Interactive Surfaces & Spaces

Lecture 07: Introduction

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Interactive Surfaces & Spaces

- Definition & Differentiation
- Big Issues (again)
- Research Context
- Examples

Definition

- Surfaces
  - 2D position (+ 0.5 aka „Fishtank“)
  - 1D rotation

Definition

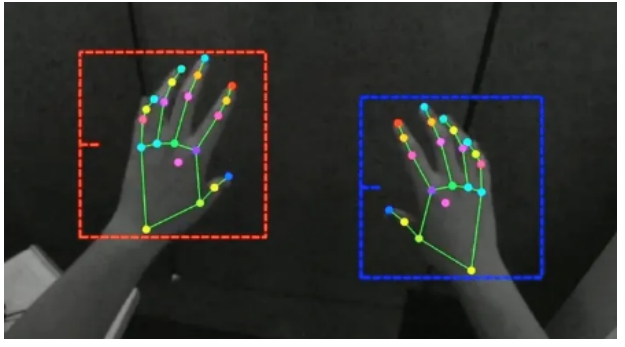
- Surfaces: Input types (cf. TUIO 2.0)
  - (Multi-)Touch: 2D positions (+ rotation, + hover)
  - Pen/stylus: ID, 2D position, rotation, angle, pressure, hover
  - Tokens: ID, 2D position, rotation
  - „Blobs“: 2D position, rotation, shape

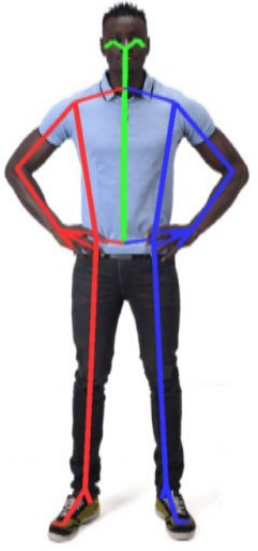
Definition

- Spaces:
  - 3D position
  - 3D rotation

Definition

- Spaces: Input types
  - Tracked objects: 3D position + 3D rotation = 6D pose
  - Tracked controllers: 6D pose + buttons
  - Hand pose (cf. lecture 4): 6D pose for all joints
  - Full body pose





Differentiation

- Is a tablet an interactive surface? A smartphone?
- Is wearing a MR headset creating an interactive space?

Big Issues

Image source (FU): Minority Report (2002)

- Similar to mobile devices:
  - Touch-related issues
  - Gestures and discoverability
- Unique to ISS:
  - Infrastructure requirements
  - Fatigue and reachability
  - https://www.youtube.com/watch?v=33Raqx9sFbo

Research Context

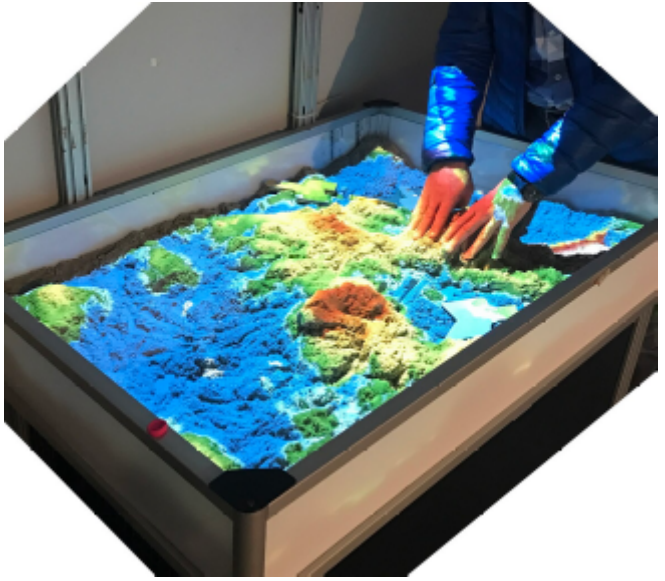
- ISS conference series (ACM)
  - More involved setup/hardware requirements
  - Smaller user group than mobile devices (cf. ACM MobileHCI)

  → more „research“-centric applications
- Related resarch areas:
  - Tangible Interaction (cf. ACM TEI)
  - Mixed Reality (cf. ACM VRST, IEEE VR)

Research Context

- Related to „Tangible Interaction“ (cf. ACM TEI)

Reactable



SandScape

Research Context

- Related to „Mixed Reality“ (cf. ACM VRST, IEEE VR)

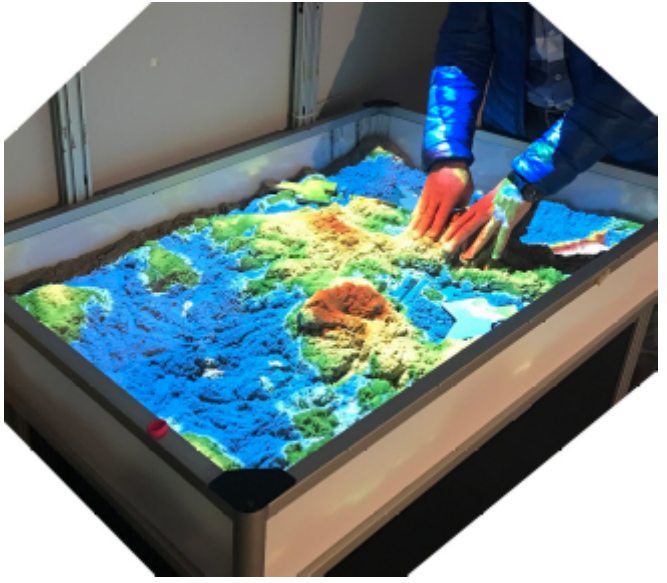
Virtual Valcamonica

Anatomy education

Examples: SandScape (2002)

Source: https://tangible.media.mit.edu/project/sandscape/

- Landscape simulator (with real sand/clay)
- e.g. for hydrodynamics, weather, architecture, …
- https://vimeo.com/44538789



Examples: Reactable (2009)

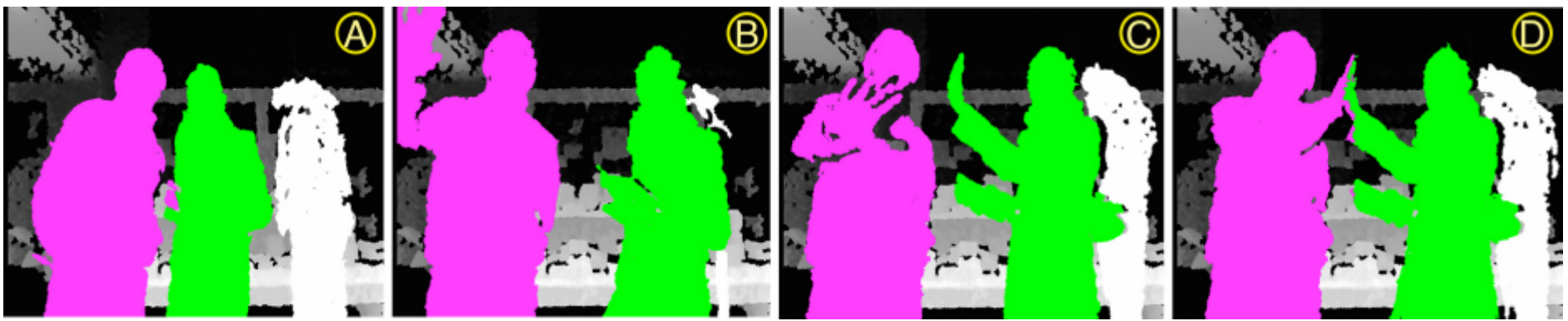
Source: https://dl.acm.org/doi/10.1145/1226969.1226998

- Technically, a musical instrument (synthesizer)
- Interaction (mostly) through tokens/tangibles
- https://www.youtube.com/watch?v=hNeCHI4NAzw

Examples: Interactive ads (2017)

Source: https://doi.org/10.1145/3025453.3025531

- How to attract passersby to view a public display?
- Shows overlay of people's silhouettes on the screen
- „Mirror" effect increases visibility



Examples: Virtual Valcamonica (2018)

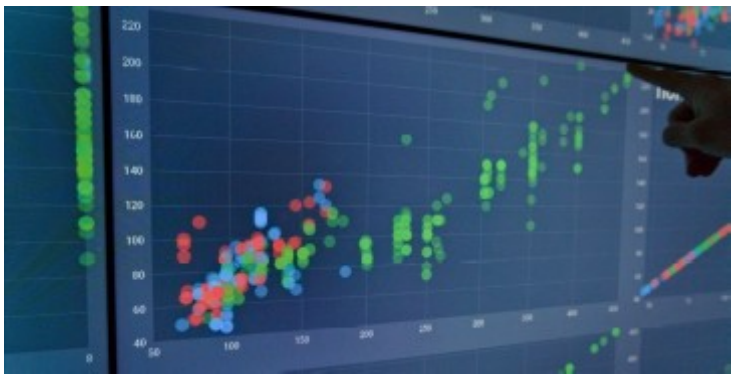
Source: https://doi.org/10.1162/pres_a_00297

- Visualize prehistoric rock carvings
- Multiple display and collaboration features (using shutter glasses)
- Large-scale tracking environment
- https://vimeo.com/163359577

Examples: SPLOM Wall (2020)

Source: https://doi.org/10.1111/cgf.13979

- SPLOM = ScatterPLOt Matrix
- Visualization of large datasets
- 4.1 m x 2.3 m wall display
- How to reach everything?

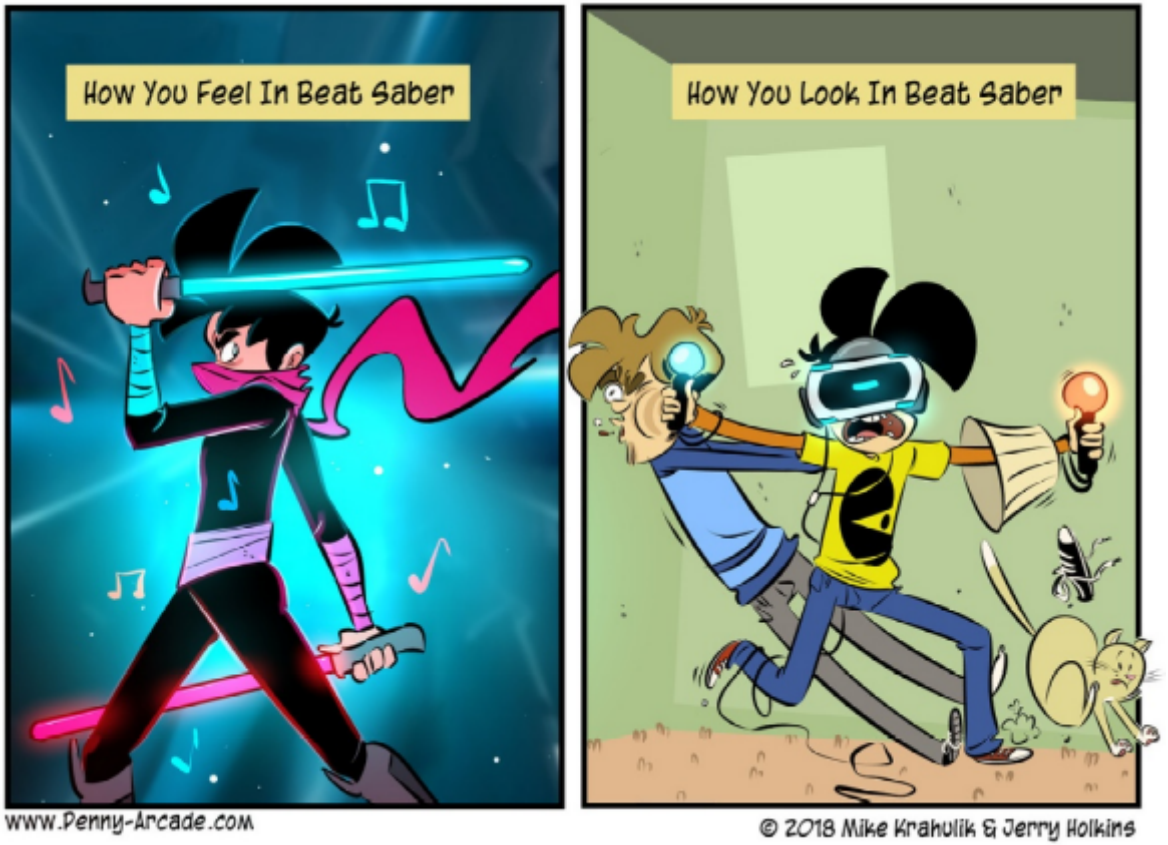


Examples: Anatomy Education (2024)

Source: https://dl.acm.org/doi/10.1145/3641825.3687706

- Study of mixed reality for „embryonic anatomy education“
- Better alone or in groups? → requires shared space

The End


How You Feel In Beat Saber
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