Reviews

Andrea Giordano, Michele Russo,
Roberta Spallone (Eds.)

***Representation Challenges.
Augmented Reality and
Artificial Intelligence in
Cultural Heritage and
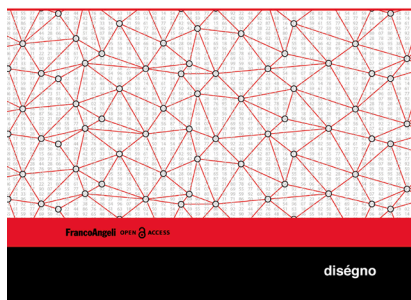Innovative Design Domain***

FrancoAngeli

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REPRESENTATION CHALLENGES
Augmented Reality and Artificial Intelligence in
Cultural Heritage and Innovative Design Domain

edited by
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About 20 years ago, eidomatics has fully entered our professional sphere. Since then, we represent and measure with computer the reality that surrounds us, we model ideas of the past, present and future, we virtually travel in space and time. Therefore, we have been using the technologies that the market offers us for about 20 years, referring to them with the adjective 'new'.

Several times I wondered if it makes sense, after all this time, to talk about new technologies and REAACH-ID conference (acronym for *Representation for Enhancement and management through Augmented reality and Artificial intelligence: Cultural Heritage and Innovative Design*) gave me an answer, demonstrating that, today as in the past, it still makes sense to talk about new technologies.

Technologies are constantly changing, evolving, refining, enriching with new applications and possibilities, opening up new frontiers and innovative horizons. And since these changes occur quickly, the organizers of REAACH-ID, Roberta Spallone (Polytechnic of Turin), Andrea Giordano (University of Padua) and Michele Russo (Sapienza University of Rome), make great efforts to organize seminars dedicated to eidomatics, publishing the proceedings to record, almost with a taxonomic attitude, every variation that the world of technological representation is registering, thus leaving a tangible trace.

In this context, the collective volume, titled *Representation Challenges. Aug-mented Reality and Artificial Intelligence in Cultural Heritage and Innovative Design Domain*, curated by the organizers of REAACH-ID and published by Franco Angeli, gathers the papers written by 175 authors, a number that testifies how widespread and current is the use of innovative technologies in the world of eidomatics.

This book opens with a *Preface* by Francesca Fatta, president of the UID (Italian Union for Drawing), placing the emphasis on the need to fix eidomatic transformations over time and on the usefulness of being able to look at a register of *exempla* that clarify the possibilities offered by new technologies. The need to systematize the relationships between drawing, representation, artificial intelligence, augmented and virtual reality appears even more compelling if, as Professor Fatta recalls, we keep in mind the new discipline declaration, whose main aspects Italian teachers of drawing and representation have recently and democratically agreed, which says: "The scientific-disciplinary contents […] include the descriptive geometric foundations of drawing and computer modeling, their theories and methods, even their historical development; the survey as an instrument of knowledge of the architectural, environmental and urban reality, its direct and instrumental methodologies, its procedures and techniques, including digital ones, […]; drawing as a graphic, infographic and multimedia language, applied to the design

process from the formation of the idea to its executive definition''.

Once the direct connection between the eidomatics and representation has been established, the President also emphasizes that, at the end, the intent of the conference organizers and curators of the proceedings is not at all to be 'fashion' but rather to respond to a concrete need, i.e., to identify multidisciplinary methodologies and skills establishing a fruitful dialogue between man, science and machine.

Following the *Preface*, the *Introduction* by the editors explains the reasons that led the 3 scholars to join their forces, organizing a series of conferences on eidomatics and publishing the proceedings. Basically, according to them, the technological domains, that relate to augmented reality and artificial intelligence, are closely linked to the concept of space so they have tangible repercussions on the narration of architecture and the city, including cultural heritage and innovative design. Given their personal research experiences, Roberta Spallone, Andrea Giordano and Michele Russo realized that the rapidly expanding applications of AR and AI raise multidisciplinary problems. Basically, their proposal is to transform representation into a privileged place where theories and application examples converge, to make available to colleagues an always updated state of the art relating to the themes of AR and AI applied to architecture, the city, the environment and cultural heritage.

To help the reader find his way between the 8 themes of the conference and the papers of 175 authors, the editors' *Introduction* ends with a brief review of the topics covered in the conference sessions, without neglecting a summary of the presented single experiences. The breadth and completeness of the volume embraces all fields of AR and AI application, in particular: *AR&AI theoretical concepts* deals with the theoretical, historical and cultural context, underlining the multidisciplinary challenges that representation is invited to face; *AR&AI virtual reconstruction* shows how digital development has favored the dissemination of the artistic/architectural heritage thanks to virtual reconstructions; *AR&AI heritage routes* presents experiences that link the real world to the virtual one, creating a *continuum* between them; *AR&AI classification and 3D analysis* deals with survey and, in particular, with the acquisition of three-dimensional data by means of hierarchically oriented information systems; *AR&AI urban enhancement* is dedicated to urban space and researches on a territorial scale; *AR&AI museum heritage* provides examples of digital applications at the service of museums for the dissemination of knowledge; *AR&AI building information modeling and monitoring* illustrates the important role that AR & AI play in the advancement of BIM technology; and, finally, *AR&AI education and shape representation* explains the repercussions that eidomatics can have in the field of education and support of people with disabilities.

Representation Challenges. Augmented Reality and Artificial Intelligence in Cultural Heritage and Innovative Design Domain is a book that demonstrates how new technologies overcome the crystallized limits of space and time, typical of traditional representation. The support provided by augmented reality and artificial intelligence allows the creation of 3D models that can be used for the analysis of the real or imaginary world, they can be used also for setting up simulations related to the transformations of urban space and architecture. The efforts of the editors of this book promote an advanced use of intelligent models by extending the field of application well beyond the three dimensions. A quick and easy way to understand the wide range of applications collected by Roberta Spallone, Andrea Giordano and Michele Russo is to consider a 3D model as a platform on which it is possible, beyond the formal data, to upload many other information, which in turn can be organized, stratified over time, as well as interrogated.

The book, presented here, is particularly precious for scholars of drawing and representation because these two disciplines match the history of art, architecture and the city in all their phases, from the registration of the reality, through its digital survey–laser scanner and photogrammetry–, to the interpretation of historical documents (cadasters, maps, urban views, engravings, paintings, plans, elevations and sections of buildings); from the reconstruction of documents in virtual space by means of 3D models to the dissemination of analytical interpretations at different levels of complexity. We could hope to overcome with our work the Leonardo's rigid dichotomy between painting (representation) and poetry (writing / history) only in a multidisciplinary and technological world, because the applications of augmented reality and artificial intelligence allow us to generate 'talking' images in a multidimensional and always evolving virtual world.

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