

Survey integrated methods and infographical techniques of representation from urban scene to architecture. Pilote project: Piazza della Cisterna in Biella's Piazza

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The object of the thesis is testing new methods of photographic survey using new applications of AutoCAD 3D and 2D infographic drawing.

The purpose of the work consists on the valuation of the present and future potentialities of the new survey technologies applied to different scale, from the urban to the architectural's one, untill a detailed one.

The scene studied is Piazza Cisterna in Biella's Piazza, a Biella's district. It's an interesting urban spot with valuable plastic features due to the presence of three different sides with medieval arcades.

The survey has been made by a 3D scanner first, which acquires a large number of metrical point data, then completed in situ by laser diastimeter.

The 3D virtual model has been realized using the software AutoCAD 2000 as well as for the 2D and 3D drawings. The animation of the 3D model has been done using the software Art-Lantis.

The work has been divided into two main stages.

The first one consisted on the data acquirement by the instrument and on a preliminary elaboration of the obtained point cloud, which would have simplified the further steps (being this the first application of these techniques to architectural matters so far, there were not software able to elaborate data from their acquirement to the final drawing).

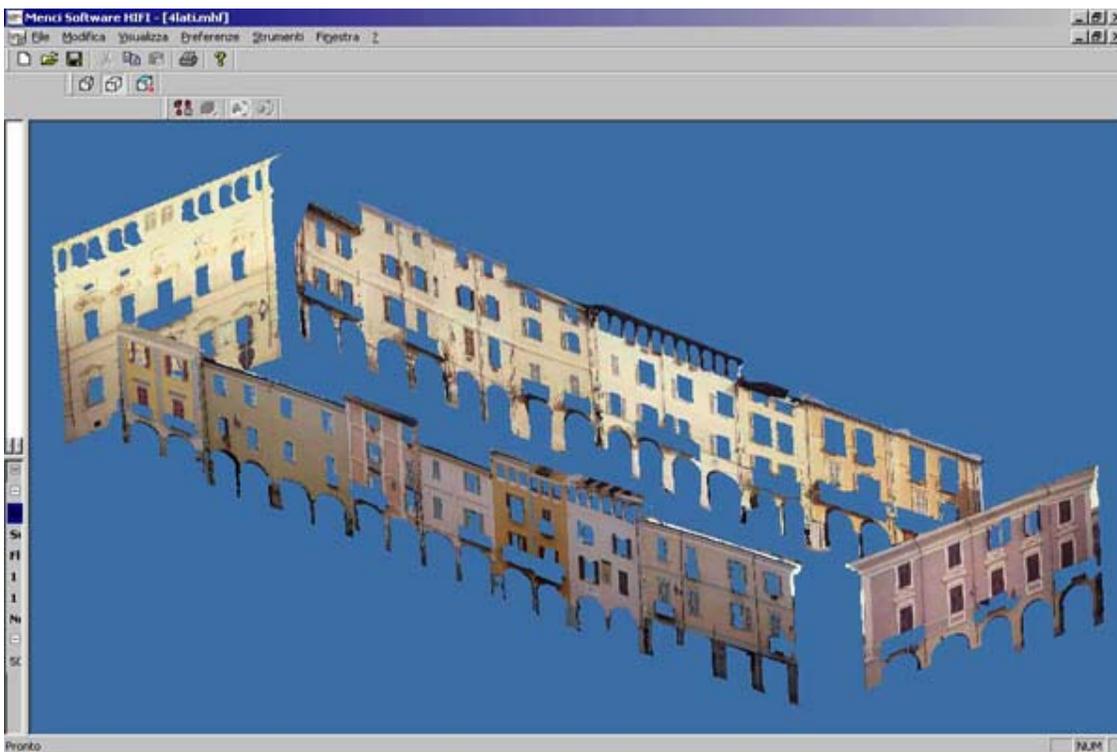
The second stage has been the elaboration of the obtained point cloud.

First of all, we have realized a 3D model of the buildings on the three sides of the square, using software of Computer Aided Design: the representation scale was 1:500 that is a good scale for urban investigations.



Piazza della Cisterna 3D model (original representation scale 1:500)

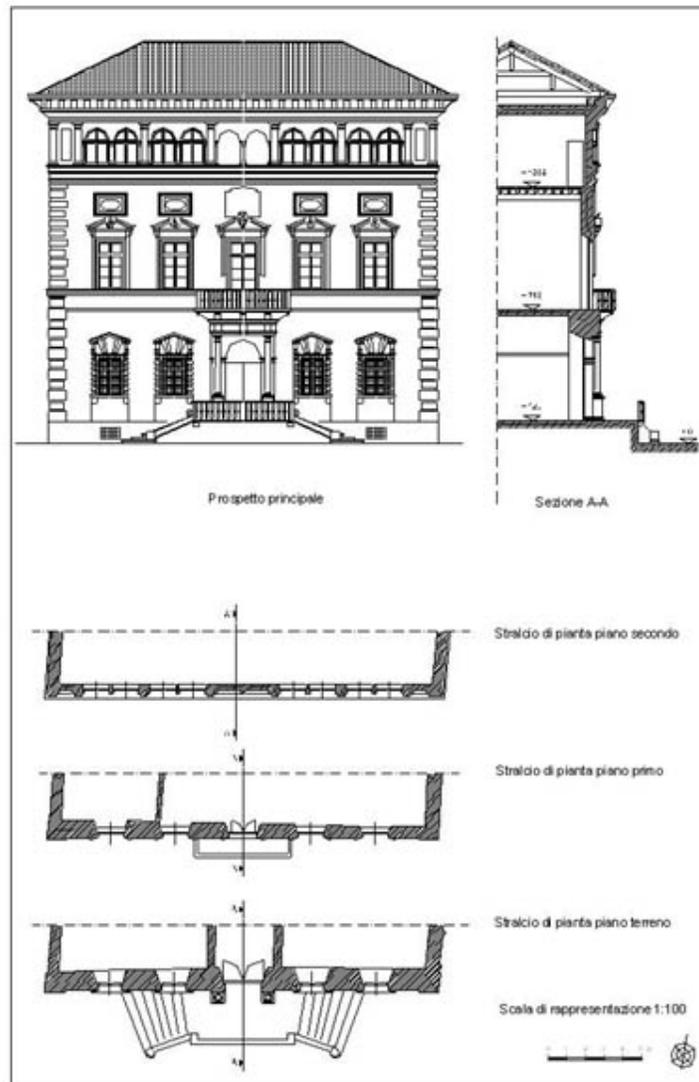
In order to project the images of the façade over each single building, a more detailed 3D model of the buildings has been realized (scale 1:200).



Piazza della Cisterna 3D model (original representation scale 1:200)

Then, analysing the architectonic consistence of Palazzo della Cisterna, which has been the residence of the Dal Pozzo family till the XVIII Century and that faces the square, we've obtained a more detailed representation.

In every stage, we have integrated laser scanner data with direct measurements on buildings, obtained with usual measurement instruments. This procedure has been necessary for the interiors of Palazzo della Cisterna and for the vaulted roofs of the buildings, for which there wasn't any laser scanner information.



Palazzo Dal Pozzo della Cisterna (original representation scale 1:100)

Before the operative stages, we have made a preliminary bibliographical research work, on the historical constitution of the town, with a point of view to other local urban spots with arcades. We have also consulted other publications on laser scanner 3D and digital restitution.

On chapter 1, there is the historical development of the town, from his foundation in 1216 to its decline.

The chapter 2 analyses the urban and architectural consistency of Piazza Cisterna and of its buildings, with reference to other local and similar ambits.

The chapter 3 shows the traditional photogrammetrical techniques for architectural survey, based on stereoscopic coupling of photogram. There is also a paragraph about the new techniques of the 3D scanning, adopted for the present inquiry.

The survey operations are illustrated on chapter 4. The working stages are exposed in detail because of the novelty of the adopted techniques.

The final stage of restitution, which consisted on the elaboration of the 3D acquired data and on the next 3D modelling, is presented on chapter 5. We have used different software for each stage, according to the scale of restitution.

On chapter 6, are presented the conclusions of the work, analysing advantages and disadvantages of the adopted techniques for architectural survey.

In appendix A there are technical information about the used instrument: the Riegl laser scanner LMS-Z210, with other technical data.

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