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Bibliography and Descriptions

Mentor and Credit for Research Help: David Lindlbauer

Florian Floyd Mueller, Pedro Lopes, Paul Strohmeier, Wendy Ju, Caitlyn Seim, Martin Weigel, Suranga Nanayakkara, Marianna Obrist, Zhuying Li, Joseph Delfa, Jun Nishida, Elizabeth M. Gerber, Dag Svanaes, Jonathan Grudin, Stefan Greuter, Kai Kunze, Thomas Erickson, Steven Greenspan, Masahiko Inami, Joe Marshall, Harald Reiterer, Katrin Wolf, Jochen Meyer, Thecla Schiphorst, Dakuo Wang, and Pattie Maes. 2020. Next Steps for Human-Computer Integration. In Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems (CHI '20). Association for Computing Machinery, New York, NY, USA, 1–15.

- Link
- **Title:** Next Steps for Human-Computer Integration
- **Abstract:** "Human-Computer Integration (HInt) is an emerging paradigm in which computational and human systems are closely interwoven. Integrating computers with the human body is not new. However, we believe that with rapid technological advancements, increasing real-world deployments, and growing ethical and societal implications, it is critical to identify an agenda for future research. We present a set of challenges for HInt research, formulated over the course of a five-day workshop consisting of 29 experts who have designed, deployed, and studied HInt systems. This agenda aims to guide researchers in a structured way towards a more coordinated and conscientious future of human-computer integration."
- **Purpose:** Thinking about the next steps of HCI/HInt and how that applies to the human body/mind

Hiroshi Ishii and Brygg Ullmer. 1997. Tangible bits: towards seamless interfaces between people, bits and atoms. In Proceedings of the ACM SIGCHI Conference on Human factors in computing systems (CHI '97). Association for Computing Machinery, New York, NY, USA, 234–241.

- Link
- **Title:** Tangible Bits - Towards Seamless Interfaces
- **Abstract:** "This paper presents our vision of Human Computer Interaction (HCI): "Tangible Bits." Tangible Bits allows users to "grasp & manipulate" bits in the center of users' attention by coupling the bits with everyday physical objects and architectural surfaces. Tangible Bits also enables users to be aware of background bits at the periphery of human perception using ambient display media such as light, sound, airflow, and water movement in an augmented space. The goal of Tangible Bits is to bridge the gaps between both cyberspace and the physical environment, as well as the foreground and background of human activities. This paper describes three key concepts of Tangible Bits: interactive surfaces; the coupling of bits with graspable physical objects; and ambient media for background awareness. We illustrate these concepts with three prototype systems – the metaDESK, transBOARD and ambientROOM – to identify underlying research issues.

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- **Purpose:** Thinking about the difference between something that is realistic/reachable and not in the matter of physical aspects of the human body and its surroundings

Hiroshi Ishii, Dávid Lakatos, Leonardo Bonanni, and Jean-Baptiste Labrune. 2012. Radical atoms: beyond tangible bits, toward transformable materials. interactions 19, 1 (January + February 2012), 38–51.

- **Link**
- **Title:** Radical Atoms: Beyond Tangible Bits, Toward Transformable Materials
- **Abstract:** "Graphical user interfaces (GUIs) let users see digital information only through a screen, as if looking into a pool of water, as depicted in Figure 1 on page 40. We interact with the forms below through remote controls, such as a mouse, a keyboard, or a touchscreen (Figure 1a). Now imagine an iceberg, a mass of ice that penetrates the surface of the water and provides a handle for the mass beneath. This metaphor describes tangible user interfaces: They act as physical manifestations of computation, allowing us to interact directly with the portion that is made tangible—the "tip of the iceberg" (Figure 1b)."
- **Purpose:** Seeing a new perspective on how to bring the digital and hidden world into a more dynamic and free interface that can respond to adaptive environments

Kangsoo Kim, Mark Billinghurst, Gerd Bruder, Henry Been-Lirn Duh, and Gregory F. Welch. 2018. Revisiting Trends in Augmented Reality Research: A Review of the 2nd Decade of ISMAR (2008-2017). IEEE transactions on visualization and computer graphics 24, 11: 2947–2962.

- **Link**
- **Title:** Revisiting Trends in Augmented Reality Research: A Review of the 2nd Decade of ISMAR (2008–2017)
- **Abstract:** In 2008, Zhou et al. presented a survey paper summarizing the previous ten years of ISMAR publications, which provided invaluable insights into the research challenges and trends associated with that time period. Ten years later, we review the research that has been presented at ISMAR conferences since the survey of Zhou et al., at a time when both academia and the AR industry are enjoying dramatic technological changes. Here we consider the research results and trends of the last decade of ISMAR by carefully reviewing the ISMAR publications from the period of 2008–2017, in the context of the first ten years. The numbers of papers for different research topics and their impacts by citations were analyzed while reviewing them—which reveals that there is a sharp increase in AR evaluation and rendering research. Based on this review we offer some observations related to potential future research areas or trends, which could be helpful to AR researchers and industry members looking ahead.
- **Purpose:** Thinking about looking ahead on how AR will develop further in the future and the ways that technology adapts alongside human adaptations

Ramesh Raskar, Greg Welch, Matt Cutts, Adam Lake, Lev Stesin, and Henry Fuchs. 1998. The office of the future: a unified approach to image-based modeling and spatially immersive

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displays. In Proceedings of the 25th annual conference on Computer graphics and interactive techniques - SIGGRAPH '98.

- **Link**
- **Title:** The Office of the Future: a Unified Approach to Image-Based Modeling and Spatially Immersive Displays
- **Abstract:** We introduce ideas, proposed technologies, and initial results for an office of the future that is based on a unified application of computer vision and computer graphics in a system that combines and builds upon the notions of the CAVE™, tiled display systems, and image-based modeling. The basic idea is to use real-time computer vision techniques to dynamically extract per-pixel depth and reflectance information for the visible surfaces in the office including walls, furniture, objects, and people, and then to either project images on the surfaces, render images of the surfaces, or interpret changes in the surfaces. In the first case, one could designate every-day (potentially irregular) real surfaces in the office to be used as spatially immersive display surfaces, and then project high-resolution graphics and text onto those surfaces. In the second case, one could transmit the dynamic image-based models over a network for display at a remote site. Finally, one could interpret dynamic changes in the surfaces for the purposes of tracking, interaction, or augmented reality applications. To accomplish the simultaneous capture and display we envision an office of the future where the ceiling lights are replaced by computer controlled cameras and "smart" projectors that are used to capture dynamic image-based models with imperceptible structured light techniques, and to display high-resolution images on designated display surfaces. By doing both simultaneously on the designated display surfaces, one can dynamically adjust or auto-calibrate for geometric, intensity, and resolution variations resulting from irregular or changing display surfaces, or overlapped projector images. Our current approach to dynamic image-based modeling is to use an optimized structured light scheme that can capture per-pixel depth and reflectance at interactive rates. Our system implementation is not yet imperceptible, but we can demonstrate the approach in the laboratory. Our approach to rendering on the designated (potentially irregular) display surfaces is to employ a two-pass projective texture scheme to generate images that when projected onto the surfaces appear correct to a moving head-tracked observer. We present here an initial implementation of the overall vision, in an office-like setting, and preliminary demonstrations of our dynamic modeling and display techniques.
- **Purpose:** Thinking about the interactivity of typical office environments, which could lead to a better understanding of how humans function effectively in virtual environments

Mark Weiser. 1999. The computer for the 21st century. SIGMOBILE Mob. Comput. Commun. Rev. 3, 3 (July 1999), 3–11.

- **Link**
- **Title:** The computer for the 21st century
- **Abstract:** Specialized elements of hardware and software, connected by wires, radio waves and infrared, will be so ubiquitous that no one will notice their presence.
- **Purpose:** Thinking about how to use different waves for different functions (new ideas)

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Weiser, Mark, and John Seely Brown. "Designing calm technology." PowerGrid Journal 1.1 (1996): 75-85.

- **Link**
- **Title:** Designing Calm Technology
- **Description:** Less information means calmer, which means it is mentally ergonomic to have less information and distractions
- **Purpose:** To think about what kinds of indications can be useful and calming as well. Anxiety is very prominent in today's technology, which contradicts the ergonomics of the human mind.

Picard, Rosalind W. Affective computing. MIT press, 2000.

- **Link**
- **Title:** Affective Computing
- **Abstract:** Computers are beginning to acquire the ability to express and recognize affect, and may soon be given the ability to "have emotions." The essential role of emotion in both human cognition and perception, as demonstrated by recent neurological studies, indicates that affective computers should not only provide better performance in assisting humans, but also might enhance computers' abilities to make decisions. This paper presents and discusses key issues in "affective computing," computing that relates to, arises from, or influences emotions. Models are suggested for computer recognition of human emotion, and new applications are presented for computer assisted learning, perceptual information retrieval, arts and entertainment, and human health and interaction. Affective computing, coupled with new wearable computers, will also provide the ability to gather new data necessary for advances in emotion and cognition theory.
- **Purpose:** This has to do with the emotional approach to the human mind and thinking about emotional ergonomics.

Mann, Steve. "Wearable computing: A first step toward personal imaging." Computer 30.2 (1997): 25-32.

- **Link**
- **Title:** Wearable computing: a First Step Toward Personal Imaging
- **Abstract:** Miniaturization of components has enabled systems that are wearable and nearly invisible, so that individuals can move about and interact freely, supported by their personal information domain. To explore such new concepts in imaging and lighting, I designed and built the wearable personal imaging system. My invention differed from present-day laptops and personal digital assistants in that I could keep an eye on the screen while walking around and doing other things. Just as computers have come to serve as organizational and personal information repositories, computer clothing, when worn regularly, could become a visual memory prosthetic and perception enhancer.
- **Purpose:** Thinking about the seamless and immersivity of technology, which will then make life enhanced and still comfortable.

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Niteesh. “Are We Ditching Keypads for Good in AR/VR?” *Niteesh Yadav*, 24 Apr. 2022, niteeshyadav.com/blog/are-we-ditching-keypads-for-good-in-ar-vr-84902/.

- **Link**
- **Title:** Are we ditching keypads for good in AR/VR?
- **Description:** Pros and cons of using AR/VR interface, specifically keyboards
- **Purpose:** Showing the difficulty of having accuracy within AR/VR tracking, which then makes the users’ experiences less immersive. This then leads to thinking about what ways to combat hand tracking.

“Emergencies and First Aid - Recovery Position.” *Harvard Health*, 14 Feb. 2017, www.health.harvard.edu/staying-healthy/emergencies-and-first-aid-recovery-position.

- **Link**
- **Title:** Emergencies and First Aid - Recovery Position
- **Description:** Showing the recovering position of the human body during an emergency
- **Purpose:** Showing the best position for humans to lie down in. Also refers to

Middlesworth, Matt. “Cognitive Ergonomics 101: Definition, Applications, and Disciplines” *Matt Middlesworth*, 15 Mar. 2022, https://ergo-plus.com/cognitive-ergonomics/#:~:text=Cognitive%20ergonomics%20is%20the%20field,%2C%20mental%20processing%2C%20and%20memory.

- **Link**
- **Title:** Cognitive Ergonomics 101: Definition, Applications, and Disciplines
- **Description:** “Cognitive ergonomics is the field of study that focuses on how well the use of a product matches the cognitive capabilities of users. It draws on knowledge of human perception, mental processing, and memory.”
- **Purpose:** Showing the cognitive tweaking of applications for the human mind that branches into physical world => ergonomics

Wikipedia. “Sword Art Online” *Wikipedia*, 28 Jan. 2024, https://en.wikipedia.org/w/index.php?title=Sword_Art_Online&action=history.

- **Link**
- **Title:** Sword Art Online
- **Description:** Anime/manga that shows a world with online VR (virtual reality) MMORPG (massively multiplayer online role play gaming) that affect real life decisions
- **Purpose:** Thinking about how these head-mounted devices can put the user into an unconscious state in order to put them into a completely immersive and virtual world that seems realistic. It is a simulation that takes out the strains of eyes and back pains of sitting (still back pains of lying down)

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Bradbury, Ray. Fahrenheit 451. *Ballatine Books*, 1953.

- **Title:** Fahrenheit 451
- **Description:** A futuristic world where certain books are forbidden by the government in order to control the people's ways of thinking
- **Purpose:** to show some futuristic technology and themes

Orwell, George. 1984. *Secker & Warburg*, 1949.

- **Title:** 1984
- **Description:** A dystopian society that has a very heightened surveillance, behavior modification, and a strict/limiting language (Newspeak)
- **Purpose:** to show some futuristic technology and themes + AI themes in surveillance and criminology

Lowry, Lois. The Giver. *Houghton Mifflin*, 1993.

- **Title:** The Giver
- **Description:** futuristic medicine that suppresses human desires
- **Purpose:** to show some medical futuristic technology and themes