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Dynamic Urban Representation for Innovative Planning Methodologies

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Some applications of hypermedia technology we developed trough the years to represent urban environment are reviewed.
From the results the need for a change of paradigm rises. The strategy for a new system to develop is exposed, based on the assumption that:
– the information does not pre-exist its representation;
-– the process of cooperatively and competitively represent a situation causes its changing in the same time.
-– no single actor will be able to represent the territory in its complexity;
The question we need to answer is not what kind of technology we need to manage the information we have but the opposite: what kind of information we need for the technology we have. This information is not neutral nor automatically generalisable, thus, to implement a content based approach, a new system will be designed during a urban developing project.
Keywords: *Urban planning; multimedia urban representation; public participation support system; Internet GIS.*

Prototypes realized

The development of new ICT (Information and Communication Technologies) opened a wide range of possibilities in the representation of urban and territorial environment, changing dramatically the way a map is conceived. A number of systems have been developed both for quantitative elaboration and simulations, from GIS (Geographic Information System) to cellular automata and, later on, with the development of hypertext and multimedia technologies, qualitative representation and communication.

In the last 10 years we prototyped a number of systems, building applications for urban analysis from what seemed to be the most advanced technology of the moment. Before that the systems experimented were based on classic GIS and data-base *technologies, but they seemed not to be flexible enough to cope with the needs of a general urban analysis, and while in the GIS community the discussion continues about the features missing and the need of a so-called GIS-2, they still seem to be more suitable for vertical programs.*

For this reason we began to develop systems based on hypertext and multimedia technologies, from which we can quote few examples, starting with a multimedia system developed, after few B/W hypertext systems, in order to provide information about the city of Glasgow: a hybrid system in which graphic information was digitalized and embedded in the presentation, while audio was interfaced externally by a CD player controlled by the CPU. (fig. 1-2)

The system was not interactive and the information flow was not constant in terms of user

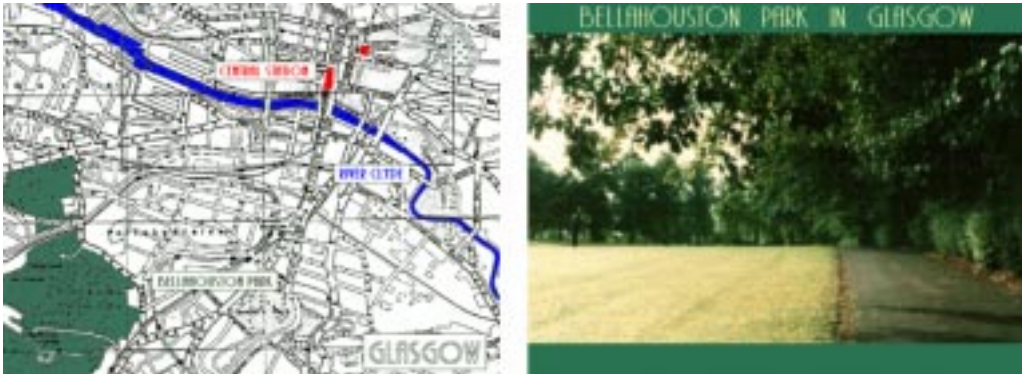

Figure 1-2. Multimedia representation

Figure 3-4. Hypermedia

interest, so, in another system, interactivity was added by mean of hypertext technologies. Information about urban development was structured in a hierarchical way while keeping the possibility for free logical links. A system like this is an effective and rich tool for analysis and communication but it is a big effort to produce also, demanding time-consuming activity by an expert and being very difficult to modify later on, so it is unlikely to be kept up-to-date. (fig. 3-4)

For this reason we developed another system, able to display data directly from files on the HD in a semi-automatic way simply writing directly in the framework. A very simple syntax (action:targetname where action is picture, movie, card etc.) allows to enrich the information showed and provides personal links. There is no need to define directly any link; the system itself generates an index and searches for the position of the relative information when a link is requested. (fig. 5-6)

To communicate visually the geographic reference to the information, a cartography was built to manage multimedia content related to diverse topics and linked to its physical position. Links were programmed to external applications as well, like a multimedia database of buildings. (fig. 7-8)

The way forward

We named “interactive” and “dynamic” the multimedia cartography that we experimented because of its ability to change the information displayed accordingly to the request of the user and to change the information content itself in time. But of course

Figure 5-6. AutoMultiMedia

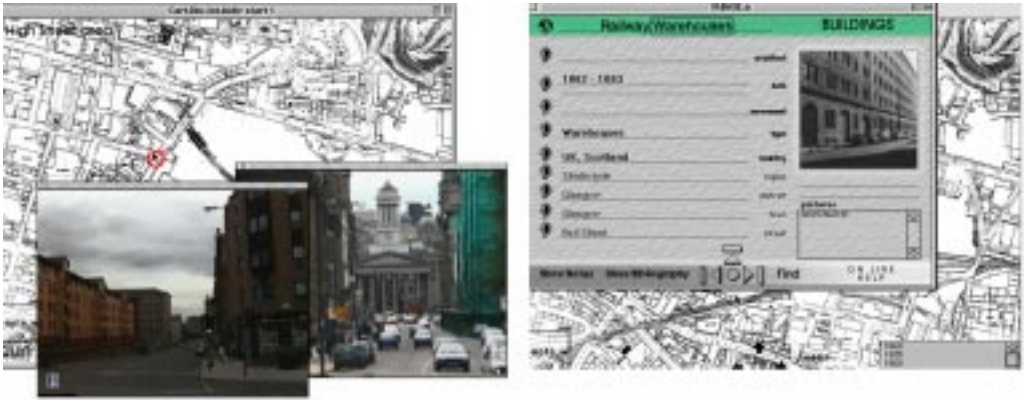

Figure 7-8. Interactive Dynamic Cartography.

attributes like "interactive" and "dynamic" may be considered in a different sense or, at least, diverse levels.

A step forward in interactivity was implemented, in the attempt to allow a bi-directional communication, giving the user the possibility to directly add information (particularly opinions, comments or local knowledge) related to a specific position in the map.

This opens a whole new range of possibilities and, of course, problems: the managing of the information by the system may be more difficult when it's not possible to anticipate the amount of it and it may be difficult to represent on the map if there is a high density of information in some areas. This kind of information may concern also aspects not strictly related to a specific geographical position nor quantitatively defined like aesthetic, cultural and social ones. Besides, subjective information, like perceptive aspects, needs to be represented as well. The task is made even more complex by the need of managing diverse points of view about the same place and also changes in time of all those informational aspects.

New technologies and urban representation

Territorial representation techniques have always been tightly related to planning and territorial management approaches. Paper based atlases have been the instrument for static centralized planning, in which the planner was trying to design a perfect, ideal,

configuration of the territory. The evolution led to thematic mapping and related planning techniques like “zoning”, but still related to a centralized decision making, even if enriched by a technocratic approach.

The recent trend toward decentralization and the shift from centralized public administration to subsidiarity, participation and partnership, prefigures the need for a whole new range of tools to handle the much more complex information base needed for the decision making process. This is likely to be manageable only with the aid of ICT based systems, able to manage the diversity of interests and points of view of actors involved, even supporting the process of reaching agreements between them. This new kind of tools is now made possible by the development of hypertext, networking and multimedia technologies. Those appears to be suitable to manage the complexity in a so changeable and multifaceted informative realm.

Virtual solutions?

The explosive development of information and communication technologies often led the research to produce solutions and thereafter search for a suitable problem. Without simplifying the complex relationship between technical innovation and society and avoiding technological determinism, it is possible to note that this approach tends to loose the complexity and richness of the real world as reference and guide for the research and development itself.

The question we need to answer is not what kind of technology we need to manage the information we have but the opposite: what kind of information we need for the technology we have. IT developed largely without any specific demand from the market, with applications created after the availability of technologies and it may continue like this in the near future. An effort is needed in order to avoid shifting the focus of all the research on the technology, in an abstract conception, not to forget the environment that could develop the technology itself in the proper way: i.e. the content.

A content based approach

The University of Roma Tre launched a project to actively participate in the development of its neighbourhood. A system is going to be designed and implemented incrementally with the experimentation of its effectiveness in real life use.

At the present stage the system is expected to be able to:

- provide an image of the physical environment (i.e. a map, a 3D model, an iconographic sketch, etc.) that must be recognizable by everybody and functional to identify easily the position in space of the referred information;
- to represent the local actors and their interrelations, even if the various kinds of networks extend outside the area considered;
- to allow information to flow bi-directionally, managing a flexible collaboration of many different subjects in building the information base;
- to represent the diversity of points of view on the environment, implementing methods useful to overcome the need of simplifying those views in static univocal ones;
- to handle the changing of those data in time and during the process of building the knowledge base;
- to allow and stimulate communication and discussion between actors, fostering the birth of local social networks;
- to represent the active dynamics in the area by all the categories involved (i.e. residents, workers, city users, etc.);
- to interface data external to the system: for instance a neigbourhood search engine could search through the domains related to the area and present the results in the position they are relative to;
- to manage qualitative or loosely defined data, even not pre-defined at all, relying more on information retrieval algorithms then on data base management systems;
- to handle subjective data (i.e. values, symbolic

and perceptive ones), supporting the process of discovering them;

- to represent non-spatial information and the relation with the territorial structure.

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