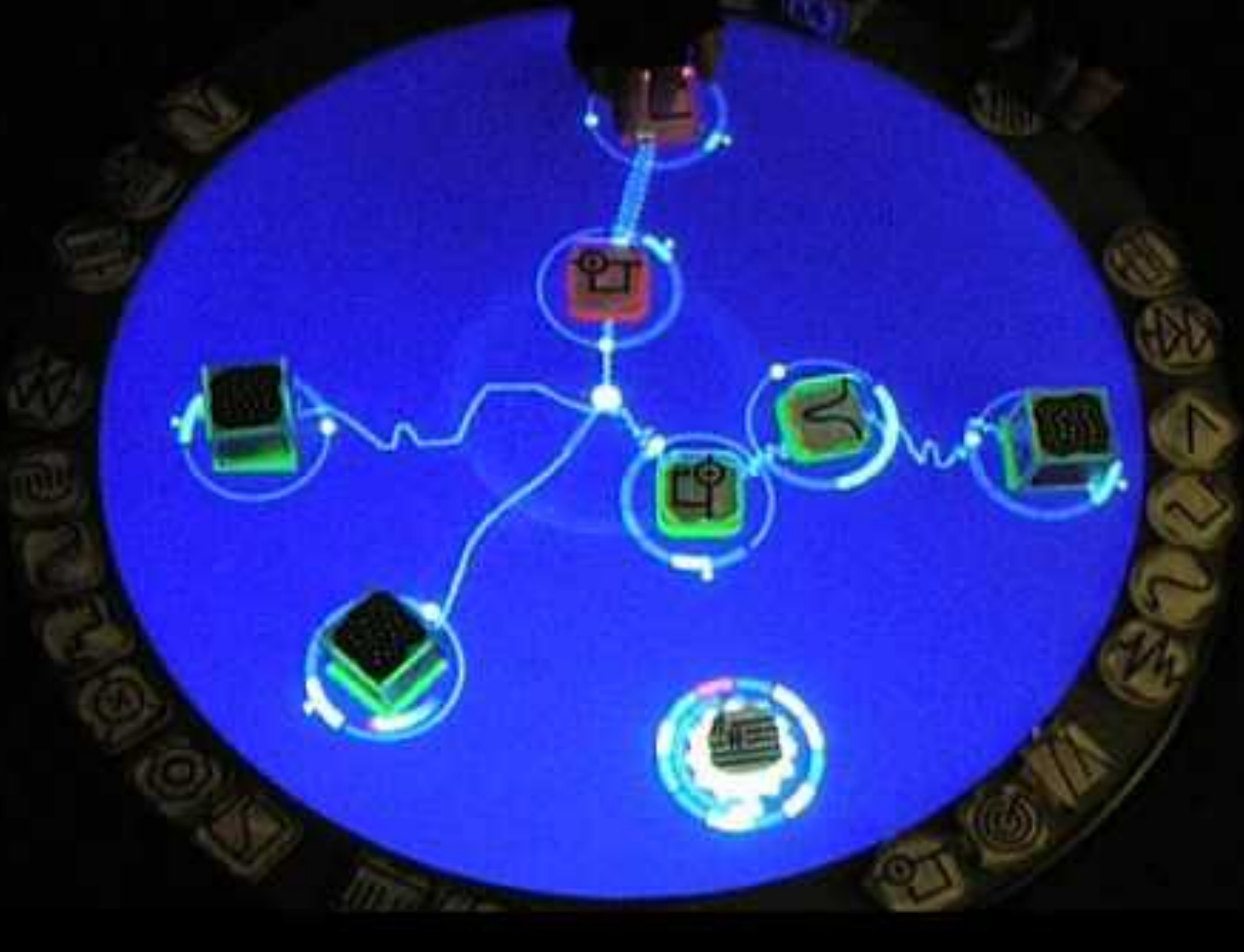
SIMON & IMOGEN'S HOUSE

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



source: [8]



<https://www.youtube.com/watch?v=Mgy1S8qymx0>

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 was head- and eyewear-mounted cameras that enabled user to record what seen and to access digital information
- Since, jewellery, head-mounted caps, smart fabrics, glasses, shoes, and jackets have all been used
 - provide the user with a means of interacting with digital information while on the move
- Applications include automatic diaries and tour guides

source: [8]



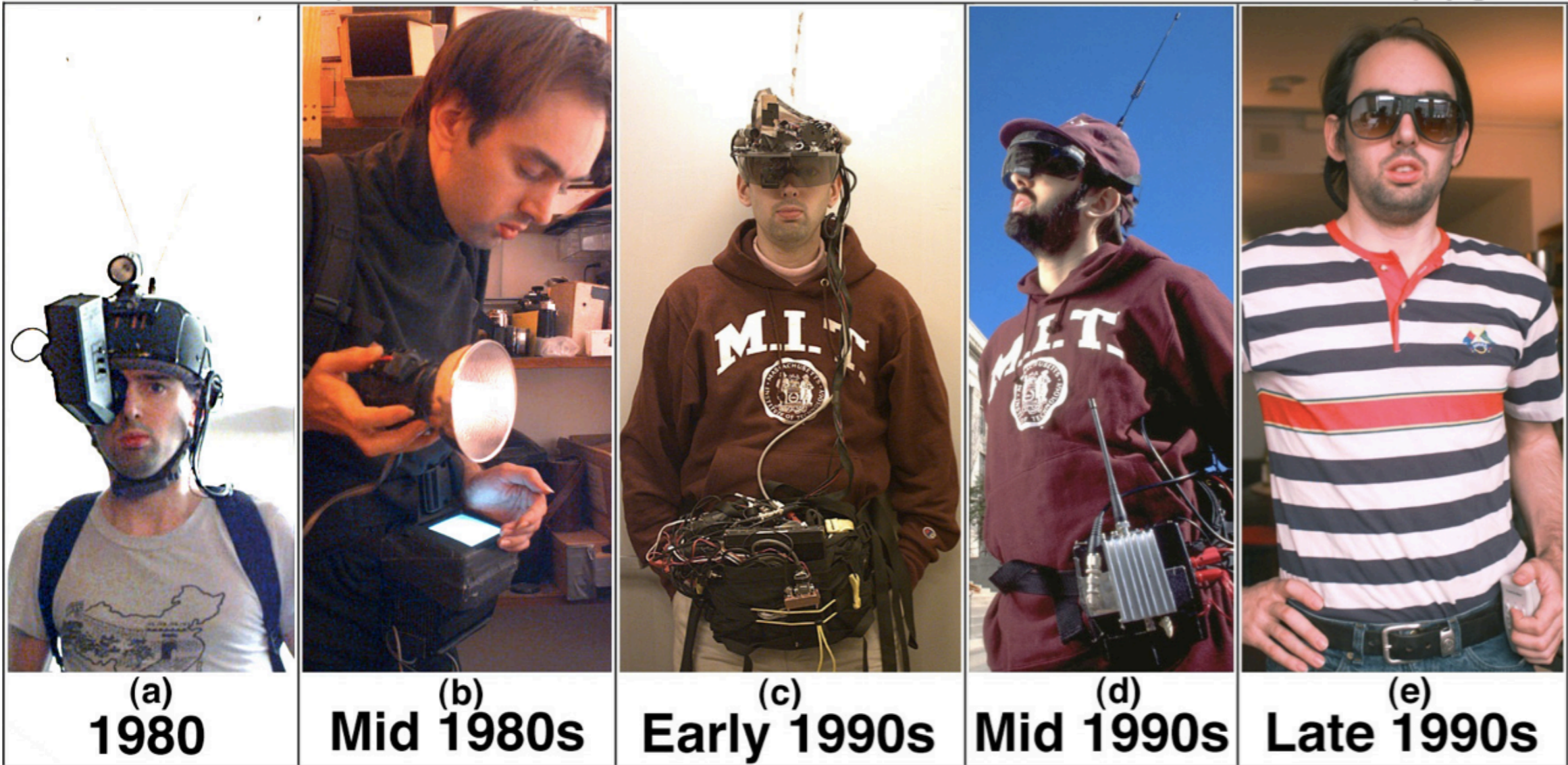


"If history is any indication, we should assume that any technology that is going to have a significant impact over the next 10 years is already 10 years old!"

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.



source: [8]

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]

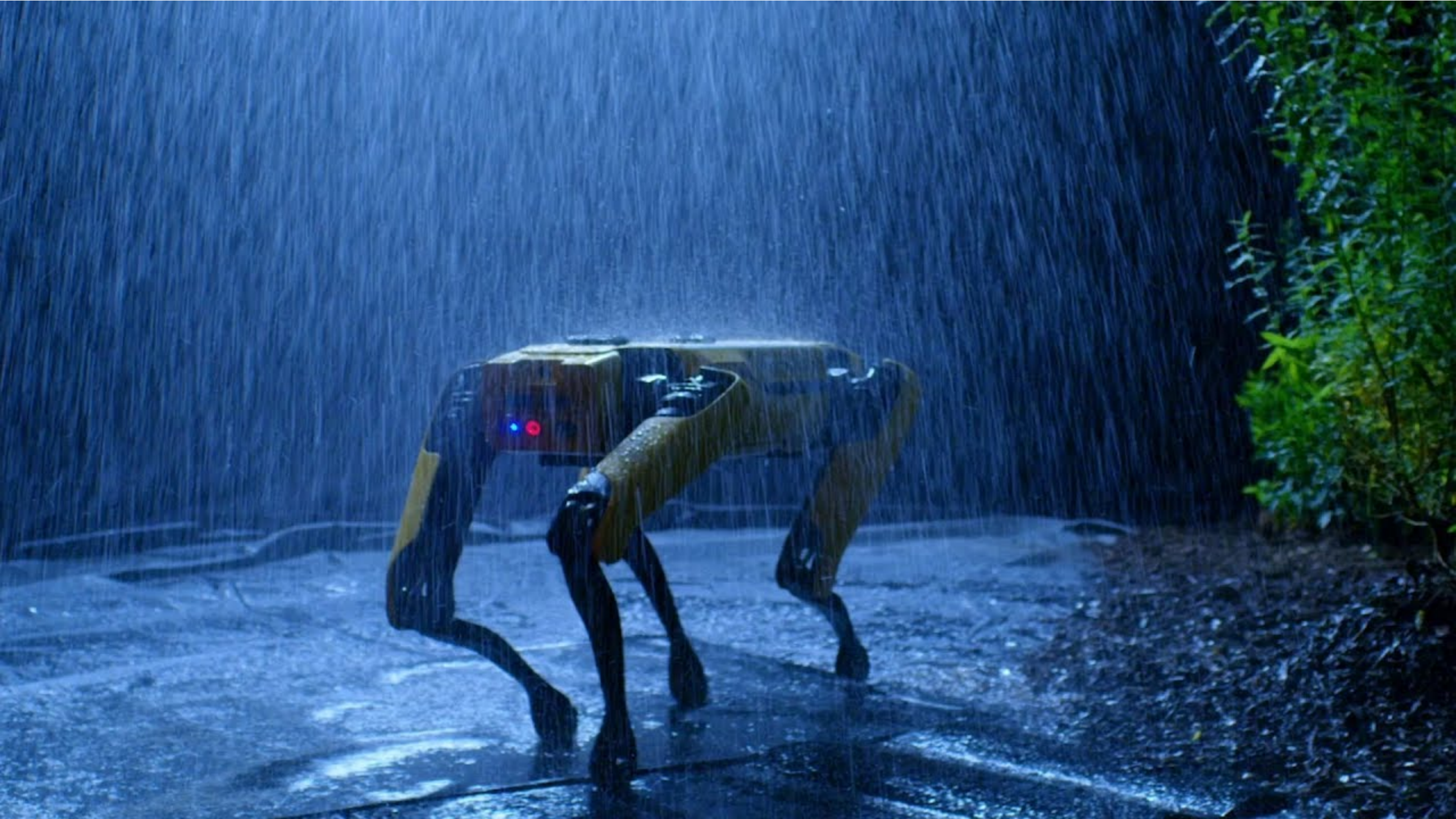
Skintrack 2016



(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



<https://www.youtube.com/watch?v=wlkCQXHEgjA>



https://www.youtube.com/watch?v=dagjQW_jgtE



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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:

- [1] Buxton, W. *Sketching User Experiences, Morgan Kaufmann 2007.*
- [2] Blom, J & Chipchase, J : Contextual and cultural challenges for user mobility research, *ACM Press 2005.*
- [3] *CHI '10 Panel Discussion on User Research, 2010.*
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- [7] Moggridge, B. *Designing Interactions, MIT Press, 2006.*
- [8] Rogers, Y., Preece, J. & Sharp, H. *Interaction Design, Wiley & Sons 2011.*