EXPERIENCES ON GEOREFERENCING AND DIGITAL PROCESSING OF AN 18th CENTURY MAP OF BOLOGNA

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Abstract

Metric recovery and digital processing of historical cartography not only allow preserving mapping heritage but also give new possibilities for the use of this information, unachievable using the analogical support. The often poor metric quality of an ancient map is balanced by the potentialities that the same map can offer in a digital form, from the study of territorial evolution, developed in a GIS environment on the georeferenced image, to the adoption of new attractive methods of representation.

In this work we report some preliminary results of a study carried out on the digital use of a map of Bologna, dating 1702, which offers a scenographic view of the city (Ricci, 1985). The map was named "*icnoscenografia*" by its author, Filippo de' Gnudi, to point out the scenographic representation (adopted for the last time in a map of this city) and the icnographic value, as the map is equipped with a geometric scale in bolognese perches, with a compass-card and various declarations on the realization method. A copy of the map was converted in digital form through high resolution scanning, in order to be processed by modern software tools. The first stage of map elaboration was georeferencing, on the base of recent municipal numerical cartography 1:2000, with the additional purpose of individualizing and representing map deformation induced by the type of cartographic realization. In this phase about 130 significant points were used, belonging to buildings recognized as existing at the time of the map; this information derives from historical research about the town of Bologna (Bocchi et al., 1995-1999), and the selected points do not appear to have been subject to significant variations. Different transformations were tested, and some analysis were carried out about the calculated parameters.

To experiment the possibilities that a digital processing can give to an historical map, a three-dimensional reconstruction was performed on the digitized map, applying elevation to its plain representation and performing a rendering on the visible sides; in this stage, on every extruded building a texture was applied with the images derived from the corresponding fronts of the original map, after cutting and correcting from distorsions due to the native representation. This way the map was provided with a new visualization in a 3D software environment, extremely effective from the graphic point of view. The new visualization is more attractive, and allows a more immediate understanding of the urban environment, maintaining all the descriptive aspects and the information of the original map. During the same experience we also tried a texturization of historical buildings with actual images, derived from aerial oblique panoramic view of buildings fronts (for instance, using the Pictometry technology implemented in the *Virtual Hearth* web based system, providing a modern "bird's eye" vision on the city). This way, not only it's possible to create an original representation, but also to add information to those buildings whose fronts are hidden in the historical map, because of its scenographic characteristic. The georeferenced 3D model was then exported in *Google Earth*, exploiting the possibilities of interface given by the adopted modeling software. This three-dimensional model, both historical and modern, superimposed on recent high resolution satellite images and texturized on a global digital terrain model, gives a suggestive vision and highlights the changes in the urban environment.

References

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