

# Benefits of Innovative Technologies for "Territorial Communication": the Case of Study "Virtual Museum Net of Magna Graecia"

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## Abstract

*Territorial communication aims at giving visibility and recognizability to a particular territory by emphasizing its distinctive aspects. It does not only supply information, but it has also a persuasive function, exciting interest and curiosity in the message receivers. In this vision, the use of innovative communication channels, such as Web-based Geographical Information Systems, as well as multimedia technologies and three-dimensional graphics, could be very effective. In this paper we introduce a case of study, the "Virtual Museum Net of Magna Graecia", a system in which technologies offer original procedures for the fruition of Calabrian Cultural Heritage.*

Categories and Subject Descriptors (according to ACM CCS): H.5.1 [Multimedia Information Systems]: Artificial, augmented and virtual realities. H.2.8 [Database Applications]: Spatial databases and GIS.

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## 1. Introduction

In global contexts "territorial communication" has a strategic importance, because it promotes the development by emphasizing some important territorial characteristics [SM03]. In this way territory is treated like a product to advertise in order to obtain a larger amount of financial flows. First of all a "territorial image" [SM03, Bra03], that is the public picture that the region offers by using several communication channels, both traditional (posters, brochures, spots) and new ones (web), is created. In other words, this territorial image is like a business card for the specific place and it consists of easy slogans, clear and memorizable images, fixed marks which summarize the idea of the region [Pap01].

Therefore the creation of a territorial image is the result of a selection process among several aspects of a territory (morphology, landscapes, economy, social characteristics, culture), that could be very interesting for external actors and acceptable for the inhabitants of the place [Pap01].

Regarding the choice of the tourist destination, the formation of this image is not only an important part of the consumer's decision process, but it is also a determining factor [RSPF06, CLM07, SS99]; in fact, a positive image is fun-

damental to produce desire to visit the destination [VA03]. Consumer's territorial image forms in different phases: the mental collection of images about destination that becomes an homogeneous one; the modifications of the initial image as a result of new information; the decision to visit the tourist destination; the visit and sharing of the destination; the modification of experience in the destination [BM04, SS02]. Visual communication of a territorial image is a powerful marketing instrument, since it allows to communicate a great variety of the destination images in a "compressed form" [Mae04, FR06].

## 2. New tools for an effective territorial communication: Information Technology and Virtual Reality

Information and communication technologies, as well as "computer-mediated communication" systems [MK03] can increase the effectiveness of territorial communication, supplying new easily integrable instruments and increasing the speed of message spreading [Rei03, PV06].

At the present time Internet is the most diffused communication channel. Its increasing use allows the diffusion of knowledge, services and information, promoting the dia-

logue among customers from different areas of the world and cancelling physical distances [Got97].

The World Wide Web produces a delocalization of information, it is emergent the necessity to relate territorial data with their own original geographic context. The solution is given by Geographic Information Systems (GIS), that can collect, manipulate, visualize geographical data [Bur86].

The fundamental task of an Information System consists in making data able to support a meaningful message, transforming them to "information". For this purpose GIS are particularly useful, because they take advantage of communicative effectiveness of graphical visualization. They can model the real world by using thematic maps, that consist of different superimposed layers about interesting aspects of a specific territory. Every layer is a spatial dataset consisting of features that represent objects, events and phenomena of real world. Every feature is characterized by its own geometry (which defines its shape and position), and by a set of attributes (which describes its qualities). In a map features, even if they belong to different layers in the map, although belonging to different layers, can be related thanks to their spatial component.

For example, in the case of the archaeological scenario of Calabrian territory, the overlapping [Got97] of layers representing the distribution of archaeological sites, the rivers, the ancient roads and the morphology of territory highlight the presence of settlements models near to watercourses, and the net of ancient itineraries along the main rivers [BBD\*06]. Moreover, GIS technology allows the managing of different kinds of data (vectorial and raster, bi-dimensional and three-dimensional), which can be integrated to benefit the communication of the information contained within maps. A textual document illustrates and clarifies the meaning of a thematic map, producing a more effective communication.

The Internet development of GIS functionality allows the integration of a complex system with a more user-friendly one. In fact, the consulting of Internet geographic information is easy, whereas the use of GIS requires some experience from system users. Internet users can access GIS applications in the World Wide Web from their browsers without purchasing proprietary GIS software [FK97].

In a Web-based GIS, geographic information are supplied in an innovative way, without the visualization of static and predefined maps, by a dynamical map that users can manipulate, pan or zoom and by choosing the more interesting features to visualize. This interaction between user and the virtual exploration system allows the knowledge of territorial distinctive aspects, increasing curiosity and interest.

In a GIS geographical features can have hot-links to texts and multimedia files. In this way GIS can be considered an instrument which makes it possible the consultation of both traditional contents (images, textual documents, photos, videos) and innovative ones (three-dimensional models, virtual reconstructions) through an original approach that foresees a geographical access to information.

Regarding the use of Virtual Reality and Computer Graph-

ics for territorial communication, they are very effective, because they allow the reconstruction of archaeological sites or of scenarios which existed only in the past (Figure 1). In this vision, virtual reconstructions of objects and environments overcome the boundaries of traditional graphical or audio/video descriptions, that implied the user's mental effort, providing the sensation of 'being there' [BRDBP06].



Figure 1: *Reconstruction of a Greek Temple.*

### 3. Territorial image of Calabria Region

Calabria is a region rich of cultural and natural resources, which are not exploited to promote tourist and economic development.

The most famous Calabrian territorial image consists of very special and different landscapes: snowy summits in Sila, Aspromonte and Pollino, and wonderful seaside (Capo Vaticano, Tropea, Scilla, Pietragrande). Moreover, Calabria offers many archaeological and artistic goods, left by ancient populations that, maybe, were attracted by this land's beauty. Most important archaeological findings are related to Greek colonization, that originated so important and flourishing civilizations that their location was called "Magna Graecia". The role understanding Cultural Heritage for local development, in particular in tourism, induced the Public Administration to support several activities for the exploitation and promotion of Calabrian cultural patrimony.

In particular, in Calabria one of the objectives of the Regional Operational Programme (ROP) 2000 – 2006 was to create "an autonomous and eco-sustainable model for socio-economic development, centred on exploitation and strengthening of local human, material and immaterial resources". In ROP, second Axis (Cultural Resources) concerns archaeological and historical resources.

### 4. A Case-Study: the Virtual Museum Net of Magna Graecia

ROP supported the "Virtual Museum Net of Magna Graecia" project for the creation of a system which offers a global vision of Magna Graecia archaeological heritage, distributed in many parks and museums, through innovative interfaces by using virtual reconstructions, 3D graphics and GIS.

User can log-on contents of System by browsing a web site, which is divided in four sections:

- Real

- Virtual
- Documents and Didactics
- Help and Presentation.

"Real" section was developed by using GIS technology and it allows the visualization of thematic maps, that correspond to several reading keys of Calabria territory. This section also allows the user to find materials in a database (images, pictures, virtual reconstructions and so on) through a geographical access.

In "Real" section there are four levels to access territorial information:

1. Archaeological and Museum Districts;
2. Museums and Archeological Parks;
3. Hinterland;
4. Cultural Districts.

In every level territorial information can be explored on the basis of an increasing degree of detail.

The "Archaeological and Museum Districts" level shows a map of Calabria divided in macro-areas ("districts"), which have homogeneous archaeological connotations. The archaeological districts are eight and their areas correspond to eight important colonies of Magna Graecia: Sybaris, Kroton, Skyllention, Lokroi, Rhegion, Hipponion, Terina and Laos. Moreover, every area was delimited considering the territorial extent of the first Ionic colonies from 580 b.C. to 550 b.C., which originated all the other sub-colonies [Lig04].

From macro-areas of the "Real" section the map allows the access to other colonies and to graphical representations about the relationship among colonies and sub-colonies.

Museums and archaeological parks have another degree of detail.



**Figure 2:** An example of access to archaeological finds.

The "Museums and Archaeological Parks" level introduces a survey of all Calabrian museums and archaeological sites, with the possibility to show every archaeological finding in the database of the system (Figure 2).

Another degree of detail shows the hinterland of museums

and parks, with relative road network. This option facilitates tourism, because it shows the ways to reach the archaeological finds, and it underlines the relationship between archaeological patrimony and territory.

In this level some packages for virtual visits, created by using QuickTime VR system, allow the users the immersion in virtual museum and park. Moreover, they allow the visualization of interesting findings from different points of view (Figure 4). The user has access not only to photos, which show their actual state, but also to their virtual reconstruction. The reconstructions make possible the superimposed and interchangeable view of three-dimensional models and real objects, as well as to allow the global vision of fragmented objects.

The objective of "Hinterland" level is to highlight Calabrian places that are not important from the archaeological point of view, but that are interesting from the cultural one. In this way user can appreciate smaller resorts, which have a potential of tourism development, related to ancient historical, architectural and artistic resources, that it is not quite exploited. Then archaeological patrimony becomes both a product to promote and a way to increase the development of hinterlands, because Cultural Heritage represents an "unicum" which can not be found in other territories.

The "Cultural Districts" level shows the oenological, gastronomic, craftmade and cultural traditions of Calabria, underlining the connections between these traditions and the roots in Magna-Graecia. User can have access to the overview of the most interesting zones and to links to other web sites, advertising companies, products and goods of the Calabrian craftsmanship.

The "Virtual" section includes the material (images, videos, QuickTime VR) related to the virtual modelling of Magna Graecia environments, characters and finds.



**Figure 3:** Virtual sculpture of Riace bronze warrior.

The modeled three-dimensional environments refer to the temple, the house, the theatre and the agora. Regarding the characters, the virtual sculpture of Riace bronze warrior and Pithagoras have been modeled (Figure 3).

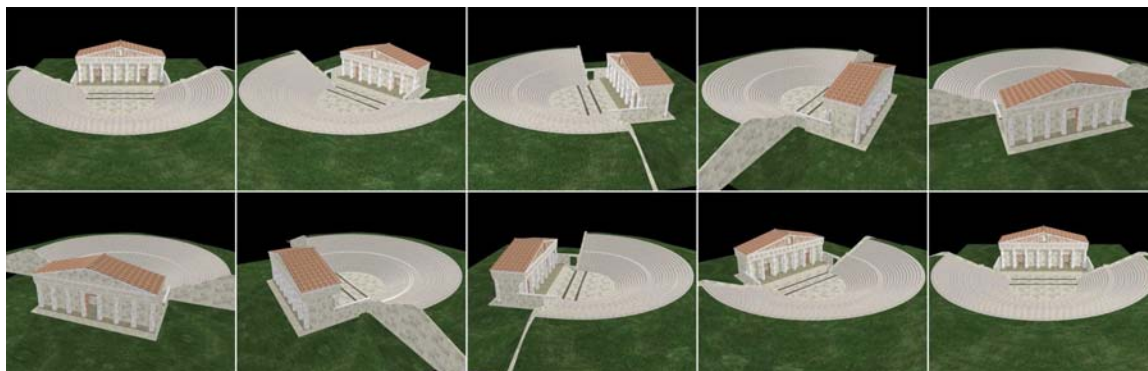


Figure 4: Visualization of a Greek Temple from different points of view.

The animation of the characters Euclide, Archimede and of an Olympic athlete are in progress. Kinematic models of some Greek mathematical machines and three-dimensional reconstruction of some finds are foreseen.

The models have been created in Softimage and are importable in DirectX9 and 3D Studio Max. The rendering of the animations uses techniques of Global Illumination, Final Gathering and Ambient Occlusion. All the models have been created on the basis of ancient images and vascular paintings, texts and other documentation. In the "Document and Didactics" section, historical, geographical and cultural contents are provided; finally, the "Help and Presentation" section introduces some guidelines to the project, the FAQs and a glossary.

## 5. Conclusions and Future Works

In this paper we explained the advantages deriving from the integrated use of technologies like GIS, Information Technology and Virtual Reality for the promotion of a territory. In particular, we referred to the "Virtual Museum Net of Magna Graecia", that aims at the exploitation of the cultural, archaeological, artistic patrimony of the region Calabria, and at the improving of territorial image for tourism development.

The researches related to the development of the "Virtual Museum System of Magna Graecia" project are focused on the creation of a tool for tourist personalized itineraries [BDG\*06]. This kind of relatively complex optimization problem involves several parameters, and some of these parameters are not fully defined: the solution regards the utilization of Artificial Intelligence (AI) and the use of decisional tools like GIS for the geographical data.

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