Digital carvings: Brand totems for the emergence of infocentricity

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Digital carvings: Brand totems for the emergence of infocentricity

by Bill Lucas and Michael Higgins

What is the future of digital branding? Bill Lucas and Michael Higgins propose a scenario of digital “totems.” These carefully crafted cyber-carvings emerge from an innovative interface paradigm. They tell stories—about companies, about brands, about products. They have multidimensional personalities—from mechanical to charming to ethereal. They encourage consumers to access, exchange, manipulate and personalize information. It is an experimental system with fascinating and powerful potential.

In 1989, a band of colleagues from Carnegie Mellon University in Pittsburgh, Pennsylvania, crossed the Monongahela River and settled on its south shore. They named their tribe MAYA and pioneered an interdisciplinary approach to product-design consulting. Through synergistic services to commercial and government clients (figure 1), the company blazed new trails throughout the technology wilderness. In addition to serving as a scout for Digital Equipment Corporation, DARPA (Defense Advanced Research Projects Agency), and many others, MAYA made numerous independent discoveries.

Among the MAYAn innovations is a new interface paradigm—an “information-centric” approach to the presentation of information. The approach was initially prototyped in a 1990s effort, code-named Visage. In the new model, displays are arrangements of elements that can be broken apart by users and directly manipulated, giving people the sense of “getting their hands on the data.” The approach empowers people to perform actions directly that would traditionally require extensive knowledge of numerous specialized interface features.

No matter how you slice it, the concept of infocentricity will result in a new consumer experience—one in which the role of designer will be central. The most recent prototype, code-named Renex, represents a turn toward use outside the lab—moving from pure

R&D for specialized domains to a community of earliest adopters for more general use. This pre-commercialization design phase offers many unique incubation opportunities, among them the promise of a new way to create brand identities.

**Human-computer interaction**

The development of infocentricity can be seen as part of a long progression in the history of computing. The large-scale trend has been toward greater decentralization and greater personalization of the computing experience. The first computers were special-purpose devices, hard-wired for a particular program. General programmability was the first revolution of computing, making a single machine capable of doing any task. Following the invention of the transistor, computers got smaller and faster. Eventually, they became networked, which spread computing chores across many machines.

As these technical feats were accomplished, similar developments in human-computer interaction (HCI) were making the machines more accessible to people. Perhaps the first watershed was the development of the high-level programming language. Time-sharing and job-control languages followed, which allowed machine resources to be efficiently used by many people. Then, in April 1973, the Alto computer was completed at Xerox Corp.’s PARC (Palo Alto Research Center). The Alto represented a revolutionary departure from the prevailing command-line HCI style and paved the way for a dramatically different relationship between people and information technologies. Personal computers hit the mass market, and *user-friendly* made its way into Merriam-Webster’s dictionary.

The Alto was the first system to pull together the fundamental elements of the modern graphical user interface. Approximately 10 years later, Apple introduced the Lisa. It featured basically the same combination of interface ideas as the Alto: Windows, Icons, Menus, and Pointers (WIMP). Over the years, Microsoft and others followed suit with slightly different varieties. Contemporary interfaces are more colorful, include improved typography, and take advantage of bigger screens with higher resolutions. However, with the exception of a few new widgets, they are all essentially the same as they were 20 years ago. Although we have seen technical improvements rivaling those of the early days of computing—most notably the rise of the Internet—we have not reached another Alto-like moment in human-computer interaction.

Indeed, the WIMP interface is such a strong mainstream mainstay that many people have trouble imagining other models. Alternatives such as speech recognition, touch devices, eye-movement detection, and new 3-D visual models are all being explored in earnest, but as yet, none has been designed or executed in a systematic manner that is sufficiently conducive to broad use. Populist adoption of inventive interfaces requires learning new paradigms. Since doing so is both a personal and a business investment, it is very likely that future interfaces will include all or part of the WIMP approach.

In some ways, MAYA’s infocentric software is an example of one such transitional form. It is not centered on competing head-to-head with existing WIMP-style operating systems. In fact, it currently works within a window of its own

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2. Some definitions/insights regarding the WIMP interface were drawn from http://searchWin2000.com, part of the TechTarget network of Enterprise IT Web Sites.
across many computer platforms. Like the WIMP, it utilizes pointer devices and has a form of pop-up menus. At the same time, MAYA’s patented approach is a radically different environment. It is designed to go well beyond service as a novel, isolated desktop program and to begin to fully take advantage of the networked, connected computing universe we now occupy.

**Hands-on data**

Most contemporary applications are rather like remote manipulator arms at a nuclear power plant; they are impersonal tools users can learn to use to manipulate their data, but always at an arm’s length. Part of this feeling of distance stems from inconsistency of interface. Common operations are often performed differently in various applications (or even in the same application). Part of it comes from the fact that data is strongly associated with the programs that manipulate it. There are very few operations that can be done to a piece of information, without first explicitly invoking a program to do them. Files can be moved from folder to folder, but that’s about it.¹

Rather than limit the user to files and documents as targets of direct manipulation, the infocentric approach permits “hands-on” drag-and-drop manipulation of data at any level of granularity. A numeric entry in a table, selected bars from a bar chart, and a complex presentation graphic are all first-class candidates for user manipulations. Data are treated as “things” in “places” rather than as abstract information. In turn, users come to imbue the information displays with a sense of physical reality.

The key to making the infocentric system work is deciding which operations need to work consistently, and which need to vary. In order to make sense of this idea of consistency and variability, it helps to separate the system into abstract data objects and the visual, physical presentation of these objects.

In Renex, data objects themselves are invisible abstract entities, in the same way a mathematical function is a logical idea rather than a physical thing. But in the same way that a mathematical function can be represented by a series of symbols or a curve drawn on graph paper, information objects can be represented in the real world in many ways. We begin to see one tension point between consistency and variation—all information objects in Renex are fundamentally similar at a logical, structural level. Such an object, called a u-form,² is just a collection of attribute-value pairs, labeled with a unique identifier (figure 2). It doesn’t matter if the u-form represents a row in a spreadsheet or an email message or a Web page; it always follows this stereotypical attribute-value structure. But, when we translate a u-form into a visible element that can be seen and manipulated, we have a choice to make. Since the u-form is wholly abstract, we could in principle choose to render it in any number of ways. It could be an icon or a document or a row in a table or a hyperlink in a document. Some of these presentations wouldn’t make sense for every piece of information, but because the underlying information structure is uniform, many of them always make sense.

This very powerful concept—that information can be shown in many ways—is called polymorphism. It is the source of an enormous amount of richness and power in the system, but also a source of danger. If a piece of information can look like anything, suddenly the user is at sea. Variability has had too great a triumph over consistency.

To rein in this power, we introduce the notion of a frame. A frame is a rectangular region that resembles a window in a WIMP system, without the clunky title bar and borders.

³. Technologists will recognize that even operating on files in the Windows desktop or Macintosh Finder involves using a program. It is simply so tightly integrated with the operating system (without which no interaction is possible) that it doesn’t feel as if a new application is being used. Microsoft has pursued strategies such as the Active Desktop to enhance this feeling, but many users find the effort clumsy or even counter-productive.

Frames are the source of consistency. Each type of frame has its own method of displaying information—for instance, a map frame places icons on a map. A bar-chart frame renders u-forms as bars; another frame might render those same u-forms as text. If you drag text to a map frame, the text element changes to a map icon, but it still represents the same underlying u-form (figure 3). In this way, there is global consistency provided through the data and local consistency provided through the frames, but at each frame boundary there is a point of variation. The act of moving a data element from one frame to another crosses that boundary and changes the presentation of the data. This localizes a very powerful point of variation at a consistent and highly visual point in the interface—the frame boundary.

**Human-information interaction**

Another source of consistency is found in certain basic interaction techniques that are supported by all frames. An element in a frame can always be dragged to another frame, and it can always be cloned (making another visual reference to the same u-form). It can always be selected, allowing convenient operations on groups of elements. It always supports navigation to related u-forms by means of a pop-up menu. It can always be marked with a paint color (and any other element referring to the same u-form, no matter what frame it appears in, will be instantly marked with the same color). No matter what form the information is currently in, these operations are always available.

This leads to an interaction style in which information objects are constantly dragged from frame to frame, incrementally revealing different facets of the underlying data. While it is a very powerful data analysis and understanding technique, this style also feels very physical. The data is moved, manipulated, and transformed like clay. Relationships and structures in the data are discovered, and new ones can be imposed.

Since the underlying data is abstracted away from the display, it is easy to separate that part of the system out into another component, which

![Figure 2](image1.png)

**Figure 2.** Stereotypical attribute-value structure of a u-form.

![Figure 3](image2.png)

**Figure 3.** Dragging information objects between display frames, and polymorphic collaboration.
can then be shared among users. Once this happens, the interaction with the information immediately becomes collaborative. Furthermore, the collaboration is polymorphic. You and I can look at the same data in completely different ways, bringing to bear our unique ways of working and understanding (figure 3).

The last important thing about frames is that they are easy to make. New frames don’t require a team of software engineers and an extensive beta-testing program. Instead, they can be created using simple scripts by end users, allowing individuals to add an almost biological diversity to the system. Since frame blueprints are themselves encoded as u-forms (just like everything else in Renex), the same fundamental operations can be used to create and extend them. Furthermore, they can be organized and understood just like any other data. This tends to blur the distinction between programmers and users. Users should constantly be casually programming, and programmers should be experiencing the same style of experience as their users.

This individual customizability, combined with the visceral feel of the overall interface, creates a more intimate relationship with information. Placed in frames, information feels substantive and real. It can be shared easily. It can be annotated and extended endlessly, without breaking anything. As people’s personal stake in their information grows, the larger shared information space grows more social. Individuality is represented in the networks and linkages between information objects.

**Dynamic digital diversity**

In this world of shared, ubiquitous information, brand identity becomes a more holistic phenomenon. Users have greater control over their information and the way in which it is presented; they can change the presentation of data as easily as they change their shoes. Because of this, no single application experience can be counted on to shoulder the brand burden; instead, brand must be woven into a large number of cooperating elements. Furthermore, the brand must be desirable, since the user has so much power over its presence.

The brand identity challenges that arise from the infocentric approach are partially foreshadowed in today’s marketplace. As static, hard-coded Web sites have given way to dynamically generated pages and customizable user interface skins have grown increasingly popular, narrow control over identity elements is less and less feasible. Many designers count the loss as a threat to building effective brand experiences. MAYA’s design team sees an exciting opportunity to capitalize on the transformational assets.

In striving to design a living, evolving system that accommodates strong lines of continuity and vibrant variety, MAYA’s team finds inspiration in Native American culture, where special artifacts represent ideas intrinsic to sustaining society. For the Northwest Coast tribes of North America, totem poles served as an emblem of family and often a reminder of ancestry. Like coats of arms and great seals, they declare, “This is who we are. These carvings symbolically show what we stand for.”

MAYA’s design team is experimenting with formation and growth of the Renex brand in the same way that a clan’s identity is upheld—through kinship to common totemic artifacts. To start, the team crafted two inaugural totems—abstract expressions of the Renex look and feel. They are silent and static, yet they evoke a full range of sensory dimensions, such that subsequent iterations can include acoustics, kinetics, and the like. The first totem relates to the heritage of the Renex prototype. The second totem displays three intertwining candidate themes for the first generation of Renex UI characteristics.

**Heritage totem**

The heritage totem (figure 4) contains digital carvings from five key spheres of historic

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5. Components that allow users to modify graphical interfaces. Additional explanation can be seen at http://support.microsoft.com/default.aspx?scid=KB:EN-US;q253739&.
influence—a sub-set of many predecessors. Each example is influential along a number of different dimensions, but the totem does not enumerate every relational facet in deep detail. Instead, it is a notional summarization that reflects the essential spirit of relevance for each sample.

At the base of the totem is HyperCard, the

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HyperCard®: Information environment and software development tool by Apple Computer Inc.

Workscape®: Office-document management system designed and prototyped for Digital Equipment Corporation by MAYA Design.

Visage / CoMotion™: DARPA research project by MAYA Design and corresponding commercial software product by MAYA Viz, Ltd.

Civium™: Mobile information tools for civic involvement designed and prototyped by MAYA Design.

Aqua: Interface design for Macintosh® OS X by Apple Computer Inc.

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that facilitates civic involvement and/or other forms of mutually beneficial collaboration. Initial R&D exercises entail early Renex prototypes and a brand identity system centered on dynamic, contemporary styling. Current and future R&D has Civium and Renex melding into a seamless user experience.

Finally, the top-right portion of the totem is devoted to a contemporary case example—specifically, AQUA, the inventive interface of Macintosh OS X. It is shown because, in the words of Jason Snell, "Just as Apple’s distinctive hardware designs set the Macintosh free from the beige-box syndrome that plagues the rest of the computer industry, Mac OS X’s bold new interface stands to do the same for software."  

The heritage totem records and validates pre-cursive designs. Each forerunner contains at least one salient corollary to Renex. For instance, the amiable spirit of Civium and AQUA is carried forth in Renex. The visual programming facet of Renex is prefaced in HyperCard, Workscape, and Visage. And the document-centric approach of Workscape led to infocentricity in Visage and collaboration in CoMotion—which, in turn, is being refined even further in Renex.

First-generation totem

The first-generation totem (figure 5) reflects a set of emergent traits. It is a threefold expression of thematic spheres suggesting that the Renex look and feel be infused with qualities that are charming, mechanical, and ethereal. Some of the characteristics descend from predecessors, but most are born out of new creative explorations. Even though the totem is in a gestational state, it begins to advertise and exalt propagation of the family line quite powerfully.

The “charming” theme positions Renex as a personable entity that fosters and facilitates creativity. A corresponding sense of inventiveness is conveyed through a witty pleasance. For example, geometric forms suggest the endless possibilities of building blocks. Likewise, when a user moves her cursor over the corner of a display frame, the cursor-change feedback signals "magnification" with clever clarity.

The “mechanical” theme corresponds with

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the fact that Renex includes a visual editor for user-scripting and a wide range of powerful tools. A corresponding sense of utility is conveyed through a somewhat industrial aesthetic. For instance, software coding resembles wiring blueprints, and tools have the tactile look of physical instruments.

The "ethereal" theme relates to the way Renex enables an arbitrarily large set of distributed users to collectively maintain a vast information space of shared interest. A corresponding sense of expansiveness is conveyed through an environment of ethereal beauty. Specifically, eclipse-like frame borders connote celestial bodies in the cosmos, and pop-up menus are designed to evoke transient clouds.

**Perpetuating identity**

As with physical totem poles, each of the proposed totems tells a story—a complex tale that is conducive to many interpretations. The symbolism of the totems is being translated into detailed design specifications. Rudimentary user interface specifications are being developed with reverence for the heritage totem and the first-generation totem. And, as interactions are refined and more robust user interface features are developed, the Renex look and feel is gradually coming to life and growing.

The symbolism of the totems is open to expansion. As new or different concept references prove necessary, totems are being adjusted accordingly. New carvings are carefully considered in light of preceding totems so that they remain cohesive. When many dramatically different conceptual references are required, extension of the lineage will be reflected in new totems for second-, third-, even fourth-generation totems. This will yield a brand identity system that is always rooted in the dichotomy of the infocentric approach—the sophisticated balance between consistency and variability. In doing so, the brand is always adapting, yet constantly reinforcing the personal comfort, connections, and empowerment that infocentricity offers.

Eventually, the totems that were initially built to help shape the graphical user interface of the Renex prototype will become foundational totems for an ever-widening range of user interfaces with the brand. From introductory promotional materials to myriad touch-points within a persistent product culture, brand totems are particularly conducive to serving as design guideposts. In turn, MAYA’s design team hypothesizes that carving and translating totems is applicable to any branding effort in any domain.

Totem building can begin at any level. It can start with sweeping corporate strategy statements, a specific experience (as with the Renex cornerstone product prototype), or a combination. In all cases, totem building can be a powerful vehicle for making customers integral to shaping the brand. As user populations expand, a prosperous push-pull relationship between designers and customers can ensue by means of totem iterations—ultimately bringing to bear communal brand transformations.

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**Suggested Readings**


