Internet Art

Rachel Greene

An exploration of the exciting and radical ways in which artists have embraced the internet and redefined the conventions of art

When the internet emerged as a mass global communication network in the mid-1990s, artists immediately recognized the exciting possibilities for creative innovation that came with it. This groundbreaking book considers the many diverse forms of internet art and the tools and equipment used to create them, while discussing the wider cultural context and historical importance of the work.

Covering email art, web sites, artist-designed software and projects that blur the boundaries between art and design, product development, political activism and communication, *Internet Art* shows how artists have employed online technologies to engage with the traditions of art history, to create new forms of art, and to depart into fields of activity normally beyond the artistic realm.

Throughout the book, the views of artists, curators and critics offer an insider's perspective on the subject, while a timeline and glossary provide easy-to-follow guides to the key works, events and technological developments that have taken art into the twenty-first century.

On the cover:
c a l c (Teresa Alonso Novo, Looks Brunner, tOmi Scheiderbauer, Malex Spiegel Silke Sporn) and Johannes Gees, *communimage*, 1999. Collaborative net art project. www.communimage.net
© c a l c and Johannes Gees

Printed in Singapore

ISBN 0-500-20376-8
9 780500 203767

Thames & Hudson world of art

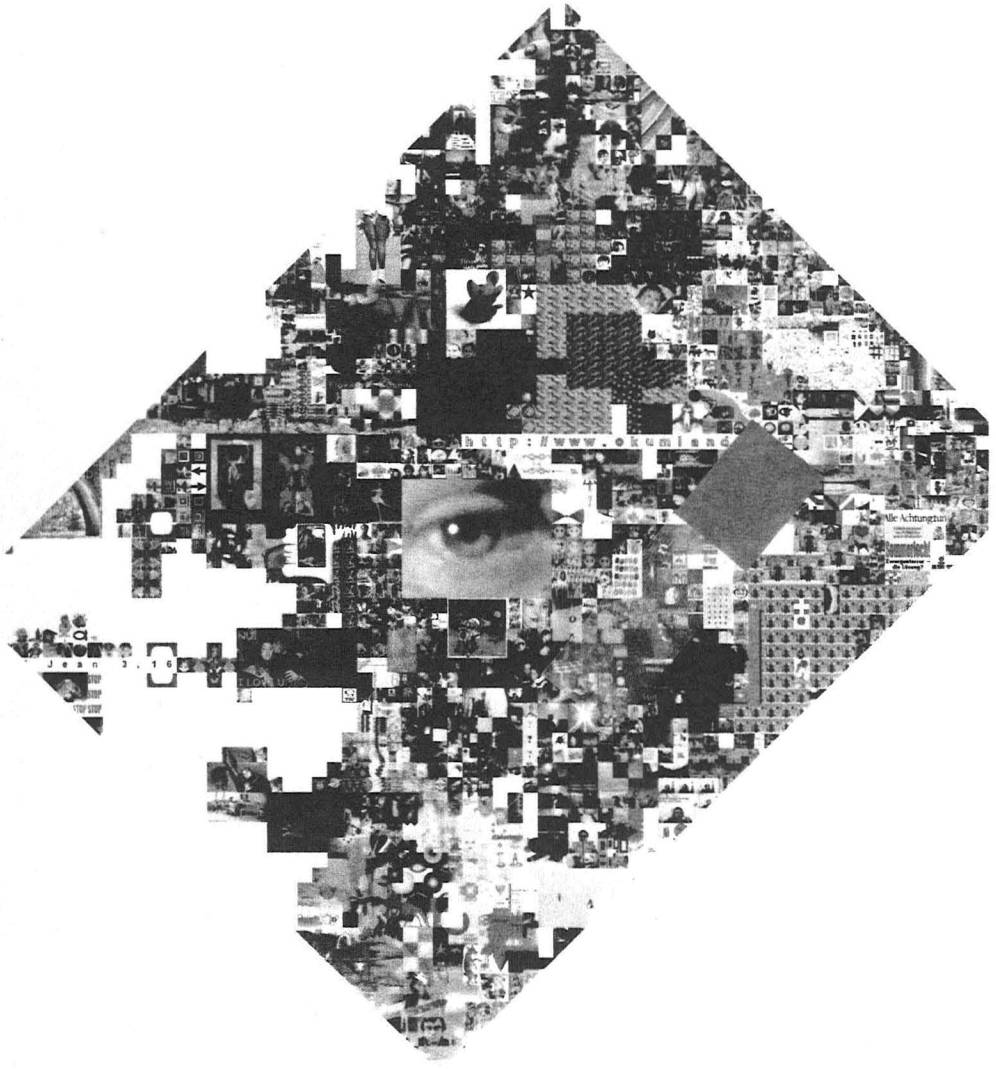
world of art

Internet Art

Rachel Greene

Internet Art

Rachel Greene



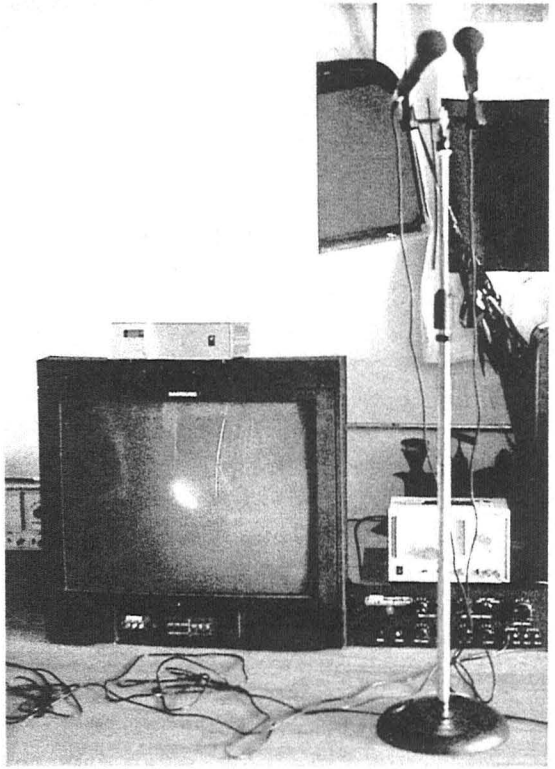
Thames & Hudson world of art

Introduction

Both everyday and exotic, public and private, autonomous and commercial, the internet is a chaotic, diverse and crowded form of contemporary public space. It is hardly surprising, therefore, to find so many art forms related to it: web sites, software, broadcast, photography, animation, radio and email, to name just a few. Moreover, the computer, fundamental for experiencing internet art, can be both a channel and a means of production and can take the form of a laptop, a cellular phone, an office computer – each with its own screen, software, speed and capability – and the experience of the artwork changes accordingly. Beyond the internet's singular ability to host many different aesthetic activities, other novel and complicating issues make internet art difficult to summarize in a critical and historical survey such as this: its relative youth; its dematerialized and ephemeral nature; its global reach. Its location, however, is clear: like the great works of art that decorated public areas and buildings in pre-nineteenth-century cultures, internet art resides in a largely open zone – cyberspace – manifesting itself on computer desktops anywhere in the world but rarely in museum halls and white cube galleries, where the past two centuries have suggested we look for art.

By virtue of its constantly diminishing and replenishing medium and tools (e.g. software and applications become obsolete, web pages are abandoned and removed, software is upgraded, new plug-ins are brought onto the market, web sites are launched), internet art is intertwined with issues of access to technology and decentralization, production and consumption, and demonstrates how media spheres increasingly function as public space. It is inextricable from the history of military and commercial innovation; and it follows the changing roles of computers, which have developed from anonymous, unwieldy machines to reasoning, portable, customizable instruments deployed with agency, coordination and selection. Still, there is more than an evolutionary argument for the significance of net art. It is not just that the tools and issues brought to the fore by internet art are current, and therefore relevant to how we live now. Internet art is part of a continuum within art history that includes such strategies and themes as instructions, appropriation, dematerialization, networks and information. It is important to explore parallels between net art and ideas in the work of earlier artists and movements – for example, Nam June Paik's (b. 1932) *Participation TV* (1963) [3], which took the television, traditionally a broadcast platform, and shaped it into an interactive canvas. Paik's apparatus for reception and production prefigured browser art (see Chapter 2), which treats browsers as fodder for experimentation.

This book will show how the shifts in information technologies that began during the 1990s have affected, impacted on and, in turn, been influenced by artistic practices. It will explore the field in two ways: firstly, by offering snapshots



3 **Nam June Paik**, *Participation TV*, 1963 (1988 version). Paik transforms the omnipresent television – a consumer-targeted device emitting a unidirectional signal – into an interactive, participatory space. Not only does the defamiliarized commercial apparatus become a more open and responsive system for art and communication, but the screen emerges as a pictorial platform. Switching from broadcast to production within one interface is common in internet art-making.

Radical Software. This short-lived ublication (1970–74), devoted to ideo and video art, was initiated y writers and artists interested in ecentralizing media. Its contents ere fundamentally cross- isciplinary and often absorbed technological concerns, and the urnal was a crucial forerunner f D.I.Y. movements such as 'free oftware' and 'tactical media'. ll eleven issues can now be ewed online: ttp://www.radicalsoftware.org/

(and screenshots) of some of the diverse methods by which artists have created and shaped cultural expression by using the internet; and secondly, by presenting a chronicle of the technologies of internet art, as well as an account of its art-historical precedents, to reveal wider concerns about societies in which media, information and commerce are ubiquitous.

The geographical starting-point of this history lies in Europe, Eastern Europe in particular, where post-Cold War technology and democracy initiatives opened up spaces for pockets of advanced art-making and media activism that gave rise to the legendary 'net.art' scene (with a requisite dot), which is described in Chapter 1. There and throughout the book, I relate the ways in which internet art is indebted to conceptual art through its emphasis on audience interaction, transfer of information and use of networks, simultaneously bypassing the autonomous status traditionally ascribed to art objects. The projects of early net artists are covered in detail in this chapter and periodized to

include political conditions. Chapter 2 describes how early net artists explored the constituent characteristics of the new medium, often communicating with one another through art projects as well as on email lists. In Chapters 3 and 4, these threads expand to include other salient topics, such as infowar, gaming, software and tactical media. Sometimes politics and commerce are referred to because internet art is no straightforward complement to 'dotcom' era capitalism but something of an active counterbalance to its excesses and injustices. Often it has been net artists who, alongside various critics and activists, have formulated critiques against the assumptions built into new or existing computer and information technologies. Furthermore, net artists often generate actual alternatives, developing practical products such as non-commercial software. Their strategies imply that commercial machinations inflect art and other fields we tend to think of as removed from industry.

British critic Lawrence Alloway seemed to anticipate the net when, in 1972, he wrote 'The Art World Described as a System' about the various social, professional and critical networks in which artists and their work circulate. Alloway, ever alert to the prominence of the mass media, cited sophisticated marketing mechanisms, increased communication, rapid production and dissemination of criticism and art 'data', or documentation, noting that 'all of us are looped together in a new and unsettling connectivity'. Alloway favoured alternative exhibition venues and diversified fields of art expertise (to accommodate a youth whose grasp of popular culture could outweigh his own generation's). Without doubt, Alloway would have been intrigued to see how net artists have been able to devise alternate methodologies, goals and communities to those in the 'offline' art world. He would also have appreciated the extent to which many of the strategies and critiques introduced by new media artists secure a prominent place for the genre in the blurry and shifting space between mass media and physical being that comprises the complex fabric of contemporary life.

Indeed, compared with concurrent work by artists such as German Gerhard Richter (b. 1932) and American Matthew Barney (b. 1967), internet art has less to do with objects of social or financial prestige, and little, at least currently, to do with the cosmopolitan art businesses that thrive in New York, Cologne, London and other culture capitals. It is generally a more marginal and oppositional form, often uniting parody, functionality and

activism under a single umbrella, actively reclaiming public space and circumnavigating boundaries that seem entrenched in the world of galleries and museums. Internet art has redefined some of the materials of current art-making, distribution and consumption, expanding operations from the white cube gallery out to the most remote networked computer. As with public sculptures or murals, email, software and web sites are easy to overlook as 'art', doubtless because their functionality or location mean that users and passers-by do not readily acknowledge them as such. Though their tools and venues differ, internet art is underwritten by the motivations that have propelled nearly all artistic practices: ideology; technology; desire; the urge to experiment, communicate, critique or destroy; the elaboration of ideals or emotions; and memorializing observation or experience.

While internet art's contributions to contemporary artistic practices comprise much of this book, the conflicts that preclude its easy inclusion within traditional art-historical canons, markets and dialogues must also be explored. To confine the field to dominant art discourse would muffle its most vital anarchic tendencies and undermine the benefits of a precise study of its singularities. Moreover, one cannot gloss over the mutual suspicions between internet artists and institutions of official culture, such as museums and galleries, that have persisted since the form's inception. Internet art is sometimes viewed by the establishment as emblematic of how we live now, but at other times is taken as derivative, immature art practice. For critics, curators and viewers who take an interest in internet art, the field represents fresh aesthetic possibilities and contributes to contemporary art discourse. For those who do not support it, net art is often thought to lack the craft and direct impact of work in painting and sculpture by privileging commercial tools, veering too close to graphic design, or exploiting cheap, 'whizz bang' programming tricks (to which authentic, meaningful art should naturally be opposed). Furthermore, net practices such as software art do not align with existing gallery, museum and discursive systems, and these institutions often want to differentiate themselves from commercial fields. There is also a tendency (since the inception of video art) to place new uses of consumer electronics or practices associated with mass media in one category and art in another.

The internet's presumed banality, with its labels and commercial tools (Netscape Navigator, Macromedia Flash) and its operational requisites – the need to turn on, boot up and log in,

in order to view the art – does not help either. For many viewers, art on a computer screen is too unfamiliar both conceptually and physically, and the technical steps necessary to access it simply do not reconcile with 'art' experiences like browsing in quiet galleries or navigating vast museum collections.

Indeed, there is a kind of reversed exoticism in play. When the internet was new, different and less commercial, it seemed more avant-garde. Now that the 'internet boom' is over and its technologies are entrenched in the way we work, play and consume, its qualities are inflected with associations of labour, research or, worse still, pop-up windows and spam. While the juxtaposition of these corporate products and free-software (a diverse and international movement focused on preserving and promoting the freedom to copy, study, use, modify and redistribute software) projects offer rich material for those interested in theorizing about art, media culture and today's society, some attack the prevalence of brand-saturated tools and phenomena. For some of these detractors, seemingly, work that begins with or exists within internet or commercial formats can never rise above those limits to achieve the status of art.

A related criticism is sometimes aimed at the works' creators: that internet and software artists, often self-identified as programmers, are not 'real' artists. This critique can be taken as a symptom of the changing modes of art and the evolving expectations of what artists should be, what skills or trades they should possess, and what their critical concerns should be. The objections can be sustained only if the role of the artist as producer is imagined in limited ways, and exist, perhaps anachronistically, outside the time and reach of the web.

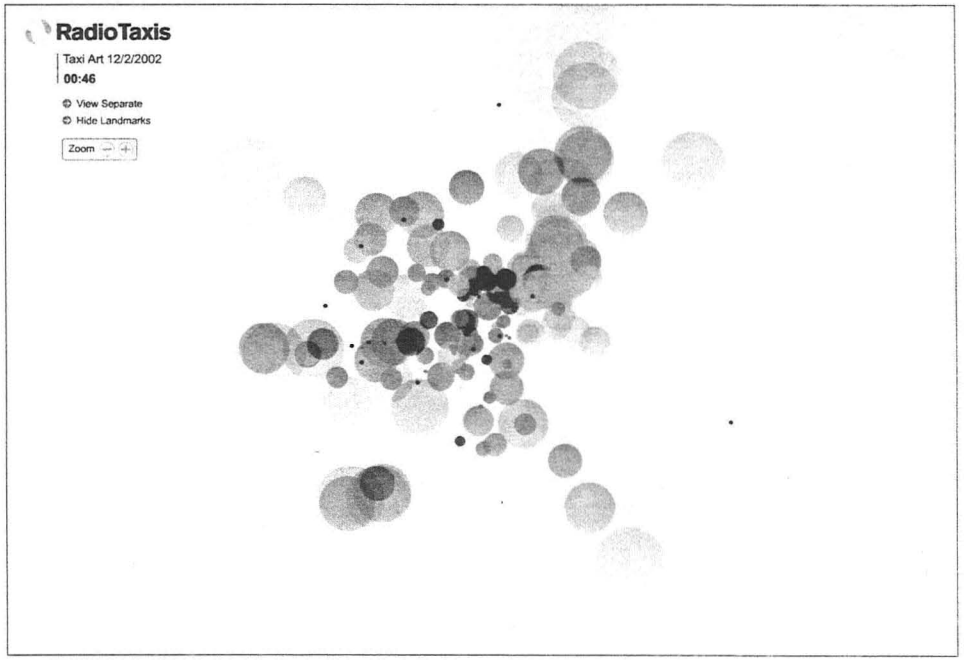
Internet art has also been critiqued for a perceived elitism, a reclusive position within the world and concerns of cyberspace. Some argue that the net conditions users to become indifferent to the offline world, as participants often become caught up in the field's linguistic and practical complexities. This critique, which situates the internet as a space of leisure and contemplation, a haven where one can dwell on the vagaries of net aesthetics and online communities, can, I think, be substantiated. Indeed, characterizations of the internet as an open playing field and space, untainted by gender, ethnic and class biases, or free from labour issues or ecological consequences are misleading. The sense of insularity among netheads, hackers et al has been such that many dialogues between internet art and other traditional art practices and histories remain nascent.

However, these critical issues should not obscure the fact that internet art has received attention and support from various influential quarters – curators, institutions and communities both at the edges of the mainstream art world and within it. Many major international museums, funding institutions and festivals, from Seoul to Kassel, are now supportive of net art, having recognized its importance and developed limited expertise in order to support its programming. And one could not offer a truthful history of internet art without naming the fruitful encouragement from the earliest moments provided by Ars Electronica (Linz, Austria), ZKM, the Center for Art and Media (Karlsruhe, Germany), the Waag Society (Amsterdam, the Netherlands), the Walker Art Center (Minneapolis, US), Postmasters Gallery (New York), Backspace (London), mailing lists Nettime, Syndicate and Old Boys Network, platforms such as *Telepolis*, THE THING and Rhizome.org, and print publications such as *Mute* and *Intelligent Agent*.

As someone who began to write about the topic of internet art during a time of urgent critical gestation, when artists and critics were trying to develop new vocabularies to talk about the medium, my view is that now is a more appropriate time for a book on the subject. The initial scepticism of net artists towards the traditional art world, the desire for polemics, as well as the mania and hype around the internet's novelty have all faded away substantially, and concepts such as web sites and software no longer seem as alien to the general art enthusiast. Though the momentum of change and development in media theory has been amplified by increasing usage of the net since the mid-1990s, there has been a shift away from any urge to concentrate on single authorial figures or final theories resolving the internet's impact, mastering its meaning or declaring its radical singularity. Whereas I felt a pressure in earlier years to come up with fresh critical approaches to new media or give them 'cyber' sensibilities, now it is possible to write a more open history for a wider audience, one that is in dialogue with other related art-historical and oppositional movements. These shifts in writing about internet art deepen my own interest in how the field illuminates the relationships between power, art and daily life.

The Internet's History and Pre-History

Like the histories of cable television, consumer electronics, video cameras, radio and even satellites, that of the internet is told in part via the innovators, companies, research centres, government



5 **Radio Taxis**, *Taxi Art*, 2002. Enlisting London black cabs, satellite tracking and the internet to orchestrate lively, colourful maps of car movements, a British taxi company literally forays outside conventional art and transport-sector zones. While its marketing considerations are not shared with the GPS artwork discussed in Chapter 4, the theoretical issues at stake are distinctly related.

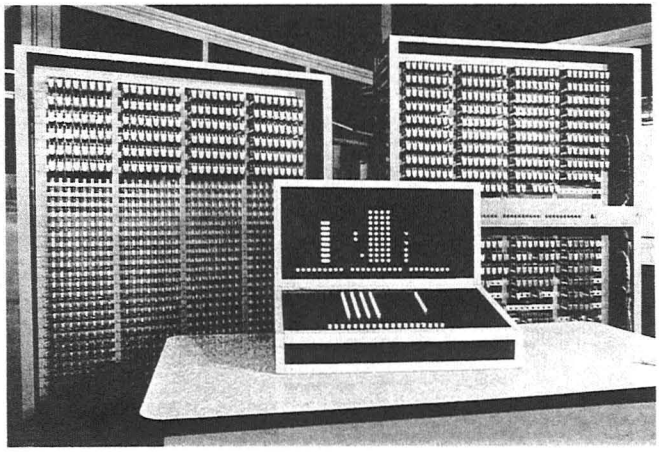
initiatives and, above all, the military development that made its tools available. Central to the evolution of the internet are the intertwined histories of the computer and electronic data. Charles Babbage (1792–1871) was an early visionary of the former, a nineteenth-century mathematics professor at Cambridge University whose work on production and labour would be taken up by John Stuart Mill (1806–73) and Karl Marx (1818–83), and who designed prototypes for apparatuses that performed tasks by following instructions, now commonly known as 'programs'. His planned 'engines' – the difference engine and the far more ambitious analytical engine – were flexible and powerful calculators controlled by punch cards. The analytical engine included many features that later reappeared in the modern computer, such as versions of RAM and memory, but it was designed to be huge and steam-powered and was never built during Babbage's lifetime. One of Babbage's most significant collaborators on the engines was Augusta Ada King (1815–52), Countess of Lovelace and the daughter of Lord Byron, who wrote some of the first instruction routines for the engines. Ada would later be the namesake of internet art platform äda'web, as well as a programming language used by the United States Department of Defense.

The work of George Boole (1815–64), who perfected a binary system of algebra that allowed mathematical equations to be represented by true or false statements, became central to the development and use of electrical circuits in the 1930s, processing only two objects: yes/no, true/false and zero/one. Employing this method, electrical logic circuits could be built to use Boolean algebra and combined to form an electric, non-steam-powered computer. Electrically operated computers were first developed in around 1938 when German engineer Konrad Zuse (1910–95) [6] constructed a large machine, the Z1, from electromagnetic telephone relays in his parents' living room. He also used two logical voltage levels (on and off) combined with binary numbering, laying the ground for many principles of future computers. Another pioneer of computer developments was the British mathematician Alan Turing (1912–54), who not only engineered computers but also did some of the first experiments in the field of artificial intelligence, asking if computers 'could think', and how computer processes compared with human logic systems. Turing developed the world's first electronic valve computer in 1943. Called the Colossus, the computer used reader systems for paper tapes punched in by the many female military teletype operators. Data intercepted from transmissions encrypted on the German Enigma devices could be input and processed at high speeds. This application demonstrated that computer technology could be used for tasks involving characters as well as numbers.

Dr Grace Murray Hopper (1906–92) was likely the first twentieth-century woman to be involved in the development of sophisticated languages for computers. She was highly influential in the development of COBOL (Common Business Oriented Language) and its application for the US military. Besides her work on this, the second oldest high-level program, and her status – she was the highest-ranking female Navy officer of her time (rear admiral) – she is also remembered for her discovery of the first computer 'bug' in 1945, an actual moth that had flown into the circuitry of a Harvard Mark II computer. Today's 'bugs' are metaphorical – errors or conflicts in programs – but that moth symbolizes the centrality of error and breakdown to computer-related activities. It is preserved at the National Museum of American History in Washington DC.

The Electronic Numerical Integrator and Computer, or ENIAC, developed by John Presper Eckert (1919–95) and John Mauchly (1907–80) at the University of Pennsylvania in 1946, was the first digital computer and was used by the US Army to

6 **Konrad Zuse**'s third computer, the Z3. After developing the Z1 and Z2, Zuse went on to build the Z3 during World War II. The machine – said to be the world's first fully functional program-controlled computer – formed the basis of Zuse's claim to have been the first in electronic computing.



calculate tables for shell trajectories. The ENIAC was enormous, consisting of more than 18,000 valves, 70,000 resistors and 5 million soldered joints. Its electrical power requirements were so great that the computer's usage is reported to have dimmed the lights in the local West Philadelphia area. Commercially available computers reached the market in 1951 with the UNIVAC (Universal Automatic Computer), and the advent of solid state electronics allowed for smaller and smaller microchips. During the 1960s, incentives to decrease the bulk and weight of computers resulted in substantial size reductions. By the early 1970s, the central components of a computer – central processing unit (CPU), memory and controls – had been aggregated on a single silicon chip.

In 1981, IBM released its personal computer, or PC. Though Steve Jobs and Steve Wozniak, the co-founders of Apple, had released several Apple models in the 1970s, they were unable to compete with the PC until they developed the Macintosh in 1984. The Mac introduced clickable icons on the screen, whereas PC interfaces required users to type instructions. Macs also popularized the 'desktop', a visual representation of the computer interface. Cursor movement was aided by an invention out of Stanford Research Institute: Douglas Engelbart's hand-controlled device called a 'mouse'. By the early 1980s, microcomputers with user-friendly software packages and applications like word processing and spreadsheet manipulation were offered by Apple, Commodore and Radio Shack. As more and more replicas or 'clones' of the IBM machine entered the market during the 1980s and 1990s, home computers became more affordable. Today, the

7 BEA Reservations Hall at West London Air Terminal. In this 1960s photograph, computers enable airline staff to secure plane seats for travellers. Transforming the way people work and live, computers first became commercially available in the early 1950s.

majority of North American and European schools have computers hooked up to the internet.

The history of the internet is rather more condensed than that of computers. Many would point to US Army scientist Vannevar Bush (1890–1974) as its grandfather. An MIT professor who had built mechanical computers in the 1930s, Bush imagined an intriguing system called Memex in a 1945 article entitled 'As We May Think', which was published in *Atlantic Monthly*. The Memex would be built into desks, allowing multiple users to browse various microfilms at the same time and input their own data. Though never constructed, the Memex's model of an interactive library of data as a tool for research and education was picked up by others in the field of electronic information. Theodor Nelson (b. 1937) reiterated Bush's ideas in the early 1960s, coining the terms 'hypertext' and 'hypermedia' to describe texts, images and sounds that could be interconnected within a 'docuverse' he called 'Xanadu'. Both Bush and Nelson were interested in the liberating potential of systems modelled on associative, non-linear thinking and experience. Their ideas, Nelson's concepts of hypertext especially, were important blueprints for what would become the internet. Named after the Department of Defense agency that sponsored its development, ARPANET was designed to be a communication system immune to nuclear attacks and was first implemented by four American universities (the University of California at Los Angeles, the University of California at Santa Barbara, the Stanford Research Institute and the University of Utah). This 'internet' remained largely a governmental and

research tool until 1989, when Briton Tim Berners-Lee (b. 1955) proposed a global hypertext project: the World Wide Web. The web was designed by Berners-Lee to enhance the efficiency of standard research practice, which was often hindered by the literal comings and goings of researchers to and from projects and centralized information repositories (such as a library). If data could be made available through public hypertext documents, research would be effectively decentralized, facilitated, and freed from the constraints of physical location. Accessible via powerful modems, Berners-Lee's web ran on protocols now widely known as HTML (HyperText Markup Language). These specifications were thoroughly reviewed and refined by programmers, and internet usage began to expand and develop in the halls of education. Parallel to the web's internal development, the net was fast becoming a popular hobbyist and community venue. Applications such as Gopher, Usenet and bulletin boards were turning it into a communication platform. Web browsers – applications that locate and display web pages – were introduced soon after but were initially only capable of displaying text. Mosaic (1993) and Netscape Navigator (1994) were the first multimedia or 'graphics browsers' (able to display images, video and audio). Later browsers included the open-source Mozilla application and Microsoft's Internet Explorer.

The Art-Historical Context for Internet Art

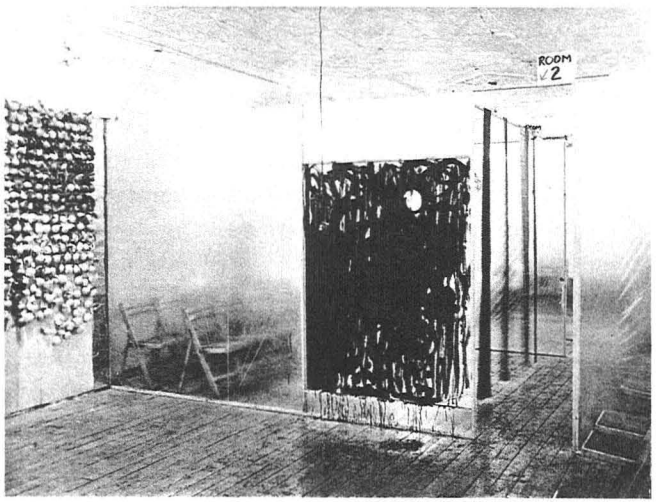
Though internet art has been discussed in a number of books and catalogues that have appeared since the mid-1990s, and a handful of net art archives are available online, the connections between net art and other art-historical movements are not well documented. In part, this may be due to the specialization of many net art critics and writers, whose methodologies are often grounded in internet culture and whose audiences remain mostly online. Their experience, useful as it is, does not always lend itself to sustained critical explorations of the relation between net art and such groups, movements and art forms as Fluxus, EAT (Experiments in Art and Technology), Happenings and multimedia art spectacles of the 1960s through to the present, as well as developments in cable and video. Within the scope of this book, there is only enough room to look at some of the works that are in dialogue with internet aesthetics.

Many net artists feel a strong connection to the work of French artist Marcel Duchamp (1887–1968) and to the participants in Dada (the international arts movement that began

in Zurich in 1916 as a reaction to World War I and to a traditional art public), all of whom helped to shift art practices away from traditional forms of pictorial representation. Dada firmly embraced the random as a means of expression. Its members created poetry, for example, that relied on instructions and chance word variations. The net analogue of such instructions is 'code', the algorithms (the set of steps for solving problems) that form the basis of all software and computer operations.

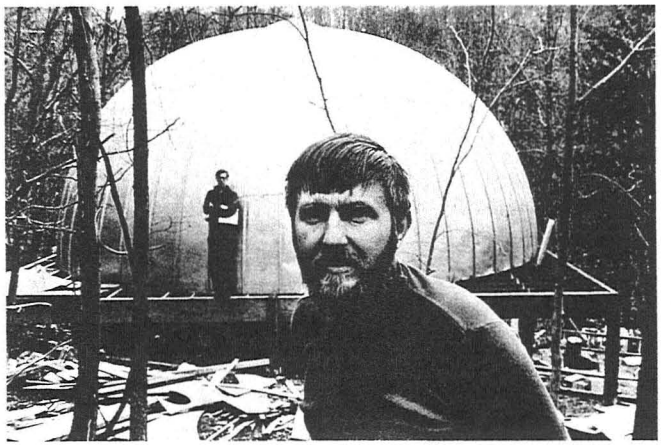
Events and Happenings (performance and publishing experiments) – which began in the late 1950s with artists associated with the Fluxus group, including Allan Kaprow (b. 1927) [8], Robert Watts (1923–88), George Brecht (b. 1925) and Yoko Ono (b. 1933) – were also based on the unpredictable execution of instructions or premises. Allan Kaprow's interest in the layers of time, space and interpersonal interaction, which in many ways anticipated the interactive, event-based nature of some computer artworks, came from what he saw as his inheritance from American abstract expressionist Jackson Pollock (1912–56) to 'utilize the specific substances of sight, sound, movements, people, odors, touch'.

As computer-generated images by artists such as Bela Julesz and Michael Noll (b. 1939) began entering the gallery purview in the 1960s, satellites came into use as a way of connecting art participants in dispersed locations. Stan VanDerBeek (1927–84), who built an audiovisual, satellite-linked venue for film, sound, animation and collage called *Movie-Drome* [9] in 1965, is a pioneer of multimedia-laden, network-dependent events that, as American



8 **Allan Kaprow**, *18 Happenings in 6 Parts*, 1959. Kaprow, who began as an action painter, shifted his practice to incorporate chance principles and to enable interaction and involvement. This highly scripted and rehearsed Happening, including projection, painting and performance, gave way to looser, open productions. Like many projects from this time, Happenings challenged rigid definitions of art objects.

9 **Stan VanDerBeek** in front of his environmental movie theatre *Movie-Drome* at Stoney Point, New York, *c.* 1966

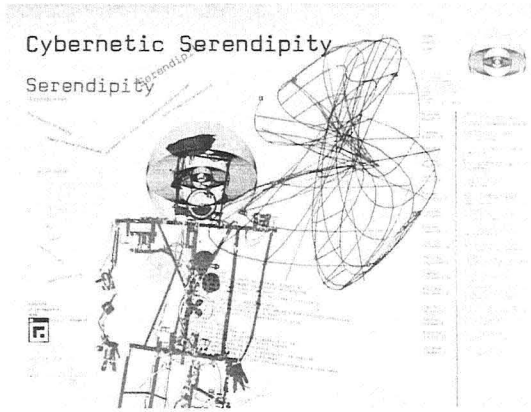


critic Gloria Sutton has noted, seem prototypical of internet data consumption enabled by web surfing and browsing. Like many working in media art, VanDerBeek was heavily influenced by composer John Cage's (1912–92) interest in found material and debris as musical content, as well as by Canadian writer and theoretician Marshall McLuhan's (1911–80) ideas that each type of media should be considered an active metaphor able to translate experience into new forms and revert agency to the participant. Many decades later, McLuhan's rhetoric of subjective experience, feedback and choice has often been invoked in arguments that cyberspace is an open and encompassing democratic medium.

One initiative of the 1960s that prefigures internet modes of collaborative production – in which an artist might work with programmers, designers or other specialists – was EAT, a group formed in 1966 by Bell Labs engineer Billy Klüver (b. 1927). During the 1960s, EAT would involve such diverse artists as Andy Warhol (1928–87), Yvonne Rainer (b. 1934), Robert Rauschenberg (b. 1925), Jasper Johns (b. 1930), John Cage and David Tudor (1926–96). Just as 1960s visual artists opened up to dance, music and other forms of mass culture, EAT's extension into scientific engineering, funded by Bell Labs, was part of an expansion into interdisciplinary spaces that can be considered a *mise en scène* for current practices like hacking, software art or net art as 'research and development' (at the MIT Media Lab, for instance).

In the late 1960s and early 1970s, a number of exhibitions and critics began to focus on articulating critical vocabularies that went beyond the 'art object' to address information and systems. It is interesting to note that many large-scale museum exhibitions

10 Exhibition poster for 'Cybernetic Serendipity', 1968



11 **Kit Galloway** and **Sherrie Rabinowitz**, *Electronic Café*, 1984. *Electronic Café* suspended spatial and temporal divides and eschewed singular, signature modes of authorship to emphasize the interplay of participants, spectacles and performances. In light of internet art, multimedia spectacles and satellite-based collaborations such as *Electronic Café* earn new historical significance.

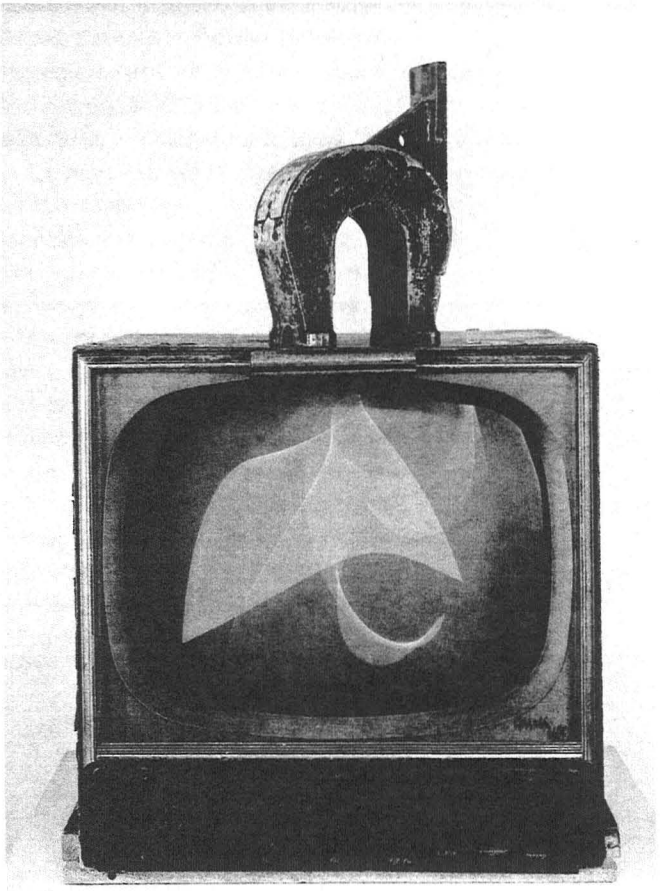
based on these somewhat radical and unfamiliar premises took place then, including 1968's 'Cybernetic Serendipity' [10] at the London Institute of Contemporary Art (curated by Jasia Reichardt), 'Software' in 1970 at New York's Jewish Museum (curated by Jack Burnham) and 'Information' at the Museum of Modern Art in New York (curated by Kynaston McShine), also in 1970. In our recent 'internet age', only a handful of new media art shows, originating at the ZKM, Ars Electronica and San Francisco's Museum of Modern Art, have equalled the scale of exhibition and venue of those that took place at that time. The curator of 'Software', Jack Burnham, who embraced cross-pollination between artists and computer scientists – showing work by computer innovators Theodor Nelson and Nicholas Negroponte (b. 1943) alongside those by self-styled 'artists' – employed computer idioms when referring to the concept and thematics structuring a work as its 'software', and the external object or form (if there was one) as 'hardware'. 'Information' took its name from the curator's sense that art was at an impasse, paralysed by world events and weighed down by materiality, and also that art was something very separate from entertainment-based spectacle. In the catalogue for the show, McShine wrote that the artists 'with the sense of mobility and change that pervades their time…are interested in ways of rapidly exchanging ideas rather than embalming the idea in an "object"'. In 2003, American critic David Joselit interpreted McShine's essay as proposing two significant claims, namely 'that by 1970, objects had come to seem practically obsolete', and that 'a dynamic exchange of information would only be "embalmed" if given permanent form'.

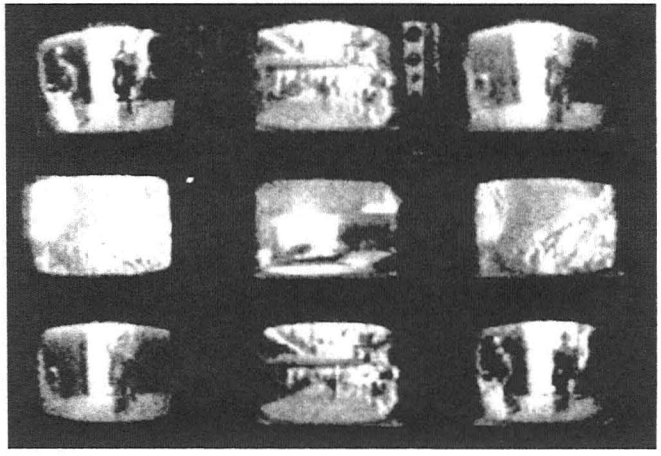
During the 1970s and 1980s, relatively affordable technologies of video, fax and cable television, as well as satellite, came into wider usage by artists, amplifying the themes of transmission, information and networks formerly investigated by minimalism and conceptual art. Artists Sherrie Rabinowitz (b. 1950) and Kit Galloway (b. 1948) secured funding from NASA to bring remote participants together to dance in the *Satellite Arts Project* (1977), creating a new type of performance that allowed what they called 'image as place'. The duo's *Electronic Café* (1984) [11] joined up various areas of Los Angeles in 'telecollaboration', yoking together art, distribution and communication, a portent of net performance models. Other kinds of network art took biological or social systems, rather than technological ones, as their materials – Ray Johnson's (1927–95) mail art projects, for example, are part of the New York Correspondence School project of the 1960s and are

precursors of email art. Jack Burnham's technological titles had actually been inspired by artists working with more natural phenomena. In 'Real Time Systems', one of his seminal essays on systems as a way of thinking about contemporary art, published in *Artforum* in 1969, Burnham cited organic systems as revealed by Hans Haacke's (b. 1936) 1966 plans for a work: 'I would like to lure 1,000 sea gulls to a certain spot (in the air) by some delicious food so as to construct an air sculpture from their combined mass.' Haacke's turning away from the art exhibition space to ornithological organization is emblematic of the period's varied anthropological explorations of process and immersion in fields usually relegated to the scientific.

Likewise, television art is a pertinent precursor of internet art and, in terms of scale of distribution and access, more relevant than cinema or satellite. Forward-thinking galleries like Howard Wise Gallery (New York) supported the format as early as 1969. 'TV as a Creative Medium', an exhibition curated by Wise in 1969, signalled the widespread influence of Marshall McLuhan and engineer, mathematician and architect Buckminster Fuller (1895–1983) and galvanized an interest in mass-media-based art. Soon after the exhibition, Boston public television station WGBH produced and aired its series *The Medium Is the Medium*, and *Time* magazine reporter Michael Shamberg, so impressed with the work of video pioneers Frank Gillette (b. 1941) and Ira Schneider (b. 1939), co-founded the artist collective the Raindance Corporation in 1969, together with Gillette, Schneider and Paul Ryan (b. 1944). Raindance was associated with the important publications *Guerrilla Television* (1971), offering a blueprint for the decentralization of TV networks, and *Radical Software* (1970–74) [4], featuring more interdisciplinary and technical approaches to democratizing media. At 'TV as a Creative Medium', Gillette and Schneider showed the important work *Wipe Cycle* [13], in which viewers saw themselves on a monitor at eight- or sixteen-second intervals, while other monitors played live television or footage. Gillette described his premise of underlining the relationship between seeing an image and assimilating the information it contains: 'The intent of this overloading (something like a play within a play within a play) is to escape the automatic "information" experience of commercial television without totally divesting it of its usual Content.' Also included in that show was *Participation TV* by Nam June Paik, the iconic artist who in that work and others like *Magnet TV* (1965) [12], as well as his many multimedia tapes for television, generated televisuals via participation or externally

12 **Nam June Paik**, *Magnet TV*, 1965. Paik applied a large magnet to a consumer television, morphing its signal into an abstract composition. In the process, he gave the monitor a sculptural character, disrupting its standardized form and function. Photo: Peter Moore © Estate of Peter Moore/VAGA, New York/DACS, London, 2004

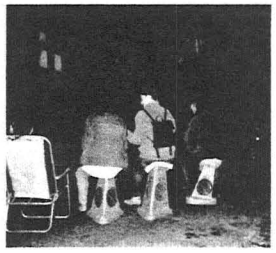




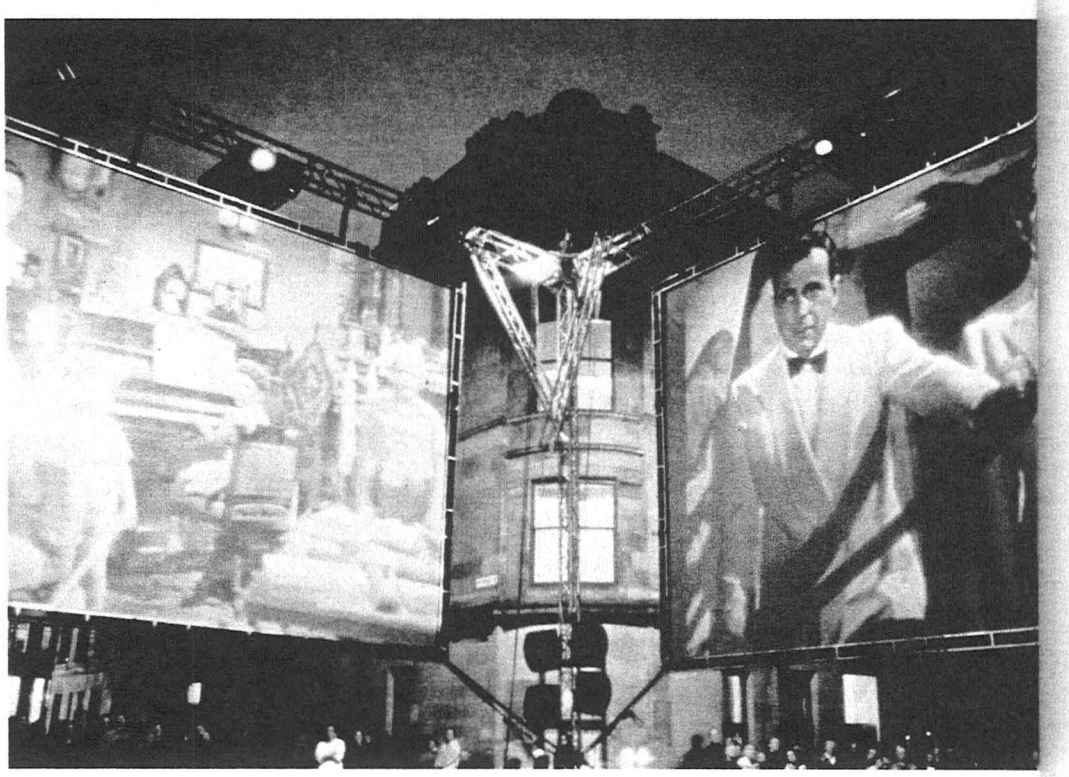
13 **Ira Schneider** and **Frank Gillette**, *Wipe Cycle*, from the 'TV as a Creative Medium' exhibition at the Howard Wise Gallery, New York, 1969

applied means. Television art never really managed to hold its ground as commercial networks became increasingly centralized, though European channels continued to programme it, like the video sketchbook *Video50*, curated by Robert Wilson, from 1978.

Some relevant points of comparison from art of the 1980s and 1990s include identity-based work, which succeeded in highlighting various inequalities both within and beyond the reach of fine arts. As a precursor of internet art and activist strategies, this kind of practice often forced its makers to represent stereotypical behaviour or images, breaking down widely held assumptions about, for example, a woman's relationship to her body, and then replacing them with new representations. Similar strategies are seen in some net art – for example, when artists reference corporate tactics and formats to reclaim and contest the colonization of public space or information.



Other salient trends in the 1980s included appropriation and hyperreal and simulationist techniques. These were bolstered by the influential writings of social theorist Jean Baudrillard (b. 1929) specifically and French literary theory more generally. In his 1981



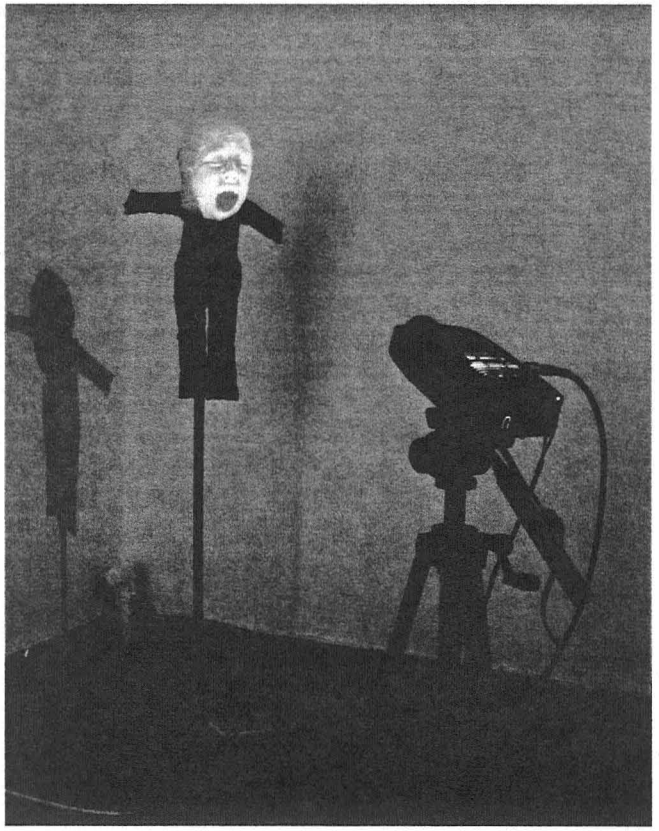
14 Rirkrit Tiravanija, *Community Cinema for a Quiet Intersection (after Oldenburg)*, 1999. Tiravanija's organization of screenings (including *Casablanca*) in Glasgow, Scotland, crystallizes five loose themes of 1990s artwork: relational aesthetics, ephemera, networks, the cross-pollination of disciplines, and new forms of public art. The artist as production coordinator, as opposed to mere craftsperson, resonates with internet artists who often collaborate with programmers and designers.

book *Simulacres et Simulation* and elsewhere, Baudrillard's formulation of the simulacrum – the copy for which there exists no original – focused closer attention on the dialectic between the virtual and the real, and the role of a work's context and aura, as seen in the rephotography works of Sherrie Levine (b. 1947) and Richard Prince (b. 1949), or the photorealistic paintings of Malcolm Morley (b. 1931). Appropriation and plagiarism, just a keyboard shortcut away when using a computer to copy a file, have become fairly standard forms of making in net art. A range of painting strategies, coupled with ongoing debates about the 'death of painting', focused critical energy on questions about medium-specificity, questions that become more complex when dealing with the multiple (e.g. text, broadcast and audio) formats of internet art. During this period, works by American artists Peter Halley (b. 1953), Barbara Kruger (b. 1945) and Jenny Holzer (b. 1950) borrowed from systems, theory and advertising, respectively, and sculptures by Israeli–American Haim Steinbach (b. 1944), American Ashley Bickerton (b. 1959) and French Sylvie Fleury (b. 1961) dealt with the objects and materials of consumer culture.

Cuban-born American artist Felix Gonzales-Torres (1957–96) and Thai artist Rirkrit Tiravanija (b. 1961) [14], both of whom came to prominence in the 1990s, worked in the installation mode, functioning as producers or facilitators more than masters of craft. The creation of participatory social events, a signature aspect of Tiravanija's work, is emblematic of what French critic Nicholas Bourriaud calls 'relational aesthetics'. In his book *Relational Aesthetics*, Bourriaud describes an emergent practice of relational and transitive art, writing that 'the artist produces connections with the world broadcast through works of social gesture, sign and form'. While this highly influential term was discussed without specific reference to the internet, net artists and critics developed like-minded models often informed by network technologies and systems such as free software or the email list.

Other artists of this era with explicit import for internet art include video artists Gary Hill (b. 1951), Bill Viola (b. 1951) and Tony Oursler (b. 1957) [15], who, as David Joselit writes, explore the 'colonization of the flesh by electronic technologies of communication' using video and installation. This is a persistent theme in net art. Installation artist Maureen Connor and photographers Isabell Heimerdinger and Cindy Sherman (b. 1954) [16] developed languages engaging with the iconophilia and

15 **Tony Oursler**, *Judy*, 1997. Oursler's portrait of *Judy* defies any secure perception of the subject or object: a range of expressions projected across the surface of a doll evokes psychological variation as well as television and surveillance technologies. An exploration of multiple personality disorder in relation to media structures, this work brings the portraiture tradition in line with the culture of channel surfing.



16 **Cindy Sherman**, *Untitled Film Still*, 1978. This still, one of an important series of photos initiated in 1977, features Sherman impersonating the iconic, if ostensibly prosaic, postures and expressions of young actresses. In Sherman's work, one of Hollywood's great legacies is revealed to be the invasion of thoughts, emotions and actions by media and information technologies.

17 **Ken Feingold**, *JCJ-Junkman*, 1995. Feingold sets an image of the worn-out ventriloquist puppet-head against a black background, surrounded by various changing 'buttons', which are difficult to catch and remove any element of calculated choice. By clicking on these 'buttons', the user can make the puppet-head speak an incoherent language – made up of snippets from public-domain archive files found on the internet – to produce what Feingold describes as interactivity 'reduced to a zero-degree'.

internalization of media (for them, film and television) experience. Net artworks on surveillance similarly develop and modify media *mise en scène*. Installation artists Toni Dove, Jeffrey Shaw (b. 1944) and Shu Lea Cheang (b. 1954) used computer technology to create immersive, interactive environments, or, like Julia Scher (b. 1954), Perry Hoberman (b. 1954) and Ken Feingold (b. 1952) [17], addressed computer-dependent culture. Works by these artists made the claim that consumer technologies and daily life are intertwined in complex ways – a claim that has been easier to sustain and illustrate the more developed internet culture and technologies have become.