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EVA 2006 Florence

PROCEEDINGS
Editors: Vito Cappellini and James Hemsley

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Electronic Imaging & the Visual Arts

‘The Foremost European Electronic Imaging Events in the Visual Arts’

EVA 2006 Florence

Conference, Workshop, Meetings, Training & Exhibition

3 – 7 April 2006

Venue: Palazzo dei Congressi, Piazza Adrua 1

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PROGRAM

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ENTE
CASSA DI RISPARMIO
DI FIRENZE
Conference Programme ~ Friday 7 April

ROOM C

9.15  THE VI-VII FRAMEWORK PROGRAMME PLANS OF THE EUROPEAN COMMISSION

Presentation by: Claude Poliart, Principal Administrator, DG INFSO E3, Technology – Enhanced Learning and Cultural Heritage, European Commission

10.15  Coffee Break

10.30  SESSION 4 – DIAGNOSTIC INVESTIGATIONS & RESTORATION

Chairman: Claude Poliart, Principal Administrator, DG INFSO E3, Technology – Enhanced Learning and Cultural Heritage, European Commission

“The Digital Paul Klee Project Management, Digitization Process and Workflow”

Sergio Gregorio, Rudolf Gschwind
Imaging and Media Lab, University of Basel, Switzerland

“Comparing X-Ray and Backlight Imaging for Paper Structure Visualization”

Mark van Staaldhuizen1, Jan C.A. van der Lubbe1, George Dietz2, Frans and Theo Laurentius3
1 Delft University of Technology, Information and Communication Theory, Delft, The Netherlands
2 Dutch University Institute for Art History, Florence, Italy
3 Old Master Prints, Art Dealers, Middelburg, The Netherlands

“Noninvasive Analysis of Rare Cultural Heritage Objects by Software/Hardware Systems of Mobile Nuclear Magnetic Resonance”

U. Grunin1, I. Nikolaev1, E. Nikol’skaya1
V. Di Martino2, L. Grunin1
1 Dept. Physics, Mary State Technical University, Yoshkar-Ola, Russia
2 CASPUR, Rome, Italy

“A Knowledge Based Model for Digital Restoration and Enhancement of Images Concerning Archaeological and Monumental Heritage of Mediterranean Coast”

E. Ardizzzone1, V. Brunì2, V. Cappellina3
A. De Polo4, H. Dindo5, U. Maniscalco5
S. Minelli6, L. Molteo6, A. Piva6, G. Ramponi6
G. Sajeva6, D. Vitulano6
1 Computer Science Engineering Department (DINFO), University of Palermo, Italy
2 Istituto per le Applicazioni del Calcolo (I.A.C) “M. Picone”, C.N.R., Rome, Italy
3 Media Integration and Communication Center (MICC), University of Florence, Italy
4 Fratelli Alinari Photo Archive and Museum, Florence, Italy
5 Department of Electrical Engineering (DEEI), University of Trieste, Italy
6 Engineering Ingegneria Informatica, Italy
12,00  
*Invited Presentation*

“MICHAEL Project: Towards a Trans-European Portal of Culture”  
Rossella Caffo  
Ministero per i Beni e le Attività Culturali, Biblioteca di Storia Moderna e Contemporanea, Rome, Italy

12,45  
Lunch

ROOM C

14,00  
**SESSION 5 – 3D TECHNOLOGIES & APPLICATIONS**  
*Chairman: David Burton, General Engineering Research Institute, Liverpool John Moores University, U.K.*

“Art and Science: From a ‘3D’ Painting to its Floor Plan”  
Luís Alberto Esteves dos Santos  
Casimiro  
Humanities Faculty, University of Porto, Portugal

“Efficient 3D Modeling of Sculptures from Photographs”  
L. Ballan, N. Brusco, G.M. Cortelazzo  
Dept. of Information Engineering, University of Padova, Italy

“Virtual Reality: Lighting and Communication for the Roman House ‘La Consolata’ in Aosta”  
M. Rossi¹, A. Siniscalco¹  
L. Appolonia²  
¹ Dept. In: D.A.Co., Politecnico di Milano, Italy  
² Direction of Cultural Heritage Valle d’Aosta, Italy

“System of the Removed Management 3-D Presentations for Virtual Museums and Galleries”  
Alexey Finogeev  
Dept. Computer Aided Design, Penza State University, Russia

15,20  
Coffee Break

15,35  
**SESSION 6 - DIGITAL LIBRARIES**  
*Chairman: Christian Lahanier, C2RMF, Paris, France*

“A Digital Library of the Historical Visual Representations of the Giotto’s Frescoes During the XIX-XX Century. The Photographic and Graphic Sources of the Basilica of Assisi”  
B. Benedetti¹, A. Vecchi²  
¹ Scuola Normale Superiore, Pisa, Italy  
² Sistemi Informativi – Liberologico, Pisa, Italy

“Knowledge Based Image Analysis Applied to Ornaments in Arts”  
C. Schmidt, L. Tavernier, C. Schneider, D. Paulus  
Institute for Computational Visualization and Institute for Arts and Sciences, University of Koblenz-Landau, Germany
3D - TECHNOLOGIES & APPLICATIONS
ART AND SCIENCE: FROM A «3D» PAINTING TO ITS FLOOR PLAN

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ABSTRACT

With this paper, we intend to prove how important it is to look to Renaissance paintings under a new point of view: its floor plan, because it can reveal a lot of hidden information.

Using the computer as an important auxiliary in all this process, we can draw, rigorously, the view from above, in order to better understand the true relation among all the personages and other elements of the paintings. This is an important step hardly ever used, but that presents several advantages, when compared with traditional analysis, as for instance, in the computational 3D modelling of a picture.

INTRODUCTION

In our doctorate thesis we had the opportunity to demonstrate the validity and the advantage of making the geometrical analysis of the Renaissance paintings as an important complement of iconographical analysis, in order to better understand the underlying message [1]. Nowadays, with our post-doctorate investigation, we intend to prove how important it is to draw the view from above of a painting, because we think that it’s the only way to have access to a precious information about that picture.

In fact, when we look, for instance, to an Italian painting of sixteenth century, we see a perfect space, organised according to very precise geometrical rules and it seems so real that we have the feeling of being inside a play, participating in the event.

However, there are, sometimes, important differences between the «pictorial space», that is the space as we can see in the picture, and the «real space», that is, the true architectonical space built with all the exactitude. It means that the reality of the scene is not exactly as the painter has represented it. So, we propose a new way to look to the paintings in order to find the true characteristics of the real space: that is, drawing its horizontal projection [2].

Until now, we only know a few representations made according to this method, but we think that it is an important research that must be done if we want to understand, in a profoundly way, the paintings and their messages.

1- THE ILLUSION OF A «3D» PAINTING

Figure 1 is a very good example of a Renaissance painting where the pictorial space was made by a rigorously application of geometrical rules of perspective drawing. It is the «Annunciation» of Francesco del Cossa. Everything seems to be on the right place and for the
observer it seems like a real play developed before his own eyes, where the characters are placed inside a complex, but correct, architectonical structure.

However, if it was possible to look to this scene by another point of view, namely the view from above, we should see a different reality. In fact, the horizontal projection of this painting, illustrated in figure 2, shows an unexpected hidden information: the central column is disposed precisely between the Angel Gabriel and the Virgin Mary, in such a place that they can not see each other [3].

![Fig. 1. Annunciation
Francesco del Cossa (1470)](image1)

![Fig. 2. Annunciation (Francesco del Cossa)
Floor plan (by Loic Richalet)](image2)

So, we can say that when the Renaissance artists built the pictorial space, they were more concerned about harmony, realism, perfection and symbolical meaning of their paintings, although, sometimes, the real architectonical space was not well adapted for the circumstances, in spite of the good visual effect.

2- THE GEOMETRICAL CONSTRUCTION OF THE PERSPECTIVE SPACE

To understand the most important steps needed to draw the above view from a picture it's necessary to know the process followed by the Renaissance artists to paint a perspective space. Everything begins with Leon Battista Alberti and his treaty named «De Pictura», wrote in Latin, in 1435. He explained the process that the painters must follow to draw a correct perspective space [4]. In fifteenth and sixteenth centuries, other treaties from other authors proposed more simple methods [5], but all of them, used the same principles, such as: the horizon line, the vanishing point, the distance points, the vanishing lines and so on. The result of all this elements is a complex structure such as that one we illustrate in figure 3 [6]. Based on this structure, the painters could correctly built a «3D» draw, like the one we can see in figure 5 [7]. This is an excellent example of an architectonical space drawing in perspective and it gives the illusion of a «3D» space.
3- PROCESS TO DRAW THE FLOOR PLAN OF A PAINTING

It's impossible to clarify, in this paper, in a few lines, all the complex method that we use to make the view from above of a Renaissance painting. However, it must be said that we use a methodology that implicates a careful observation of all the details of the pictorial elements and an application of Alberti’s method in association with a personal development based on the process followed by Piero della Francesca, illustrated on his own treaty, named «De prospectiva pingendi», (The painters perspective) (1475-1480), that we reproduce in figure 4.

[8] Here we can see two faces of a cube. Using this diagram we can imagine that the upper face is the surface represented in perspective of a painting, and the lower face is the view from above of the same picture [9].

Everything we draw in the upper face as, for instance, the lines and the intersection points, have a complete correspondence in the lower face, that remains parallel to the observer, just like the horizontal projection of a painting.

4- SOME APPLICATION EXAMPLES

To exemplify the presented procedure and to prove all the advantages knowing the painting’s floor plan, we are going to apply this method on the picture presented in figure 5.

Fig. 3. Elements of the perspective (by Jan Vredeman de Vries)

Fig. 4. Perspective cube (adapted from Piero’s treaty)

Fig. 5. The building method of a structure (by Jan Vredeman de Vries)

Fig. 6. The floor plan of the structure drawing in fig. 5

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As we can see, we have a rectangular surface divided into small squares. Drawing the diagonal lines, the vanishing point and the vanishing lines, and transposing them to the lower face of the cube, it's possible to draw the horizontal projection of the architectonical structure as we can see in figure 6 [10]. This is a simple and direct application of Piero's method. However, we can make other applications of this principles, drawing the floor plan of more complex paintings like those ones illustrated in figure 7 and 9.

Fig. 7. Annunciation
Bartolomeo della Gatta (c. 1500)

Fig. 8. Annunciation (floor plan)
Bartolomeo della Gatta (c. 1500)

The first step is to know what kind of pavement we have. In the case of the «Annunciation» of Bartolomeo della Gatta (figure 7) we have a brick pavement divided into small squares: ten squares wide and ten squares length. This characteristic defines the base of the main structure that allows to place, rigorously in the real space, the Angel Gabriel and the Virgin Mary, as well as the doors, the chair, the wood platform where the Virgin prays, the reading desk, and the dove, symbol of the Holy Spirit. The result of this view from above is illustrated in figure 8. Here we can see, for instance, that the two personages aren't placed in front of each other, and that the Angel Gabriel isn't disposed in front of the door as it seems when we look to the painting.

Finally, we present a more complex painting: the «Annunciation» of Sandro Botticelli (figure 9). Using the same method (too much large to describe on this paper) we got the view from above, illustrated in figure 10. By this scheme, we realise, for instance, that the room is bigger than it seems, and that the Angel Gabriel isn't placed in front of the door, and the two personages aren't also disposed in front of each other, and that even the four columns look as having a square section, but, in fact they have a rectangular section.
But, in our opinion, the most important of all is a small detail: if we look carefully, we realise that there is only a small space between the second and the third columns through which the Angel can see the Virgin Mary. That’s the reason why the artist placed the Angel Gabriel in such position, because if the personages were placed in front of each other, the presence of the second column should not allow them to see each other.

5- CONCLUSION

With our investigation, based on the same geometrical principles used by the Renaissance painters, we propose a different way to look to the paintings in order to realise exactly the relations among the personages and other elements of the pictures: its floor plan. With the assistance of the computer, it’s possible to draw, rigorously, the above view of a picture and to reveal a lot of hidden information as we have proved by some examples.

With this procedure, we get the possibility of having the exact position of the several elements of a painting that allows the computational 3D modelling of a picture and, therefore, obtaining the view of any angle we want.

References

[2] For instance, the draw made by M. A. Laving about «Flagellation at the column» of Piero della Francesca, or Loic Richalet, about the paintings of Annunciation, of Francesco del Cossa and Carlo Crivelli.
[4] This is a very complex process. Alberti proposes three steps to draw the perspective space. We can not explain here, in a few lines, his method, but the result of its application is a correct perspective space.

[5] Namely, Antonio di Pietro Averlino, detto II Filarete (Trattato di Architettura - 1451/1464; Piero della Francesca (De Prospectiva Pingendi - 1475/1480); Francesco di Giorgio Martini (Geometria e modo di misurare distanze, altezze e profondità - 1478/1481); Leonardo da Vinci (Trattato della Pittura - c. 1492); Jean Pélerin (De Artificiali Perspectiva - 1505); Albrecht Dürer (Underweysung der messung ... - 1525).


[9] This is a personal method developed and adapted from Albert’s and Piero’s methods with excellent results in this area.

[10] The schemes of horizontal projection illustrated in fig. 6, 8 and 10 are the result of our own research.

BIBLIOGRAPHY


DE VRIES, Jan Vredeman - Perspective. New York: Dover Publications (S.d.).


