Fundamentals of Situated Interaction

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Please choose a topic and read the three related papers. Prepare to discuss them in class, as follows:

1. Summarize the primary contribution of each paper.
2. Analyze the paper in terms of *reification*, *polymorphism* and *reuse*, as well as *substrates* and *co-adaptation.*
3. Propose a novel design idea that extends one or more of the papers, based on the above theoretical concepts.

Alignment tools

Techniques that offer new ways to align objects.

1. Raisamo, R. and Räihä, K.-J. **A new Direct Manipulation Technique for Aligning Objects in Drawing Programs**. *Proc. UIST*, ACM (1996), 157–164. DOI=http://dx.doi.org/10.1145/237091.237113
2. Baudisch, P., Cutrell, E., Hinckley, K., and Eversole, A. **Snap-and-go: Helping Users Align Objects Without the Modality of Traditional Snapping**. *Proc. CHI*, ACM (2005), 301–310. DOI=http://dx.doi.org/10.1145/1054972.1055014
3. Ciolfi Felice, M., Maudet, N., Mackay, W.E., and Beaudouin-Lafon, M. (2016) **Beyond Snapping: Persistent, Tweakable Alignment and Distribution with StickyLines**. In *Proc. UIST*, ACM (2016), 133–144. DOI: https://doi.org/10.1145/2984511.2984577

Augmented Reality

Techniques that combine the physical world with the digital world.

1. Pierre Wellner. 1993. **Interacting with paper on the DigitalDesk**. *Commun. ACM* (July 1993), 36(7):87–96. DOI=http://dx.doi.org/10.1145/159544.159630
2. Steven Feiner, Blair Macintyre, and Dorée Seligmann. 1993. **Knowledge-based augmented reality**. *Commun. ACM* (July 1993), 36(7):53–62. DOI=http://dx.doi.org/10.1145/159544.159587
3. Wendy E. Mackay, Guillaume Pothier, Catherine Letondal, Kaare Bøegh, and Hans Erik Sørensen. **The missing link: augmenting biology laboratory notebooks**. In *Proc. UIST*, ACM (2002), 41–50. DOI: https://doi.org/10.1145/571985.571992
4. Wendy E. Mackay. **Augmented reality: linking real and virtual worlds: a new paradigm for interacting with computers**. In *Proc. AVI*, ACM (1998), 13–21. DOI=http://doi.org/10.1145/948496.948498

Beautification

Techniques that 'beautify' hand-drawn gestures into more standard shapes. (Set of tools that alter the cursor movement in order to embellish the resulting strokes.)

1. Pengfei Xu, Hongbo Fu, Takeo Igarashi, Chiew-Lan Tai (2014) **Global beautification of layouts with interactive ambiguity resolution**. In *Proc. UIST*, ACM (2014), 243–252. DOI=https://doi.org/10.1145/2642918.2647398
2. Fung, R., Lank, E., Terry, M., and Latulipe, C. **Kinematic Templates: end-User Tools for Content-Relative Cursor Manipulations**. *Proc. UIST*, ACM (2008), 47–56. DOI=https://doi.org/10.1145/1449715.1449725
3. Cheema, S., Gulwani, S., and LaViola, J. **Quickdraw: Improving Drawing Experience for Geometric Diagrams**. *Proc. CHI*, ACM (2012), 1037–1064. DOI=http://dx.doi.org/10.1145/2207676.2208550

Drawing-based interaction

Techniques that transform drawings into interactive interfaces.

1. Hong, J. and Landay, J. **SATIN: a toolkit for informal ink-based applications**. In *Proc. UIST*, ACM (2000), 63–72. DOI=http://dx.doi.org/10.1145/354401.354412
2. Landay, J.A. **SILK: Sketching Interfaces Like Krazy**. In *CHI Companion*, ACM (1996), 398–399. DOI=http://dx.doi.org/10.1145/257089.257396
3. Kramer, A. Translucent Patches - **Dissolving Windows**. In *Proc. UIST*, ACM (1994), 121–130. DOI=http://dx.doi.org/10.1145/192426.192474
4. Xia, H., Hinckley, K., Pahud, M., Tu, X., and Buxton, B. **WritLarge: Ink Unleashed by Unified Scope, Action, & Zoom**. In *Proc. CHI*, ACM (2017), 3227–3240. DOI=https://doi.org/10.1145/3025453.3025664

Dynamic guides

Techniques that help users discover the gestures that map to commands.

1. Bau, O. and Mackay, W. **OctoPocus: A Dynamic Guide for Learning Gesture-Based Command Sets**. In *Proc. UIST*, ACM (2008), 37–46. DO=https://doi.org/10.1145/1449715.1449724
2. Ghomi, E., Huot, S., Bau, O., Beaudouin-Lafon, M. and Mackay, W. Arpè**ge: Learning Multitouch Chord Gestures Vocabularies**. In *Proc. ITS, ACM* (2013), pp. 209–218. DOI=http://dx.doi.org/10.1145/2512349.2512795
3. Freeman, D., Benko, H., Ringel Morris, M. and Wigdor, D. **ShadowGuides: visualizations for in-situ learning of multi-touch and whole-hand gestures**. In *Proc. ITS, ACM* (2009), 165–172. DOI=https://doi.org/10.1145/1731903.1731935

Dynamic query

Users can quickly explore a multidimensional data space.

1. Williamson, C. and Shneiderman, B. **The Dynamic HomeFinder: Evaluating Dynamic Queries in a Real-Estate Information Exploration System**. In *Proc. SIGIR*, ACM (1992), 338–346. DOI=https://doi.org/10.1145/133160.133216
2. Ahlberg, C. and Shneiderman, B. **Visual Information Seeking: Tight Coupling of Dynamic Query Filters With Starfield Displays**. *Proc. CHI*, ACM (1994), 313–317. DOI=http://dx.doi.org/10.1145/191666.191775
3. Ahlberg, C. and Shneiderman, B. (1994). **The alphaslider: a compact and rapid selector**. In *Proc. CHI*, ACM (1994), 365–371. DOI=http://dx.doi.org/10.1145/191666.191790

Managing the interaction scope

Techniques that let users select graphical objects based on their characteristics (shape, property value, etc.) or group them based on specific rules (parenthood, common property, etc.) to subsequently edit their properties.

1. Hoarau, R. and Conversy, S. **Augmenting the scope of interactions with implicit and explicit graphical structures**. In *Proc. CHI*, ACM (2012), 1937–1946. DOI=http://dx.doi.org/10.1145/2207676.2208337
2. Kurlander, D. and Bier, E.A. **Graphical search and replace**. In *Proc. SIGGRAPH*, ACM (1988), 22(4):113–120. DOI=http://dx.doi.org/10.1145/378456.378495
3. Xia, H., Araujo, B., and Wigdor, D. **Collection Objects: Enabling Fluid Formation and Manipulation of Aggregate Selections**. In *Proc. CHI, ACM* (2017), 5592–5604. DOI=https://doi.org/10.1145/3025453.3025554

Lenses

Techniques that combine selection and edition of objects with a single click, based on the lens metaphor.

1. Bier, E.A., Stone, M.C., Pier, K., Buxton, W., and DeRose, T.D. **Toolglass and Magic Lenses: the see-Through Interface**. In *Proc. SIGGRAPH*, ACM (1993), 73–80. DOI=http://dx.doi.org/10.1145/166117.166126
2. Terry, M. and Mynatt, E.D. **Side Views: Persistent, on-Demand Previews for Open-Ended Tasks**. *Proc. UIST*, ACM (2002), 71–80. DOI=https://doi.org/10.1145/571985.571996
3. Cyprien Pindat, Emmanuel Pietriga, Oliver Chapuis, and Claude Puech. 2013. **Drilling into complex 3D models with gimlenses**. In *Proc. VRST, ACM* (2013), 223–230. DOI=https://doi.org/10.1145/2503713.2503714

Personalizable Gestures

Techniques for allowing users to add meaning and interaction to gestures

1. Tsandilas, T. and Mackay, W. **Knotty Gestures: Subtle Traces to Support Interactive Use of Paper**. In *Proc. AVI*, ACM (2010), 147–154. DOI=http://dx.doi.org/10.1145/1842993.1843020
2. Tsandilas, F., Mackay, W. and Letondal, C. **Musink: Composing Music through Augmented Drawing**. In *Proc. CHI*, ACM (2009), 819–828. DOI=https://doi.org/10.1145/1518701.1518827
3. Malloch, J., Griggio, C., McGrenere, J., and Mackay, W.E. **Fieldward and Pathward: Dynamic Guides for Defining Your Own Gestures**. In *Proc. CHI*, ACM (2017), 4266–4277. DOI=https://doi.org/10.1145/3025453.3025764
4. Garcia, J., Tsandilas, T., Agon C., and Mackay, W. **PaperComposer: Creating Interactive Paper Interfaces for Music Composition**. In *Proc. IHM*, ACM (2014), 1–8. DOI=https://doi.org/10.1145/2670444.2670450

Scrolling

Techniques that leverage characteristics of sliders to improve navigation.

1. Smith, R.B. and Taivalsaari, A. **Generalized and Stationary Scrolling**. In *Proc. UIST*, ACM (1999), 1–9. DOI=http://dx.doi.org/10.1145/320719.322577
2. Appert, C. and Fekete, J.-D. **OrthoZoom scroller: 1D multi-scale navigation**. In *Proc. CHI*, ACM (2006), 21–30. DOI=http://dx.doi.org/10.1145/1124772.1124776
3. Ishak, E. and Feiner, S. (2006) **Content-aware scrolling**. In *Proc. UIST*, ACM (2006), 155–158. DOI=https://doi.org/10.1145/1166253.1166277

Video Logging

Techniques for live annotation of video.

1. Weber, K. and Poon, A. **Marquee: A Tool for Real-Time Video Logging**. In *Proc. CHI*, ACM (1994), 58–64. DOI=http://dx.doi.org/10.1145/191666.191697
2. Mackay, W. and Davenport, G. (1989) **Virtual Video Editing in Interactive Multimedia Applications**. *Commun. ACM* (July 1989), 32(7):902–810. DOI=http://doi.acm.org/10.1145/65445.65447
3. Mackay, W.E., and Beaudouin-Lafon M. (1998) **DIVA: exploratory data analysis with multimedia streams**. In *Proc. CHI*, ACM (1998), 416-423. DOI=http://dx.doi.org/10.1145/274644.274701
4. Fouse, A., Weibel, N., Hutchins, E. and Hollan J. **ChronoViz: a system for supporting navigation of time-coded data**. In *CHI Extended Abstracts*, ACM (2011), 299–304. DOI= https://doi.org/10.1145/1979742.1979706

Zoomable User Interfaces (ZUI)

Zoomable (or Multi-scale) User Interfaces take advantage of a third spatial dimension to lay out and navigate through documents.

1. Perlin, K. and Fox, D. **Pad: an Alternative Approach to the Computer Interface**. In *Proc. SIGGRAPH*, ACM (1993), 57–64. DOI=http://dx.doi.org/10.1145/166117.166125
2. Bederson, B.B. and Hollan, J.D. **Pad++: a Zooming Graphical Interface for Exploring Alternate Interface Physics**. In *Proc. UIST*, ACM (1994), 17–26. DOI=http://dx.doi.org/10.1145/192426.192435
3. Bederson, B.B., Meyer, J., and Good, L. **Jazz: an Extensible Zoomable User Interface Graphics Toolkit in Java**. In *Proc. UIST*, ACM (2000), 171–180. DOI=http://dx.doi.org/10.1145/354401.354754

Acronyms of conferences and journals:

- *AVI*: International Conference on Advanced Visual Interfaces
- *CHI*: ACM Conference on Human Factors in Computing Systems
- *Commun. ACM*: Communications of the ACM
- *IHM*: Conférence Francophone sur l'Interaction Homme-Machine
- ITS
- *SIGGRAPH*: Conference on Computer Graphics and Interactive Techniques
- *SIGIR*: ACM Conference on Research and Development in Information Retrieval
- *UIST*: ACM Symposium on User Interface Software and Technonology
- *VRST*: Virtual Reality Systems and Technology