

Digital landscapes

Paesaggi digitali

Digital processes for the representation of city, architecture, product
Processi digitali per la rappresentazione della città, l'architettura, il prodotto

2

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La collana adotta un sistema di valutazione dei testi basato sulla revisione paritaria e anonima (*peer-review*). I criteri di valutazione adottati riguardano: l'originalità e la significatività del tema proposto; la coerenza teorica e la pertinenza dei riferimenti rispetto agli ambiti tematici propri della collana; l'assetto metodologico e il rigore scientifico degli strumenti utilizzati; la chiarezza dell'esposizione e la completezza d'analisi. Per temi specifici la revisione anonima è effettuata da esperti esterni scelti dal comitato scientifico.

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Digital landscapes / Paesaggi digitali

Digital processes for the representation of city, architecture, product
Processi digitali per la rappresentazione della città, l'architettura, il prodotto

Landscape is not scenery, it is not a political unit; it is really no more than a collection, a system of man-made spaces on the surface of the earth. Whatever its shape or size it is never simply a natural space, a feature of the natural environment; it is always artificial, always synthetic, always subject to sudden or unpredictable change.

J.B. JACKSON

La collana mette in luce il ruolo della rappresentazione digitale come metodo di prefigurazione del progetto e come strumento di indagine per la conoscenza. Le rappresentazioni, che siano rivolte al pensiero, alla comunicazione o alla costruzione, sono generalmente improntate su processi impliciti che scaturiscono nella mente del progettista. La digitalizzazione impone la necessaria esplicitazione delle azioni per la costruzione dei modelli. Gli ambiti indagati sono il paesaggio, la città, l'architettura e il prodotto. Attraverso esperienze teoriche e casi studio si dimostra quanto le scelte insite nei processi siano foriere di creatività e invenzione. L'interesse verso le procedure per disegnare prevede l'utilizzo di processi aperti e condivisi anche per agevolare il dialogo tra le discipline, rendendo il modello informato e creando un nuovo legame tra modello concettuale e modello costruttivo.

The book series highlights the role of digital representation as a method of foreshadowing the project and as an investigative tool for knowledge. The representations, whether they are aimed at thought, communication or construction, are generally based on implicit processes that flow into the mind of the designer. Digitisation imposes the necessary explicitation of actions for the construction of models. The areas investigated are the landscape, the city, the architecture and the product. Through theoretical experiences and case studies it is shown how much the choices embedded in the processes are the harbingers of creativity and invention. The interest in procedures for designing involves the use of open and shared processes also to facilitate dialogue between disciplines, making the model informed and creating a new link between conceptual model and construction model.

ELISABETTA CATERINA GIOVANNINI

KNOWLEDGE REPRESENTATION IN ARCHITECTURE

DATA MODELLING
BETWEEN DIGITAL HUMANITIES AND H-BIM

Foreword by

STEFANO BRUSAPORCI

Afterword by

EMANUEL DEMETRESCU





ISBN
979-12-5994-554-9

FIRST EDITION
ROMA JANUARY 18TH 2022

*In loving memory
of my grandparents*

Data is not information,
information is not knowledge,
knowledge is not understanding,
understanding is not wisdom.

Clifford Stoll

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The Digital Golden Fleece

STEFANO BRUSAPORCI¹

The growth and diffusion of digital applications have produced important consequences in the fields of digital heritage. Considering the so-called ‘digitality’, two topics of particular interest rise: the relation between the scientific fields, and the role of visual representation.

Ross Perry writes that digital heritage poses cultural, methodological, and operative issues to the scholars.

Disciplines typically preserve their own canon of key works, their own common grammar of research questions, as well as core sets of methodologies and even shared protocols of publishing. Offering identity, community and intellectual equipment to their members, scholars, academic disciplines remain, in effect, the tribes of scholarship.

But, at the same time, «*There are, after all, no core sets of methodologies at the centre of digital heritage, no routine forms of evidence or data*». Follows that «*Instead of a ‘discipline’ digital heritage is, rather, an ‘agora’*»². The image of digital heritage as an *agora* is interesting: the dimensions of *digitality* are a sort of place – a conceptual but real meeting space – where experiences are shown, scholars observe and talk to each other, disciplines and methodologies contaminate each other. Often, in practice, the approach of scholars from different

¹ Full Professor of Architectural Representation, Drawing, Survey, and Modeling at the University of L’Aquila (Italy) - Department of Civil, Construction-Architectural and Environmental Engineering..

² Perry, R. *Foreword. Digital Heritage: Agora and Agility*. In E. Ch’ng, V. Gaffney, & H. Chapman (Eds.), *Visual Heritage in the Digital Age* (pp. v–vii). New York, 2003

fields of research appears empirical: they observe IT experiences and case studies, they appropriate tools and software, as ‘digital craftsmen’ they compose procedures, and test the results in their own field of application. It is a heuristic process, extremely pragmatic in its paths, which runs the risk of being animated by a sort of *savage mind* (evoking Lévi Strauss) oriented to the result rather than the scientific nature of the methodology. At the same time, the disciplines can hardly be homologated, not because they are the result of historical traditions, but because the different characteristics of the objects under study inevitably require distinct approaches and methodologies. Therefore *digitality* offers common tools to the disciplines, but scholars are called to use them about various theories, methodologies, and purposes. This also happens in the architectural field because the buildings are the result of processes of modification and transformation over time, witnesses of events, protagonists and cultures of the past, and characterised by current historical, aesthetic, material and use-values.

At the same time, *digitality* refers to the second order of issues: the digitisation of cultural heritage finds in the visual representation its own language, according to a cross-reference between real and digital signifiers and signifying. Therefore, the image plays a central role – with its rules of visual communication and in its multiple manifestation modes (traditional, VR, AR, MR, etc.) –. Consequently, the discourse on images renews the demands of the visual sciences – in line with the so-called *Pictorial Turn* –. According to this context, the wording *visual heritage* seems particularly appropriate.

Digital heritage images are complex: they are systems of multiple dimensions that allow navigating the spatiality of the architectural heritage, its historical transformations, the building systems, the archival documentation, the heterogeneous multimedia contents, also the products of participatory approaches. This favours the visual computing of data, its interpretation, and the scientific representation of knowledge (The London Charter, 2009). Therefore, renderings

can show processing of data, data is visualised as useful information, information is represented in forms of knowledge, knowledge finds its epiphany in wise practices of interpretation and presentation. It is significant that Ware titled his book *Information Visualization: Perception for Design* (2000).

In a certain sense, through the visual language, the *digitality* evokes concepts that have their roots in the ancient terrain of linguistics, but not according to constructivist and/or deconstructivist approaches. The semiotic universe of Lotman (*The Semiosphere*, 1985) comes to mind where the scholars are aware that of what appears to our consciousness it is possible to understand only some partial aspects and never the complexity of an unlimited network of meanings and significance. At the same time, it is interesting to remember the ontological return to the *physical* and the *material* underlined by Ferraris in his *Manifesto of New Realism* (2012). He writes that, without prejudice to the lesson of post-modern and hermeneutics, New Realism focuses on the observation of reality as an effective presence, based on a re-evaluation of the role of Perception.

In a certain sense, the function of perception is similar to the falsification in Popper, only that here it performs an ontological function and not, as in Popper, an epistemological one (2011, p. 154).

There is a perception of an *external* with which the viewer has to confront. And this *external* could be both the cultural and digital heritage, with their visualisations. Follows that the concept of *interpretation* is pivotal: *interpretation* in the sense that Tielden already intended in 1957 in his book *Interpreting Our Heritage*, and that is re-proposed by *The ICOMOS Charter for the Interpretation and Presentation of Cultural Heritage Sites* (2008). Therefore, the *interpretation* is a discourse, or rather a dialogue, but above all it is an applied active action.

Certainly the *digitality* offers enormous potential regarding the complex problems posed by the study, conservation and enhancement of cultural heritage, including architectural heritage. Sometimes scholars seem to look to *digitality* as a

panacea for all problems. Sometimes scholars seem to chase the digital dimension like argonauts the golden fleece. But navigating the digital sea requires experienced sailors, with theoretical and methodological appropriate ships.

The book of Elisabetta Caterina Giovannini traces a path in this context, with rigour and methodological properties, and supports the reader in the interpretative journey, stating the digital experiences in an architectural sense, and – last but not least – validating reflections through applicative discourses. In the interplay between disciplines, the author moves carefully, without forgetting methodologies and references that find their reasons in the nature of architecture. Because the questions the author raises – even when developed from a technological point of view – are eminently critical, in line with the more general dimensions of *Digital Culture*, a concept – as Gere (2002) remember us – which cannot simply be referred to a discrete data systems or to the use of computer sciences, but to a universe of experiences – technological aspects, virtual processing, forms of instant communication, social media, etc. – that define a large part of our everyday life.

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Introduction

The theme of interpretation in the field of representation of architecture is a topic that has been widely debated over the past years. The use of representation in architecture has always left space, where possible, for an interpretative approach to reality. Architectural representation, mediated by the discipline of drawing, has always offered the opportunity to explore a reality often interpreted by humans and does not reflect objective reality. As in the past, this topic has become increasingly challenging thanks to the advent of digital technologies. If on the one hand have expanded the possibilities of representations and visualisations, on the other hand, have highlighted the lack of tools capable of conveying the interpretive process at the base of the creation of digital content, increasingly photorealistic and attractive, but less scientifically correct or at least scientifically illustrated.

The discipline of drawing and architectural representation offers a lot of opportunities and challenges in closing the gap between reality and representation since it has always been a form of knowledge visualisation mediated by human experience. As the drawings of ruins of the past were the result of the visual experience of the author, so today, digital models are created within the discipline thanks to an apparatus of complex and pre-constituted knowledge made often not explicit. Instead, this hidden knowledge should be made reusable and understandable in the academic sector and beyond.

Digital Humanities (DH) have long been questioning issues such as data visualisation and information systems capable of using computational systems to create, preserve, and interpret cultural data (Burdick *et al.*, 2012). It is precisely this vision of knowledge creation through a representation of reality, never

objective, that has seen the need to investigate the interrelation between knowledge, visualisation, and interpretation. The most of projects in DH highlighted how they focus more on the content of projects than on the method.

In the DH, the many visual codes and methods for visualising data, maps, charts, and diagrams have been borrowed from the natural and social sciences that use them as empirical models of knowledge for long times. Moreover, the use of these mediums has seen exponential growth in recent decades, thanks to the advent of the personal computer that allows handling a large amount of data even with a low degree of computer science knowledge (Drucker, 2020).

Similarly, the use of digital models in the field of Architectural Representation, as a relevant discipline in the Digital Cultural Heritage (DCH) sector has seen a real increase related to the democratisation of digital acquisition techniques, which are increasingly less expensive than in the past and affordable for everyone. Smartphones and tablets offer nowadays many applications for making 3D models and printing them.

If the purpose of metric acquisition often focuses primarily on the material and physical aspect of an asset, on the contrary, three-dimensional mathematical modelling remains the primary tool for the study and analysis of the architectural forms and their complexity.

This volume aims to investigate the diverse forms of digital representation of the data and information in the architectural field, analysing and describing what the information tools can offer today. The theme of interpretation affects all research projects on the digitalisation of cultural and architectural heritage, and a common methodology to close the gap between research and its data visualisation is missing. In architecture, the use of a 3D model also intends to visualise information and can be considered a product of knowledge. But, despite the product, the volume's intent offers some critical remarks on the importance of knowledge representation using diverse