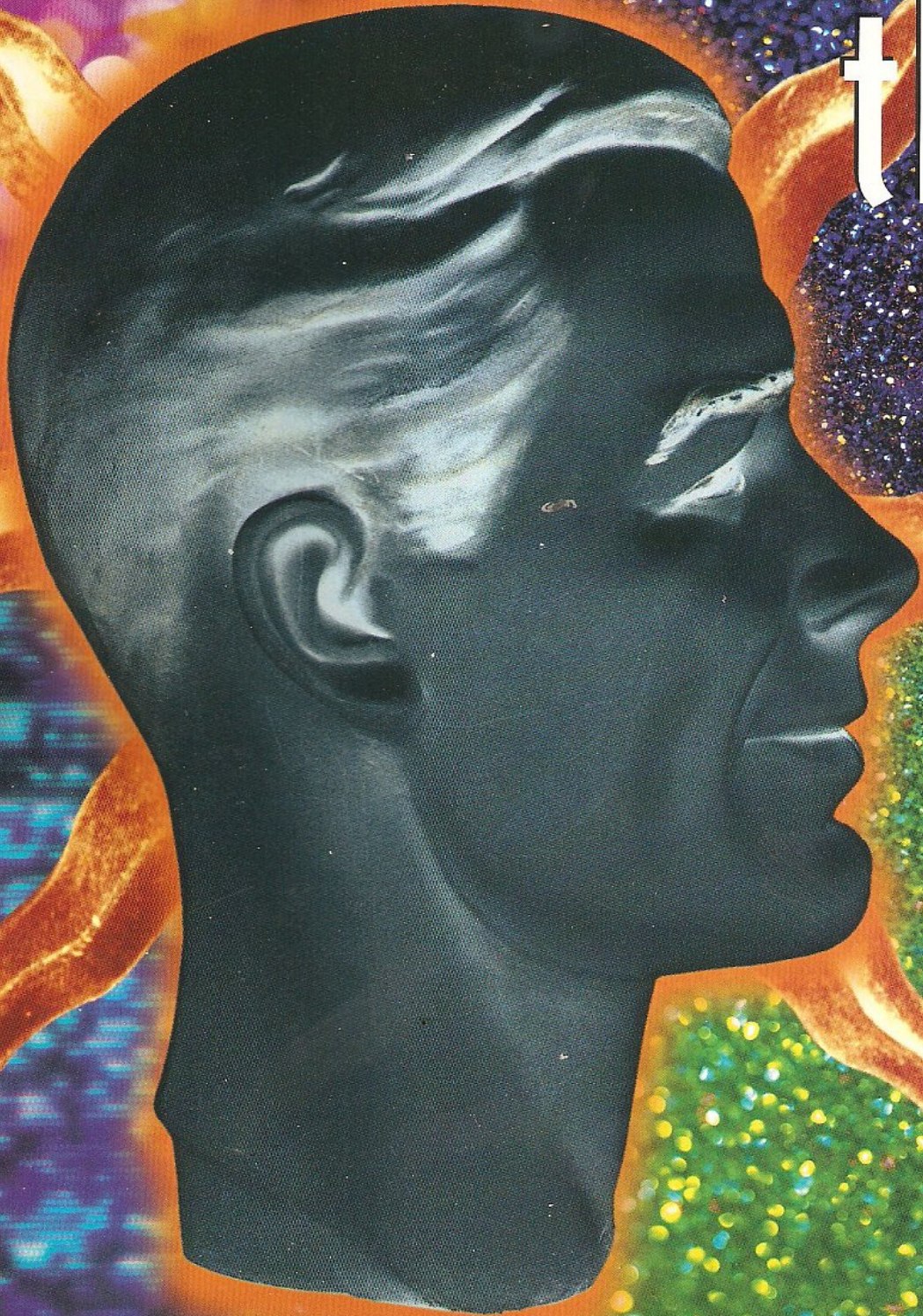


Building the



Body Electric

An Introduction to Avatars

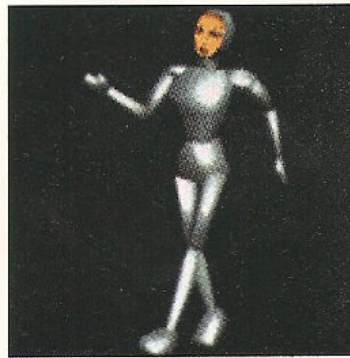
"...Hiro's not actually here at all. He's in a computer-generated universe that his computer is drawing onto his goggles and pumping into his earphones... Hiro is approaching the Street... It is the brilliantly lit boulevard that can be seen, miniaturized and backward, reflected in the lenses of his goggles. It does not really exist. But right now, millions of people are walking up and down it."

— Neal Stephenson, *Snow Crash*

In 1992, when the World Wide Web was nothing more than a distant radar blip, writer-hacker Neal Stephenson created a compelling vision of a global virtual reality he called the metaverse. A purely electronic realm of great beauty and chaos, the metaverse could be "entered" through the use of special hardware and software. Users could move within this world, experiencing and interacting with the graphical environment as though they were really there: data-mining, shopping, exploring, or simply socializing.

BY TOD FOLEY

Today's Internet is rapidly approaching this level of sophistication: the browser presents a consistent interface for all types of Internet services; plug-in software has expanded the role of the browser to carry audio, video, live chat, and simple virtual realities known as VRML Worlds (run by software written in Virtual Reality Markup Language). Data-gloves wired to allow you to interact with software through hand movements and VR headsets that enable you to immerse yourself in computer-generated landscapes are now commercially available (if not quite ubiquitous), and the desktop com-



The management of virtual worlds closely resembles the process of government in the real world, the experimental new-frontiers kind of government, in which human needs and actions are viewed in a refreshingly pragmatic light.

puter has become powerful enough to perform complex graphical rendering and display tasks while downloading the necessary data through a modem. These impressive developments imply that we're not very far from a metaverse much as Stephenson envisioned. A quick trip around the Web will reveal storefronts, libraries, offices, theaters, boulevards, and billboards of all types. The one thing missing is the people.

Enter the avatars.

What Is an Avatar?

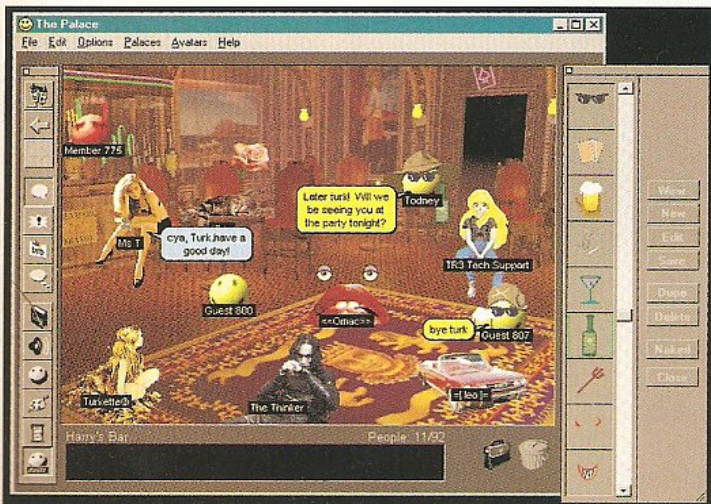
"Avatar" is the common term for the representation of a real person in a virtual space. From a Sanskrit word meaning manifestation (as in the physical manifestation of a deity in human or animal form), an avatar is a virtual body that moves around and performs various actions in cyberspace. In other words, Super Mario for the Internet.

Like Nintendo's famed videogame hero, an avatar possesses certain preordained capabilities, such as moving around, picking up objects, putting down objects, etc. These behaviors are controlled via a combination of keyboard and mouse, or by joystick. Unlike Mario, however, avatars in most virtual worlds can be personalized, taking on a variety of shapes and behaviors limited only by the ingenuity of their users. With the right software, you can not only move around and carry on conversations in a virtual world; you can dance, gesture, display emotions, and change instantly into other avatars.

Although the basic idea is extremely straightforward, it turns out that avatars raise all sorts of thorny issues, both technical and social. And while the social issues are predictably subtle, in this field, even the technical issues have an abstract tinge. Just what, for instance, constitutes a "realistic" representation of a person? Must it be

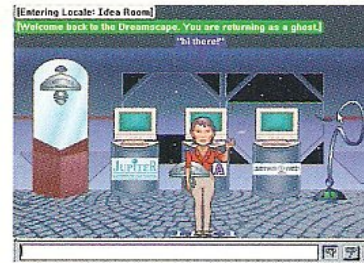
three-dimensional? Must it move fluidly? How fluidly? Does it require an audible voice, or is text sufficient? What basic physical actions must it be able to perform? How should these actions be controlled? The list goes on and on.

Despite laborious research being done at institutions like MIT and the University of Pennsylvania, for the most part these issues will be resolved in the marketplace of the Web. Sensing a growing demand, and extrapolating from the success of real-time chat systems (the number-one moneymaker for most online service providers), a small number of progressive companies are already offering their own versions of avatar-based virtual world systems, sending early adopters racing to download the required software and put it to use. From the animated 2D inhabitants of *The Palace* (www.the-palace.com) to the floating 3D statues of CyberGate (<http://www2.blacksun.com/pointworld/index.html>), a variety of systems are now being offered—often for free—by companies with names like Cultural Tech-



The Palace fairly overflows with virtual bodies of every description—from lime-green happy faces to blond bombshells.

nologies and Worlds, Inc. These brave souls are risking major investments (and shareholder returns) on the belief that users and content developers will prefer their virtual world systems over their competitors'. Among the theories being tested is a fundamental concept that avatar functionality (or



With the right software, you can not only move around and carry on conversations in a virtual world; you can dance, gesture, display emotions, and change instantly into other avatars.

sophistication, if you will) is directly related to marketshare.

All Avatars Are Not Created Equal

The problems of avatar functionality can be broken into two main areas: representation and behavior. Representation issues involve the graphical depiction of avatars themselves, including positioning and navigational cues. Representational concerns are largely dependent upon the kind of operating system on which they're generated, since they involve such basic decisions as whether or not the world is rendered in 3D and whether avatars move smoothly or suddenly from point to point.

Although most virtual world vendors agree that the trend will ultimately favor true 3D environments, many systems currently use 2D or "2-and-a-half-D" images (in which perspective used to imply greater depth than traditional animation). This is largely because of the spotty performance of VRML when navigating through complex worlds and the unreasonable rendering times required on lower-end machines.

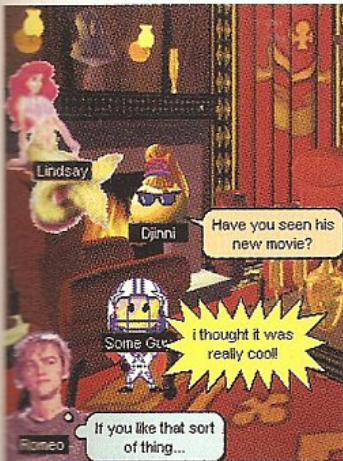
There are tradeoffs, of course. Unlike the dozens of linked individual poses required to convey 2D animation, a 3D model only needs to be designed once. After textures are applied to its virtual surfaces, the object may be rotated in any direction without requiring new art. (It's the difference, in computer terms, between a moving picture and the genuine article.) Unfortunately, it's a lot harder to find good 3D artists than traditional animators. Despite the otherworldly appeal of 3D environments, it will be a few years before complex models will run smoothly on the average home desktop machine.

There are three ways to approach avatar creation: 'pre-made avatars, mix-n-match avatars, or hand-made avatars. Each method has its strong and weak points. Selecting a pre-made

avatar—like those available in Black Sun Interactive's *CyberGate* worlds—is a simple decision, but one that constrains choice, possibly forcing users to assume appearances or styles that express someone else's taste.

The opposite problem can be seen in systems like *The Palace* and Microsoft's *V-Chat* (<http://www.msn.com/v-chat/index.htm>), which allow hand-made avatars of all types. In such worlds, users are largely responsible for creating or procuring their own images, which can be a daunting task for non-artists. It also means that system operators (the Big Brothers of Web) must always be on the lookout for lewd or otherwise objectionable avatars. Although no cases are pending yet, it can't be long before someone gets sued for appearing in cyberspace as a naked celebrity, or a corporate mascot in a less-than-flattering pose.

Mix-n-match systems, such as *WorldsAway* (<http://teleparc.com/habitat2>) from Fujitsu Cultural Technologies, take a middle ground, providing users with both the best and



Just what behaviors are considered necessary in order to effectively simulate a human being? Should avatars have the ability to run? Jump? Steal things? Kill other avatars?

worst of the other approaches. Generally, such systems provide users with a selection of heads and a selection of bodies they can mix and match to produce a complete avatar. While this approach manages to avoid the problems of hand-made art, it may still be too restrictive to offer truly broad selections.

Some have suggested that in the near future, third-party companies will produce avatar sets for various worlds and genres. Given the solid performance of clip-art collections and online multimedia stockhouses, this could happen sooner than anyone expects.

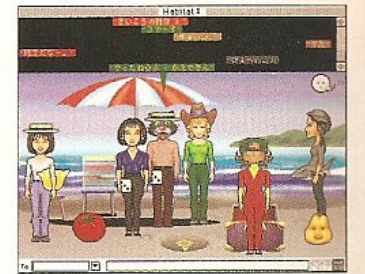
This is Not Your Father's Cyberspace

While the representational issues raised by avatars are immense, at

"Everyone feels certain they know what constitutes inappropriate behavior, and they all disagree."

least they offer the promise of technological solutions: many of the inherent difficulties will diminish as bandwidth and CPU speed increase. When it comes to behavior design, however, developers face problems which are much more intractable.

Just what behaviors are considered necessary in order to effectively simulate a human being? Should avatars have the ability to run? Jump? Steal things? Kill other avatars?



Fujitsu's *Habitat*, the first avatar-based online world, represents the bell-bottom analogue to the current cutting edge.

Have Av, Will Travel

"Do you like my new av?" asks Gwen. The twinkling jewel in her forehead is a definite eye-catcher. Several users voice approval, cartoon balloons emanating from their heads. "MachoMan," a tough-looking hombre with a big mustache, floats over and animates, patting her on the virtual head. Suddenly I feel low-tech in my non-animated form, and I open a menu to find a more exciting self.

As I click on my selection—a tentacled alien figure with a big eye that changes colors—my avatar transforms. Throughout the crowded room, others follow suit. "AVATAR PARTY!" someone shouts. In moments, the room fills with film heroes, cartoon characters and other bizarre figures as people don their most impressive avs. Fidel Castro sits in the corner, a smoking cigar poised to his lips. Crazy Kat does somersaults in the middle of the room. A grey-bearded Moses, in a surreal looped sequence, hands out stone tablets that soon litter the floor.

"Looks like I started something," Gwen says. I agree, adding that it's getting hard to talk with all the activity going on. "Wanna come to my private room?" she asks. "Sure," I answer, as the screen swarms with exclamations of "Me too!"

"Woops!" Gwen's reply appears italicized. "I forgot to whisper!"

Just another day in Cyberspace.

These questions have long been considered by the designers of text-based MUDs (Multi-User Domains) on the Internet (the sort where people interact in the form of dialogue on the page, including descriptions of the physical environment and of the events that are transpiring). Without multimedia assets like graphics and sound to worry about, text-based MUD characters can be programmed to display all types of complex behavior—including stealing and killing—and each MUD community makes up its own mind as to whether such activities will be permitted, tolerated, or even possible. For many users, chaotic situations and the ever-present possibility of “death” are all part of the appeal. For others, however, this is no game. In a survey of users done by Jim Bumgardner, inventor of *The Palace* software, roughly 50 per-



The avatars are already among us, and they have much to say.

when complex social structures develop online. Unfortunately once graphics are added into the mix, the lessons of text-based MUDs become a bit less applicable. Since no one's ever built a truly functional online society before, developers are forced to take on trial-and-error approach and must be willing to learn from mistakes made along the way. “Everyone feels certain they know what constitutes inappropriate behavior,” says Bumgardner, to which he adds: “And they all disagree.”

Randall Farmer and Chip Morningstar of Electric Communities are as familiar with these difficulties as anyone. Co-designers of *Habitat*, the first commercial multi-user graphical environment, Farmer and Morningstar decided early on that such issues would be best sorted out by the users themselves. “Nobody knows how to produce an automaton that even approaches the complexity of a real human being, let alone a society,” they wrote in their 1990 essay “The Lessons of Lucasfilm’s *Habitat*,” published in *Cyberspace: First Steps*, MIT Press, Cambridge, Mass. “The idea behind our world was precisely that it did not come with a fixed set of objectives for its inhabitants, but rather provided a broad palette of possible activities from which the players could choose, driven by their own internal inclinations.” Unfortunately, as is so often the case, a few bad apples spoiled it for the whole


bunch, abusing “loopholes” in the system and giving other users a bad time. It wasn’t long before cyber-theft and cyber-murder reared their ugly heads. Eventually, certain limits had to be created, certain powers revoked. Virtual sheriffs and deputies were sworn in, and virtual lawyers soon put out their shingles in the online world. Freedom, it seems, tends to encourage outrageousness.

Of the Avatars, By the Avatars

In many ways, the creation and management of avatar systems and virtual worlds closely resemble the processes of government in the real world. Not the modern-day, ready-to-wear, love-it-or-leave-it kind of government, but the experimental new frontiers kind, in which human needs and actions are viewed in a refreshingly pragmatic light. Perhaps this appeals to developers. Each new technological development exposes a rich realm of human assumptions and interactions, for which the only guide can be experience.

Like the American colonies or the handful of HTML pages that comprised the original World Wide Web, today’s virtual worlds are growing steadily in size, power, and population, exhibiting every indication that they’ll eventually dominate cyberspace. And like the first settlers of any new territory, the avatars that inhabit these digital worlds today are taking an active role in the grand experiment of forming an entirely unique virtual society.

Although there are still many mistakes to be made and lessons to be learned, the metaverse of tomorrow is already beginning to take form. As cross-platform standards are hammered out, today’s virtual worlds will begin to link, merge, and finally blend into one vast landscape of historical significance and surreal variety.

The avatars are already among us, and they have much to say. 

Tod Foley is a writer, gamemaster, and designer of narrative environments for all media, both traditional and new. His website is located at <http://www.prime-net.com/~asif>.



The Japanese version of Fujitsu/Cultural Technologies’ *Habitat* is the longest running virtual online world.

cent reported that they don’t take it personally when their avatars are teased or harmed, while the other 50 percent felt that their avatars were extensions of themselves and should be treated with all due respect.

Many MUD designers have responded by building complex social structures and resident authority figures into their electronic worlds. These forebears of today’s chat worlds are like experimental colonies in cyberspace, pointing out some of the powers and problems we face