Hypermedia approaching to digital cities

3D Maracaibo Project

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This paper relates preliminary experiences creating a comprehensive digital model of a 2 million inhabitant’s city in Venezuela. Applying multiple computer strategies, professors and graduate students are working together in order to get a 22 thousand hectares 3D model of Maracaibo city, the second largest in the country.

Keywords: CAAD; GIS; Telematic Systems; Vectorial Models; Documentation.

Introduction

The existence of a meaning in the urban facts, their corresponding interpretation by the inhabitants, and the system of symbols and images of city, they are some of the subjects that disturb the professionals who see the expressive force of the architecture like one of more powerful cultural mass media of the man. From the “semiopolis” idea, to the concept of an “hypertecture” based on the knowledge of the architectonic object further on that the physical object in itself, it drive us to rethink new ways to conceive and to understand the city, now under the scope of the new information and documentation technologies.

In this sense, professors and students of Faculty of Architecture and Design Research Institute have been working from 1996 to obtain a comprehensive Hypermedia Model of Maracaibo City (Venezuela) which will let to understand the urban facts beyond its two-dimensional planimetric physic evidence. In fact, any city really is a complex synthesis of the cultural and environmental references that merge from the perceivable world, and research team hope that use of digital models could facilitate understanding of urban dynamics within a dialectical and historical continuum. By this way, the creation of a digital reinterpretation of the three-dimensional urban reality through a computer platform is allowing the creation, linking and processing of graphic and descriptive information about buildings and sites on town.

Decision to aboard this project was a hard work. Although a Master Degree studies on Computer Assisted Design started in 1988 on our university, and computer graphics appear in 1992 on graduate curricula of architecture students, it was only 5 years ago when a structured sequence of research projects started in order to obtain a compressive model of our city. They initially used CAD and GIS technologies, graphic database, virtual world modeling and telematic data systems as isolated exercises, generating a lot of digital information in several formats. But in 2000, a Research and Development Project established principles to enforce and to assemble these five ways to “digitize” the city, in a whole compressive model to support planning, marketing o diffusion uses.

Digital City

Evolution of digital cities has token on recent years different ways. Basically, this evolution has been according predictable use of information, that it
defined the core technology for digital model. But, all ways converges in a same intention: to get more amount and diversity of information about a built urban fact, by selecting it through an identification key or a specific shape in an urban graphic. This principle of “information contained” is the same one of hypertext concept; in this order, hypermedia definition corresponds to collections of media’s, images, sounds and texts that profusely describes a build or urban place.

Modeling hypermedia cities is to make “Hypertecture” (Cuberos, 2000). Here, builders change hard construction materials of physical environments, to use digital components of conceptual and cognitive spaces. Architects work on Cartesian lots or entity-relation diagram space, to design mentally inhabitable locations. In this sense, incorporation of architecture students to this particular spatial design adds value to traditional skills learned on regular courses.

Hypermedia model implies data warehousing solutions, creation and processing workstations, and specific interfaces, articulated in a hybrid centralized-decentralized client-server environment. On a MS WinNT/2000AS domain, a dozen of workstations are configured to creation and preliminary hard use of information, but telematic and LAN services currently let to consult considerable quantities of data about Maracaibo City. Hypermedia model is constituted by five cybernetic approaches to the city: a Vectorial City, supported by CAAD programs; a Virtual City, sustained by the immersible VR technologies; a Documentary City, cradle in multimedia buildings data bases of the city; a Geomatic City, founded on GIS technologies; and a Telematic City, with inhabitable ubiquity on the Internet. These five cyber-cities are being developed with financial supporting of Zulia University and other national organisms, and combining research with educational and consulting experiences.

**Digital City**

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**Vectorial City**

Continuous use of Autodesk AutoCAD on architecture and graduate studies by almost 14 years, represents a long history creating vectorial models of local buildings and places on our Faculty. With recent finishing of vectorial map of Maracaibo City, our Research Institute could start integration of a lot of geometric information in a reliable set of map bases, combining experiences of collaborative drafting on a nested external references environment. Almost one hundred of detailed 3d buildings are been integrated to
this model, indicating very interesting challenges to conclude whole areas of the city.

Virtual City
Inclusion of rendering and photorealistic views on architecture curricula in 1996, plus previous experiences on Master Degree students defining animation paths on 3D models, constituted bases to start creation of 3Dmax / VRML non-immersive world models of three significant historical places of Maracaibo City. Next incorporation of VR helmet and data glove will enlarge these experiences with immersible visits of virtual locations.

Documentary City
By governmental alliances, our Research Institute manages regional patrimonial goods from 1996. Also, our library is the main documentation unit about architecture and urban information on Western Venezuela. This facts drove that information systems team designed in 1997 a set of graphic databases on MS Access / Dbase IV / MS Visual Fox, in order to associate image and video documents to building registers. But in 2001, incorporation of MS SQL Server elevated the level of these storages, in order to create a true media data warehouse. Combination of three MS Win NT/2000 Advance Server with Centralized RAID – Decentralized Backup policies in distributed stor-

ages, constitutes the core of documentation system of almost one thousand buildings and urban places.

Geomatic City
Since 1978, our Faculty has been working with geographic information systems. Apple Ile and
Intergraph workstations were used from early 80’s to analyze spatial data. From 1992, Maracaibo City data was totally discovered for a new urban plan developed on our Institute, and successive studies were enlarging that data bank to other aspects such as tourism. Incorporation of ESRI ArcViewGIS extensions on 2000, introduced a new look of urban data, especially about 3D modeling of topography (TIN coverages) and building high. A new installation of ArcSDE (to manage GIS coverage’s on SQL environment) and ArcCatalog (to use data-metadata through ArcInfo platform), improve possibilities to conclude whole 3D urban areas on GIS technologies, in order to facilitates quantitative studies for decision making support.

Telematic City
In June 1995, the first documentation site about Maracaibo and its architecture was published on the World Wide Web, using a non-document word processor and Netscape 2 / Winsock Trumpet over MS Win3.11 to generate two dozens of static pages posted on a the main University Unix server. A long history happened from that not so far time until today: 3 million matches on our own web server illustrate this situation. Articulation of

ASP pages with ESRI ArcIMS Map Server, is changing the predominantly architecture of almost 4 thousand static pages to a new agile system, incorporating media streaming and other interactive technologies considering Internet browser as suitable way to manage and visualize urban data.

Conclusions
These five cybernetic models described here, they converge in an integral system denominated “3DMaracaibo”, as a Digital City that will allow: 1) to make studies over architectonic projects and urban planning on the city; 2) to carry out routes and immersible and non-immersible virtual simulations; 3) to consult data bases of the buildings of the city; 3) to obtain urban information from the Internet; and 4) to allow on-line collaborative work of designers and planners teams. With this system, Zulia University, government offices and general public, can be supported at different levels in decision taking processes about spatial urban development, having diverse points of view about the city and their architecture.

Also this technical, public and extra-scientists goal, research team (professors and students) hope to develop a valuable experience and expertise in these five technologies that are changing the way of designing and understanding the cities and their architecture.

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References


