City of News

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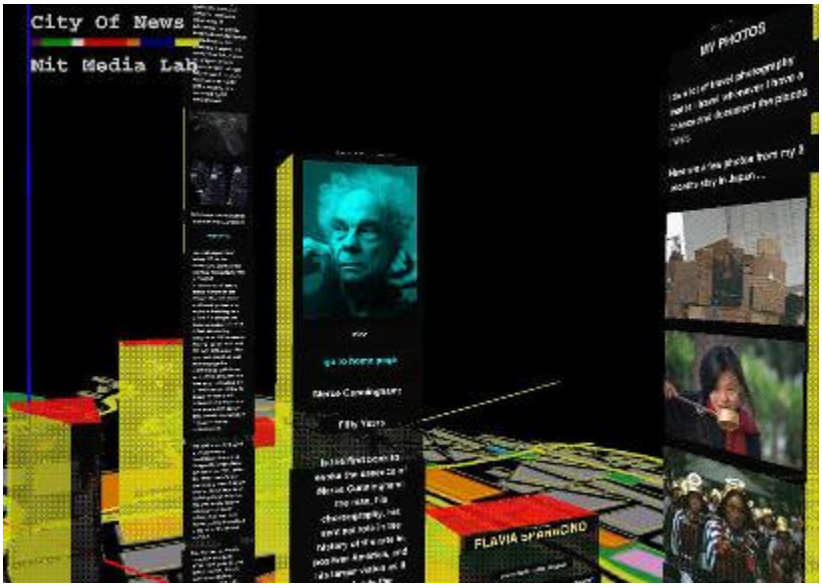
"How do we explore the digital box of fragments that pastes together disjunctive arrays of images and sets of data into a seemingly continuous display?" … We "need to develop new modes of perception with which to receive, absorb, criticize, and produce new combinations of information" M. Christine Boyer

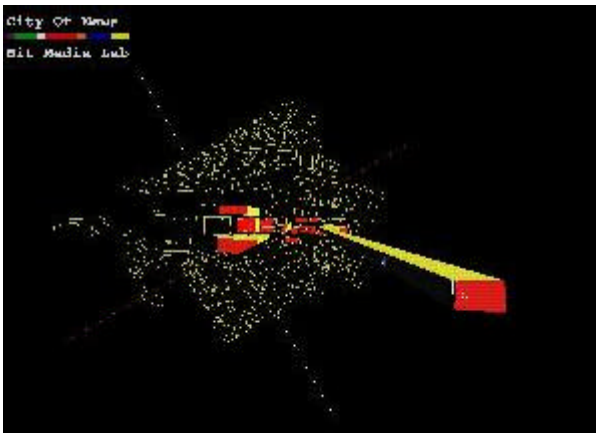
In a 1995 article, appeared in "Le Monde Diplomatique", the French theorist of technology, Paul Virilio, describes the phenomenon of the loss of orientation experienced by the exponentially increasing crowd which is relentlessly enthralled in cyberspace. Virilio observes that the construction of information superhighways, which are globalized and instantaneously updated, presents us with a threat, a menace to our perception of what reality is, of what it means for us to exist, as individuals, here and now. Induced by the splitting of the sensible world into real and virtual in parallel with the "invention of the perspective of real-time", this threat causes a shock, a "mental concussion", that hooks the happenings of events to a globalized monorail track. We have extended Virilio's concern to the varied world of the Net, and observed that for many, the Web is a wasteland of information, a Babel without dictionary, an encyclopaedia with no table of contents, an unstructured territory without a map. While web crawlers and search engines help us locate general topics information, even while using these tools, we often experience, with Virilio, "information anxiety", and loose our bearings in the "flatland" of our regular browsers, under the vast horizon of the information superhighways. In order for any kind of information to be presented to us in a way which is not fragmented or disruptive of our current activities, for it to become a part of our cognitive space, and be remembered and integrated with the flow of our mental activities, we need to be able to map, directly or by analogy, some of the real-world architecture back into the computer display. We need to build a display environment, a tailored information landscape, which helps people construct a cognitive map to organize, sort, classify, remember, integrate, the variety of textual or visual information presented. In accomplishing this task, we have been inspired by the existing literature in the field of spatial orientation, from a cognitive psychology perspective, as well as the literature on mnemonics. Our work shows how our knowledge of space can be used not only to find our bearings in cyberspace, but also to memorize and organize information, using space as a memory device or technique. As "spacemakers" [Walser, 1990], we have therefore undertaken the task to "escape flatland" [Tufte, 1990], to design an information browser that organizes information as it fetches it, in real-time, in a virtual three-dimensional space which anchors our perceptual flow of data to a cognitive map of a (virtual) place. This place is a city.



“Is there a way for us to define ourselves and the space in which we dwell, when the city is increasingly referenced as a space of disappearance, a space of the future but not of the present, a space of anxiety and loss ?” M. Christine Boyer

CITY OF NEWS

Since William Gibson, in his visionary science-fiction novel called Neuromancer, described “the Matrix”, i.e. the new informational network, as Los Angeles seen from five thousand feet up in the air, the idea of mapping the informational wasteland of the web to a metroscape has become an urge more that an invention. City of News is a dynamically growing urban landscape of information. It is an immersive, interactive, web browser that takes advantage of people's strength remembering the surrounding three-dimensional spatial layout. Starting from a chosen “home page”, where home is finally associated with a physical space, our browser fetches and displays URLs so as to form skyscrapers and alleys of text and images through which the user can “fly”. The City is organized in urban quarters (districts) that provide territorial regrouping of urban activities. Similarly to some major contemporary cities there is a financial district, an entertainment district, and a shopping district. In addition to these areas we have created other functional groupings by creating a mapping between modern newspaper layout and city planning. Hence the name “City of News” for this designwork. There are therefore sports, books, advertising, science, and opinion districts. One could think of these districts as urban quarters associated to the different conceptual areas of one of the many currently available search engines on the WWW. According to the architectural suggestions of the Krier brothers [Krier, 1984], zoning does not fragment the virtual city in huge sections where a citizen can only accomplish a single task. City of News is federation of autonomous quarters, which are “cities within the city” [ibid], and that are distinguished mainly by the people who inhabit them (students or artists, for example) and their common tastes or preferences (like Paris). The City evolves and grows organically through exploration: following a link causes a new building to be raised in the district to which it belongs, conceptually, by the content it carries.



“If I tell you that the city toward which my journey tends is discontinuous in space and time, now scattered, now more condensed, you must not believe the search for it can stop.” Italo Calvino, Invisible Cities.

SPATIAL ORIENTATION AND COGNITIVE MAPS

The language that we use today to describe the WWW makes a constant reference to a place. We ask people their internet *address*, we call a web page a *site*, and our site a *home* page, we meet in chat *rooms*, and so on. However the browsers we have currently available use the old metaphor of the hypertext and the book, with only one page visible at one time, and bookmarks to help our wayfinding. There is a mismatch, a cognitive dissonance, between the way we imagine and talk about the Net, and the means we are provided to access it. A short description of the relevant literature on spatial cognition is important to understand how to organize cyberspace into a livable information city.

Psychologists call the acquisition of spatial knowledge “cognitive mapping process.” Golledge [Golledge, 1992] described this process as leading to the formation of an internal representation of space, which is

indispensable to allow interaction with the external world. The term “cognitive map” was introduced to refer to this internal representation [Tolman, 1948]. During the past decade psychologists and philosophers have been involved in a long debate aimed at establishing if people build internal representations of space as a mental image [Kosslyn, 1980], or as verbal propositions which syntactically describe space [Couclelis, 1988], or as a set of connected representations of a different nature [Kuipers, 1982], or if there is any mental representations at all, but instead only symbolic associations [Pylyshin, 1981].

Many researchers in this field today agree with the mental image hypothesis. Most relevant however to our investigation are the studies which explain the processes by which spatial knowledge is acquired. Inspired by the developmental studies of Jean Piaget [1948], Siegel and White [Siegel and White, 1975] describe the cognitive mapping process as a sequence of three phases: identification of landmarks, a procedural route knowledge, formed when traveling between two landmarks, and a structural survey knowledge, which is equivalent to inferring a map. Landmarks are reference points, often individual buildings that are distinctive and recognizable. Routes are the channels along which we move around, such as streets, roads, alleys, or even rivers and railway lines. Survey knowledge allows understanding of how different reference points are connected, what are the routes between them, distance evaluation, and alternative path finding. This work has been refined by Golledge [Golledge, 1992] who stressed the importance of landmarks as organizers which cluster spatial information around familiar places, such as the workplace, the house, the school, etc.

The research of urban designers focusing on spatial orientation is also aligned with the work of the above mentioned psychologists. Appleyard [1969] studied the role of buildings as landmarks in big cities, on the basis of their visibility and social significance. He also classified cities according to the survey representation that experimental subjects would provide. Perhaps most influential is the work of Kevin Lynch [Lynch, 1960]. Lynch identifies five elements to be essential in the construction of the cognitive map of an urban environment: paths, edges, districts, nodes, and landmarks. Through his analysis of the constitutive elements of the image of the city, he has not only transmitted a lesson to urban designers, but also to the virtual reality designers of our generation.

“Places are spaces that you can remember, that you can care about and make part of your life... The world should be filled with places so vivid and distinct that they can carry significance... Places could bring emotions, recollections, people and even ideas to mind.” Donlyn Lyndon

MEMORY PALACES, MEMORY THEATERS, MEMORY CITIES

Mnemonics techniques based on associating information to a location in space are at least as old as at least 500 BC. In the ancient Greece it was common to use a familiar itinerary, including its landmarks such as temples, theaters, columns, statues, houses, as placeholders for things to remember. Ancient

roman rhetoricians used a variety of images and location based mnemonics techniques to memorize their speeches. The recollection of information through spatial associations leverages from our familiarity with the places where we live and operate, and the natural easiness we have in remembering the location of the hundreds of objets in our house, workplace, neighborhood, city. This easiness contrasts with our scarce ability to memorize things like poems, mathematical formulas, or sometimes the details of a story we read in the newspaper or the Internet. This can be explained by the fact that, as shown in the previous paragraph, our spatial memory is structured: we cluster spatial information around landmarks, we recall sequential routes, and infer survey maps. Throughout antiquity until the seventeenth century, scholars have emphasized the importance of these techniques, especially since at the time neither books nor certainly computers, which are the physical support of our long-term memory, were easily available. We have found three of these location-based techniques to be relevant to our objective of building an information landscape tailored to a wearable computer display.

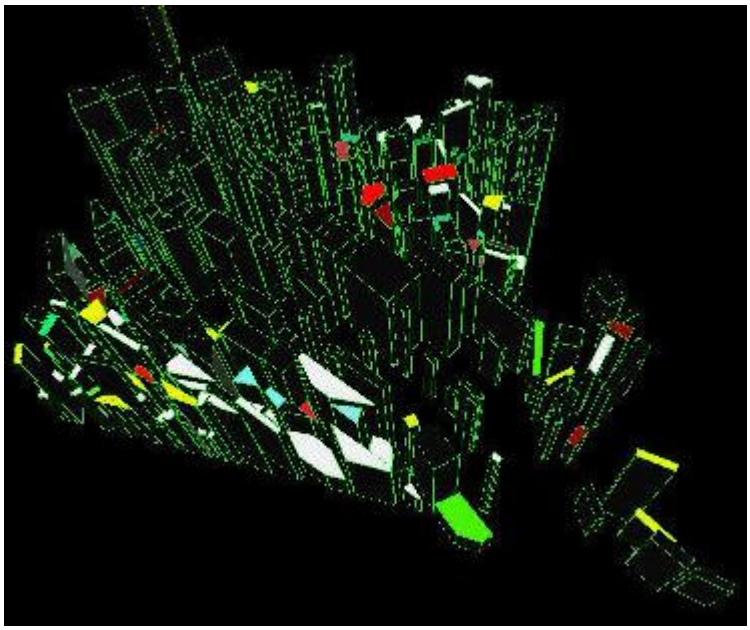
The *memory palace* is the most ancient memory organizer. It is based on the fact that we all easily remember the layout and sequence of the rooms in our house, as well as the location of the objects and furniture they contain. The memory palace can be a real or imaginary place, it can be a famous architecture, or a fantasy place, and can be adapted to our learning goals. Things to remember can be transformed in images, signs, symbols, or sculptures and placed inside the memory palace to trigger the correct associations.

The *memory theater* was designed by Camillo (1480-1544) as a horseshoe shaped theater, and a hierarchical architecture containing universal ideas represented by statues. By mapping the architecture of the theater to the architecture of knowledge he was hoping to achieve an understanding of the entire universe. His theater was conceived not only as a system encompassing and leading to encyclopedic knowledge, but also as a method to find and generate new ideas.

The *memory city*: Camillo’s memory theater inspired the philosopher Campanella (1568-1639) to imagine a utopian “sun-city” which embeds in its architecture – gardens, houses, city-walls – all knowledge and keys to knowledge. Its districts correspond to fundamental disciplines, such that navigating through the city would correspond to a learning path through a huge library where the architecture takes the place of the books.

By analyzing these architectural memory devices we see the emergence of an ambition to build a place – real or imaginary – which is at the same time a universal library, a museum, and a theater. Yet today there is already a place which acts as the universal library, and aspiring for more: it’s the World Wide Web. Our task has been to provide a structuring means which integrates web information into our cognitive map of familiar places. We have built a memory city, within which we can orient ourselves according to the spatial abilities we described in the previous paragraph. We use this Internet memory city as our perceptual anchor which bridges and associates the real and the virtual. While we have organized City of News around districts, added memorable landmarks, as organic constructions or as virtual sculpures, and aligned typographic buildings along paths, we have also designed City of News to serve as a Memory Theatre. The “Classical Art of Memory” depended on the mental construction of complex architectures composed by places inhabited by vivid images. These images would provide associational hooks to the material to be recollected. Inspired by Yates' [Yates, 1966] description of Camillo's Memory Theatre we have endowed City of News with salient images which act as architectural landmarks and memory cues in the different districts. They appear attached to huge and tall billboards, like those that animate the city of Tokyo with glooming publicity.

“Architects aspiring to place their constructs within the non space of cyberspace will have to learn to think in terms of genetic engines of artificial life” Marcos Novak

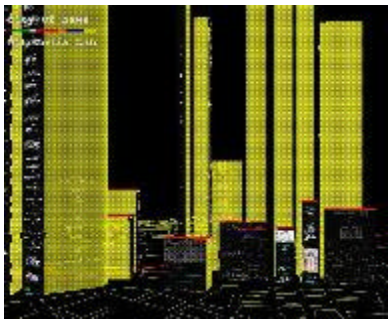


ORGANIC ARCHITECTURE

City of News is an “architecture machine” which gives "the physical environment the ability to design itself" [Negroponte, 1975]. However, this machine operates according to the organic laws of the garden. As the user follows a link on the World Wide Web, she creates new city-elements that are added according to an algorithm which simulates artificial growth and evolution. Following a link becomes equivalent to a pursuit of possibility which determines a change in the environment: the consequence of every choice is amplified, causing a building to be raised or a path to be followed. In the previous age of the machine, city planners would design cities according to the rigid discipline of the workchain and plan traffic flow to the rhythm of the clockwork. In our contemporary time, global networks of computers, time-shared activities, internet life and usenet groups define a life-like skin or membrane of virtual places and activities. Hence we have found that an organic pattern of development of the city would be best suited to represent life-on-the-web i.e. “the Net.” From William Mitchell's mathematical formalism of “The Logic of Architecture” to Marcos Novak's genetics-based “Liquid Architecture”; from Christopher Alexander's rational design of “Notes on the Synthesis of Form” to his later nature-inspired “Pattern Language”, we witness a trend towards finding biologically-driven or simu-life solutions to complex problems of design and organization. In parallel to this phenomenon, an increasing number of individuals, communities and social groups, wish to plan their own worlds, under the techno-promise of personalized news and entertainement services. A new utopian movement seems to animate the view of the city as a “theatre of prophecy” [Rowe, 1978] overlapping the theatre of memory previously described.

“Could not this ideal city, at one and the same time, behave, quite explicitly, as both a theatre of prophecy AND a theatre of memory ? ... For, if without prophecy there is no hope, then, without memory there can be no communication.” Colin Rowe

POSTMODERN UTOPIA



The fantasy of a comprehensive city of deliverance, which dates back to early Modern Architecture, invests also the collective imagination of cyberspace. Howard's smokeless Garden City, Wright's decentralized Broadacre City, Le Corbusier's enthousiastic Radiant City, and Sant'Elia dynamic New City are just a few among the many historical examples of visionary architectures for future cities. More recently an English group of architects that calls itself Archigram (Architectural Telegram) has designed fantastic spaces like: Walking Cities, Plug-in

Cities, Instant Cities, and Inflatable Cities, which respond to our contemporary transformed imaginary view of the urban space. The new city is seen as "an immense node of communication, a messy nexus of messages, storage and transportation facilities, a massive education machine of its own complexity, involving equally all media, including buildings" [Benedikt, 1991]. City of News certainly participates in the utopian dimension of this historical line of thought as it carries within itself a hope for an ideal space of information sharing and consumption. At the same time it does not pretend to offer all information available on the Web in a fully rationalized and non-polluted way. As many architectural theorists have observed, there are some similarities between the virtual space of computer networks and posturban spaces of disorder and decay. City of News reflects this view of the city from "the Periphery of the Empire", as a science-fiction narrative a la Hugh Ferris. It is a gleaming metropolis, a lurring city, a glorious slum of information that hosts the internet addicts as well as the hyperefficient businessmen that surf the wave of real-time, a city that welcomes, excites, and consumes people. It is a city imbued with a postmodern nostalgia for the future and that ambitiously wishes to compare itself to the film architectures of Blade Runner, Brazil, and 5th Element.

"From the manufacturer to the final consumer, the cyber market has defined a new concept. For the first time, the market is bigger than the marketplace. Indeed in many respects there remains no such thing as place. There are thousand, a million, and eventually a billion points of entry and exit, production, and consumption. Above all, it is a market of multiple (indeed infinite) points of contact." Walter Forbes

PUBLIC SPACES OF EXCHANGE: THE KASBAH AND THE ELECTRONIC MARKETPLACE

The new cyber city is a place of consumption, encounter, interaction, and transaction. The Net has grown from the communication matrix, the place of exploration and information, into the global marketplace of exchange, commerce, and trade. From amazon.com to ebay.com we witness a virtualization of the marketplace. The faster rhythms of life and work, and the availability of international delivery couriers, have determined the transformation of the shopping mall into a clickable electronic catalogue of merchandise. In parallel, the WWW operates more and more as a place of new encounters, socialization, and aggregation. A large variety of meeting services, chat rooms, and opinion forums, are currently available on the WWW. City of News adopts the architectural model of the traditional Arabic market, the Kasbah, to provide a place of encounter and exchange. The Kasbah is a community which functions around a small, everyday market, a district of varied shops, and a sense of everybody knowing, more or less, everybody else. Historical traces of these markets can still be found in Marrakech, Algiers, and Cairo. The essence of the Kasbah is social: it establishes a network of human interactions which transcends the economical, and builds the basis for a community life.

With City of News, one could easily imagine to virtually walk along 5th Avenue in New York, or Via Frattini in Rome, and see the web pages of the stores along those shopping alleys, remapped on the virtual city. The clickable text catalogue of the old browsers is now a virtual three-dimensional space where we can wander, stop, purchase, trade, and eventually meet other people. Chavez and Maes [1996] have created a system of software agents on the WWW which provide a classified ads service and called it Kasbah. In this case Kasbah is meant to represent an e-market place, a web site, where Kasbah agents, acting as brokers or middlemen, can filter through the ads on the WWW and find those that their users may be interested in and then proceed to negotiate, buy, and sell items. Yet, for the market to become a community, and for communities to grow, evolve, and make changes, we need to provide a virtual place of interaction and transaction, which surpasses the limitations of the text-based interface. Just like the real city, the virtual city cries to becomes

the collective memory of its people, and like memory, it is associated with objects and places [Rossi, 1982]. Following the lesson of Maurice Halbwachs [1980] we have created City of News as a memory city in which social groups participate in shaping and transforming the virtual space of encounter and transaction of the Net.

"When I began filming, I thought of myself as a painter of space engaged on a quest for time. It never occurred to me that this search would be called 'storytelling. My stories start with places, cities, landscapes, and roads. A map is like a screenplay to me." Wim Wenders

THE WWW AND THE MUSEUM: WEARABLE CITY / WEARABLE CINEMA

Using City of News in conjunction with some of the most advanced embedded sensing technologies we have developed at MIT, we are working towards fusing the real and the virtual into a new combined and unified perception of reality and the Net inside the museum space. Applications of technology to museums have so far mainly focused in making extensive and attractive web sites with catalogues of exhibits. Occasionally these web sites also present introductory or complementary information with respect to what is shown inside the physical space of the museum. However, unless the public is interested in retrieving a specific information about an artist or artwork, they will end up spending time scrolling across photographs and text in static pages, and likely are not involved in an engaging or entertaining experience. Museums have recently developed a strong interest in technology, as they are more than ever before in the orbit of leisure industries. They are faced with the challenge of designing appealing exhibitions, handling large volumes of visitors, and conserving precious artwork. They look at technology as a possible partner which can help archive a balance between leisure and learning as well as help them be more effective in conveying story and meaning. One of the main challenges that exhibit designers are faced with is that to give life to the objects on display by telling their story within the context determined by the other objects in the exhibit. Another challenge for museums is that of selecting the right subset of representative objects among the many belonging to the collections available. Usually, a large portion of interesting and relevant material never sees the light because of the physical limitations of the available display surfaces. Technology can help construct a coherent narrative of the exhibit for the visitor, and to show far more than what can physically be contained in the museum galleries, by creating experiences in which the objects on display narrate their own story in context. Wearable computers have recently raised to the attention of technological and scientifical investigation and offer an opportunity to "augment" the visitor and his perception/memory/experience of the exhibit in a personalized way. Wearable computers can be used to simulate a museum curator, or to dynamically edit a documentary about the shown artwork which is interactively edited according to the path of the visitor inside the physical space of the museum. A wearable computer usually comes in the form of a jacket or vest with a small embedded computer, an on-board sensing system, and a lightweight headmounted display, or glasses with a miniature computer monitor in them. Sensors placed in key locations of the exhibit site, signal to the wearable computer its vicinity to a selected location, and trigger an appropriate response on the personalized display. Our wearable computer is connected to a small wide-angle camera worn on the user's headmounted display, and uses computer vision – a combination of color

histograms and shape analysis – to identify paintings on the wall, objects, or locations. The display is placed only in front of one eye, and therefore the viewer sees the external world as it is, as well as the superimposed graphics, text, or images, interactively played by the wearable. Using this device, we fuse together the audiovisual documentary which illustrates and extends an exhibit, with the visitor's path inside that exhibit. We *create a new type of experience which makes the museum visit indistinguishable from seeing a movie from inside the movie set*. Our approach is that of bridging story and space through the web, with City of News. It is based on the observation that both museums and the world wide web are memory devices, repositories of information that we explore, and navigate, seeking for knowledge and education. By using 3D web browsing to choreograph information, and wearable computing for sensing and orchestrating an audiovisual narrative, we connect architecture and information. We create a cinematic experience which will immerse us in a memory device to imprint us with the memories of the past and project them indelibly into our future.

"Places that are memorable are necessary. We need to think about where we are and what is unique and special about our surroundings so that we can better understand ourselves and how we relate to others." Donlyn Lyndon

CONCLUSIONS

City of News was first completed in May 1996 and it is since a work in progress. As it progresses, we feel that this project raises more questions than the ones it provides answers to. As we push along the city metaphor, we ask ourselves: "What does it mean to have an Information Hospital or an Information Cemetery ?"; "What are the criteria for the 'livability' of this cybercity ?." Because, although we make cities, they also make us. We have built a virtual environment under the natural law of the "creatio mundi" rather than by following the compulsion to the "fuga mundi." It is an environment where to organize is to construct, and to build an informational structure that facilitates the recollection of memories. At the same time, we hope that our audiences become aware of how information affects who they are, and how the urban layout of their surroundings has an influence in making them the way they are. In a near future, as we find ourselves tied together under the new perspective of a globalized real-time, we are not likely to ask each other any more: "Do you have the time ?", but instead: "Do you have the place?."

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