

Physical Interaction Techniques

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Emerging Input Technologies for Always-Available Mobile Interaction

Dan Morris, T. Scott Saponas, and Desney Tan

- Published in Foundations and Trends in Human-Computer Interaction journal.
- Started in 2009.
- H index 22.
- Authors Dan Morris, T. Scott Saponas, and Desney Tan are affiliated with Medical Devices Groups at Microsoft Research.

Framing Paper

- Always-available technology can trigger paradigm shift in usage.
- Comprehensive literature review on input modalities relevant to transition between physical interaction with devices and real-world world activities.
- Challenges: Ambiguity, Sensor Fusion, Gesture Design and Usability, Cognitive Interference, and Computational Senses.

About the Authors



Desney Tan

Managing Director, Microsoft Health Futures



Dan Morris

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Principal Architect

Keep the Phone in Your Pocket: Enabling Smartphone Operation with an IMU Ring for Visually Impaired People

GUANHONG LIU* , YIZHENG GU* , YIWEN YIN, CHUN YU‡ , YUNTAO WANG† , HAIPENG MI, and YUANCHUN SHI

- Published in Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies, June 2020.
- A ring-based gesture input system to enhance phone interaction.
- Addresses the pain points associated with fishing a phone out of a pocket and one-handed operation, mitigates privacy and social concerns.

Designing and Evaluating Hand-to-Hand Gestures with Dual Commodity Wrist-Worn Devices

YIQIN LU, BINGJIAN HUANG, CHUN YU* , GUAHONG LIU, and YUANCHUN SHI

- Published in the Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies 2020.
- Design space of hand-to-hand gestures, a group of gestures that are performed by touching one hand with the other hand.
- Hand-to-hand gesture vocabulary with subjective ratings from users and select gesture sets for real-life scenarios

About the Authors



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Discussion Point

“..... I can send a text message from my mobile phone or I can carry my grocery bags, ride my bike, walk my dog, hold my child, etc. But using modern touch-based devices I cannot, so to speak, have my hands and use them too

Will ubiquitous technology like mobile phone ever become always-available? In what scenarios smoother transition between interaction with technology and real-world activities will benefit the users more?

Discussion Point

- “Ben Shneiderman describes why after 30 years of trying to provide airplane pilots with speech interfaces, complex functionality remains built into mechanical controls “
- “This goes to show how complex it is to create technology that is "always-available" for everyone” – Neeraj
- “it would probably be difficult to convince someone to put cameras all over their house and to wear cameras for CV-based interactions” – Colby
- **To what extent, always-availability can cause disruption in everyday life?
To what extent this disruption would impact usability?**

Discussion Point

- “I haven't seen anyone use those devices before, but I'd love to see it in the real world one day” - Arthur
- **One interesting finding of this study was that users did not want to stand-out in social settings because of the IMU ring they had. How can we design accessible technologies that would not further alienate the users from their social peers?**

Discussion Point

What is the universality of gesture detection technologies. For example, different cultures have different gesture vocabulary. While designing a global technology that detects gestures, can we be accommodating to different cultures and perspectives?