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Critical Multimedia

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Recent articles in *IEEE MultiMedia* have highlighted challenging problems and promising opportunities for the multimedia community in thought-provoking ways. In "Content Is Dead … Long Live Content: The New Age of Multimedia-Hard Problems,"[1] the authors tip their hats toward AI classification schemas and propose an ordering of multimedia-hard (MM-hard) problems. Such problems can require "human-level insights and perceptions" in developing solutions that take advantage of human "oracle" assistants working in conjunction with machines. This vision positions the intelligence and actions of humans or groups of humans as a fundamental component of the application space. Extending this notion, we can also imagine the broader implications of humans-in-the-loop approaches when we consider the sociocultural context within which our technologies and systems function. Rather than just conceiving of the role of the human as primarily to increase the efficiency of an algorithm or facilitate a transaction, we can adopt a more radical position and consider the human also as an active and subversive force. The innovation here lies in the middle ground, where there is both technological advancement and cultural transcendence.

Previous Artful Media articles have examined opportunities for augmenting museum experiences, developing novel musical instruments and designing media performance systems. In this article, I explore the concept of criticality as applied and practiced within art and design, with a view to the potential of this approach within engineering and computer science. A critical viewpoint here entails deeply reflecting on and examining the norms, values, and structures of all or some subsection of society with a view to affecting change. While critical theory has typically been the purview of philosophers, literary theorists, and sociologists, the act of criticality itself has very much been a part of artistic practice from Jonathan Swift to Shakespeare, Jenny Holzer to The Guerilla Girls. Within a contemporary context, the vitality of critical approaches across sociotechnical domains points to the value of this reflexive process in provoking necessary discussion and exchange.

Critical Theory

Phil Agre first proposed the notion of "critical technical practice" as an approach for recognizing and reflecting on the underlying philosophies, values, and assumptions embedded in technologies and systems.[2] Based on his own experiences as an AI researcher, together with the development of his interest in critical theory, Agre expressed the need for reflective examination of the concepts and methods of his field. Originally, this type of interrogation was ostensibly oriented toward improving technology, but it has been adopted more recently by a variety of researchers in computer science, human-computer-interaction, and design armed with a broader set of cultural motivations.[3]

With computation and technology moving into the home, accompanying us on the streets, and driving us to work, as multimedia developers, analysts, and users, we are faced with complex moral, ethical, political, and social conditions. The last few years of Multimedia Grand Challenges and the emerging tracks at the annual ACM MultiMedia conference highlight such issues, including emotional and social signals, personalization, and security and forensics. Delving into interrogative strategies and critical related practices from other disciplines may help shine some light on new opportunities or possible threats.

Critical Design

"Critical" or "speculative design" aims to provoke dialog and public conversation through the creation of products, systems, and services that exemplify possible futures. Museum of Modern Art (MoMA) Curator Paola Antonelli describes the responsibility of critical designers as "thorns in the side of politicians and

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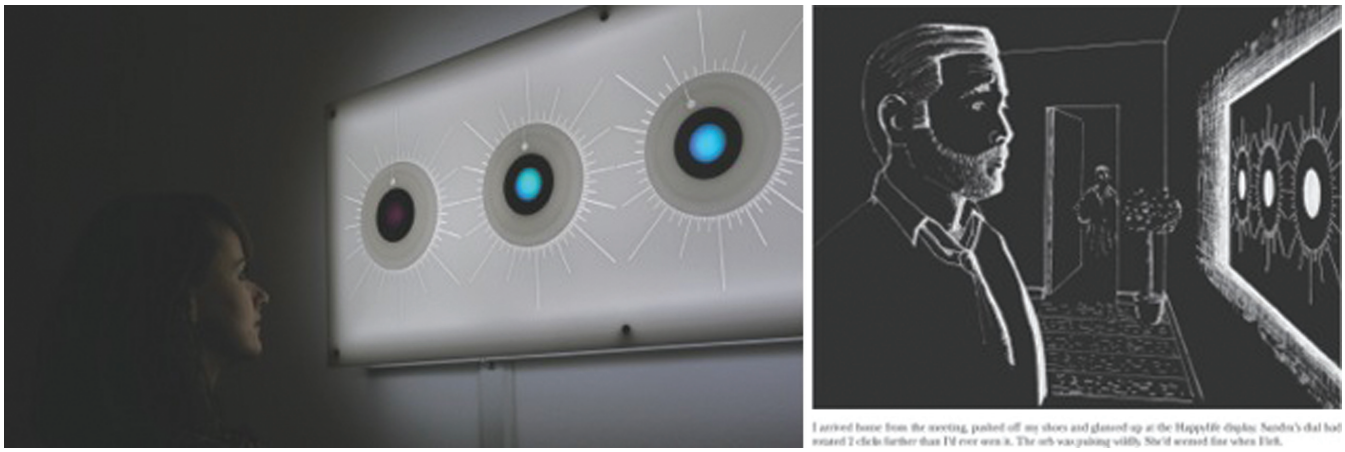

Figure 1. Happylife. Visual display depicting current and predictive mood of family members and a usage scenario rendering. (Courtesy of James Auger.)

industrialists, as well as partners for scientists or consumer advocates, while stimulating discussion and debate about the social, cultural and ethical future implications of decisions about technology made today."[4] Leading practitioners in this realm include critical designers Anthony Dunne and Fiona Raby, design futurists Stuart Candy and Jake Dunagan, and companies and labs such as Superflux and Near Future Laboratory. These practitioners are creating alternate reality games, design fiction movies, and what-if performance scenarios as a way to embody futures thinking in possible, probable, and preferable worlds.

Encountered in galleries, on YouTube, in community workshops, at corporate think tanks, and on the streets, the speculative artifacts and systems created often demonstrate technical virtuosity while challenging the context within which they exist. For example, James Auger and Jimmy Loizeau's Happylife project (www.auger-loizeau.com/index.php?id=23) explores the emergence of "real-time dynamic passive profiling techniques" by situating the technology in the home as a way to "mediate and display human emotive states in a family." Created in collaboration with computer scientists at Aberystwyth University, this unsettling positioning of thermal cameras, emotion analytics, and visual displays in the domestic sphere raises questions about national security, smart homes, privacy, and identity (see Figure 1). Such collaborations point to the potential value of designing and developing critical mediated systems as a powerful reflexive tool for exploring the implications of our work.

Critical Engineering

Building on this, the 11-point "Critical Engineering Manifesto" (http://criticalengineering.org) puts forth a group of statements aimed at raising awareness, arousing emotions, and needling opinion on the work and role of contemporary engineers. Authored by Julian Oliver, Danja Vasiliev, and Gordan Savičić, the manifesto calls for deeper engagement and interrogation of the systems and technologies of everyday living. Key manifesto declarations include "The Critical Engineer considers Engineering to be the most transformative language of our time, shaping the way we move, communicate and think. It is the work of the Critical Engineer to study and exploit this language, exposing its influence" and "The Critical Engineer recognizes that each work of engineering engineers its user, proportional to that user's dependency upon it." Central to their thesis is the notion of exploiting the inner workings of black box technology and determining the hidden influences and forces behind the technologies society is increasingly dependent on. To support those interested in critically exploring this view of engineering, the authors have developed a series of intensive workshops, teaching participants about network infrastructure and manipulation, the power of command line interfaces, and running secure custom servers.

Their own prolific work as critical practitioners also seeks to engage audiences in provocative, yet accessible media. Oliver's "The Transparency Grenade" (http://julianoliver.com/output/transparency-grenade) is exactly that—a

Figure 2. Transparency Grenade. The transparent shell contains a microcomputer, wireless antenna, and microphone that can securely and anonymously stream captured network traffic and audio to a server for subsequent analysis. (Courtesy of Khuong Bismuth.)

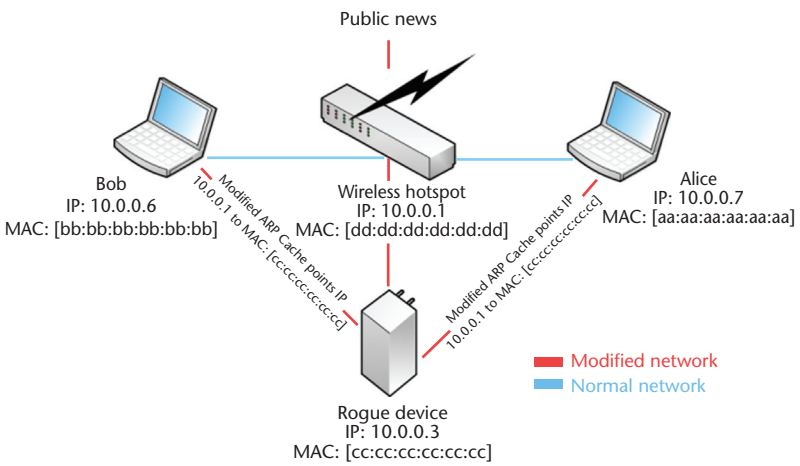

Figure 3. Newstweek. The wall plug can be plugged into a public outlet, where it then allows remote authors to filter and alter the news content streaming to nearby patrons across the local network. (Courtesy of Julian Oliver.)

transparent grenade shell encasing a microcomputer, wireless antenna, and microphone aimed at "making the process of leaking information from closed meetings as easy as pulling a pin." This device can be triggered to securely and anonymously stream captured network traffic and audio to a server for subsequent analysis (see Figure 2). In an era of increased citizen surveillance, such interventions serve to upset the balance of power by explicitly making the tools, code, and technical know-how to create your own transparent grenade freely available online.

In a collaborative project by Oliver and Vasiliev, the Newstweek interrogates network infrastructure via localized manipulation of news feeds. The winner of the Golden Nica at Ars Electronica in 2011, the Newstweek (http://newstweek.com) device challenges the corporate hegemony of large media networks by providing an opportunity for local editors to subvert news feeds accessed over wireless hotspots. Taking the form of an innocuous wall plug, the Newstweek can be plugged into a public outlet in a coffee store, for example, where it then allows remote authors to filter and alter the news content streaming to patrons across the local network (see Figure 3). This tactical intervention exposes opportunities for reality manipulation, both casual and intentioned across the terrain of news distribution "from ISP workers, numerous server administrators and wireless access point owners." Such work critically addresses pertinent issues such as personalization, the filter bubble, and reverse engineering the Web through a technical implementation that is cheap, replicable, and of course, in the vast majority of cases, completely illegal.

Finally, earlier and ongoing work by the critical engineers on augmented reality systems reconceived as improved reality technologies is of interest to multimedia researchers engaged in social, local, mobile (SoLoMo) activities. The Artvertiser (http://theartvertiser.com) is a software platform that replaces billboard style advertisements with artwork when viewed through multiple custom and consumer devices (see Figure 4). This work challenges the read-only nature of consumer advertising with "a 'read-write' platform for the presentation of non-proprietary, critically engaging content in a new form of public exhibition." This project, and a similar online version add-art (http://add-art.org), provide agency to the human actor to subvert and control their personal media environment.

The technical innovation and sociocultural implications of these projects and others like

them range from simple hacks to powerful tools of dissent in repressive regimes. Deeply considering the cultural and critical contexts within which we set loose our algorithms provides an opportunity not only to find new applications for our work, but also to reflect on the potential of our research to more gracefully elevate the human condition. **MM**

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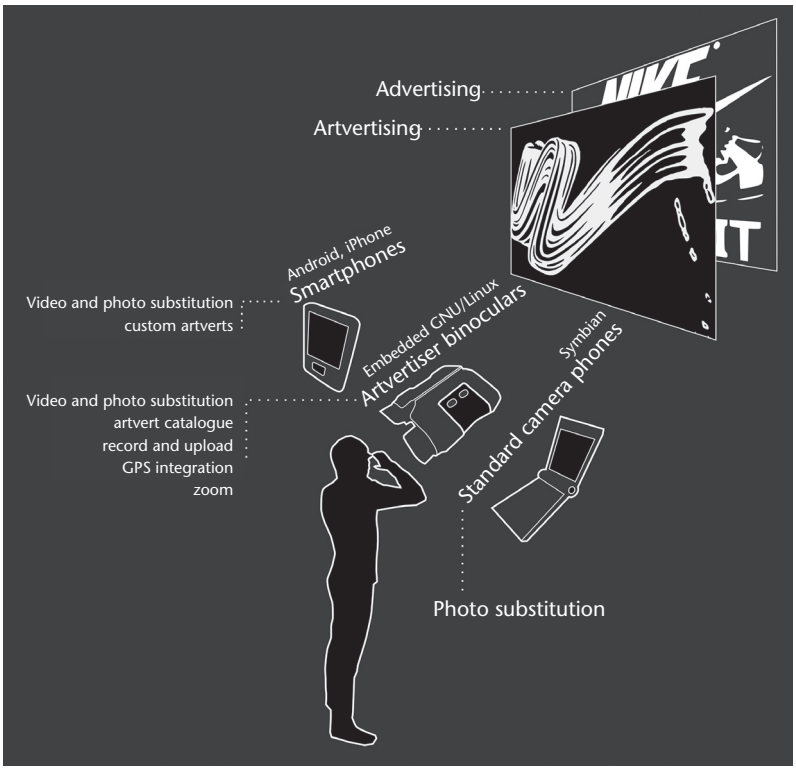

Figure 4. Artvertiser. The software platform that replaces billboard style advertisements with artworks when viewed through multiple custom and consumer devices. (Courtesy of Julian Oliver.)

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