IJAE
Vol. 120, n. 1 (Supplement): 236, 2015
ITALIAN JOURNAL OF ANATOMY AND EMBRYOLOGY

Innovative anatomical representation through the use of x-ray tomography and holographic display emulator

Luisa Leonardi[1], Maria Pia Morigi[2], Rosa Brancaccio[2], Eva Peccenini[2], Matteo Bettuzzi[2], Franco Casali[3], Elios Sequi[1], Cristian Mancini[1], Antonio Todero[4], Francesco Colaci[1], Laura Piro[2]

[1] Università di Bologna, Dibinem, Alma Mater Studiorum, Bologna, Italy - [2] Università di Bologna, DiFa, Alma Mater Studiorum, Bologna, Italy - [3] Istituto Nazionale di Fisica Nucleare, c/o Alma Mater, Bologna, Italy - [4] SMA Sistema Museale di Ateneo, Alma Mater Studiorum, Bologna, Italy

The "L. Cattaneo" Anatomy Museum wax anatomical models in Bologna, works of great historical, artistic and scientific value, have been used since the beginning of the 18th century for medical sciences students practical demonstrations. For this work, which aims to use innovative diagnostic investigation techniques for advancement either in education and scientific communication through a new "remote" method for the museum fruition, we used anatomical preparations and both normal human anatomical and pathological one wax models, from the dawn of the nineteenth according to the new Morgagni's theories. We acquired a lot of high resolution photographs as many as tomographic images than processed using innovative representation techniques through new generation hardware equipment and an original software especially developed for full three-dimensional display. The several high-resolution photographs acquired around the object, combined with the results of the X-ray computed tomography (CT) investigation, show the 3D reconstruction of the object with their internal parts reassembled and, at the same time, reveal hidden structures and materials used, all in a non-invasive way. The CT analysis was performed using a specifically designed system, developed for application on Cultural Heritage at the Physics and Astronomy Department of Bologna University. The results of this work are shown through a virtual 3D projection using a device able to emulate a holographic representation.

References

[1] F. Casali, X-ray and Neutron Digital Radiography and Computed Tomography for Cultural Heritage, in Physical Techniques in the Study of Art, Archaeology and Cultural Heritage, ed. By D. Bradley, D. Creagh (Elsevier, Amsterdam, 2006), pp. 41–123
[2] M.P. Morigi, F. Casali, M. Bettuzzi, R. Brancaccio, V. D'Errico, "Application of X-ray Computed Tomography to Cultural Heritage diagnostics" Springer, Appl. Phys. A,Vol 100, 2010, pp 653-661
[3] M.P. Morigi, F. Casali, A. Berdondini, M. Bettuzzi, D. Bianconi, R. Brancaccio, A. Castellani, V. D'Errico, A. Pasini, A. Rossi, C. Labanti, N. Scianna, X-ray 3D Computed Tomography of large objects: investigation of an ancient globe created by Vincenzo Coronelli, in Optics for Arts, Architecture, and Archaeology. Proceedings of SPIE, vol. 6618 (SPIE, Bellingham, 2007)
[4] E. Peccenini, F. Albertin, M. Bettuzzi, R. Brancaccio, F. Casali, M. P. Morigi, F. Petrucci "Advanced imaging systems for diagnostic investigations applied to Cultural Heritage", IOP, J. Phys.: Conf. Ser., 566, 2014.
[5] Maraldi N., Mazzotti G, Cocco, L. et al. - "Anatomical Waxwork Modeling: The History of the Bologna Anatomy Museum" - The Anatomical Record (New Anat.) 2000; 261:5-10
[6] Ruggeri, A., Leonardi, L. - Amazing Models Storia dell'anatomia e della raffigurazione - EACEA 2014:6-17
[7] Ruggeri, A., Pontoni, L. - Il museo delle cere anatomiche Luigi Cattaneo a Bologna. In: Le arti della salute Il patrimonio culturale e scientifico della sanità pubblica in Emilia. - Preliminary Report. Clinic Anat.14:19-24.2001
[8] Scarani, P. - Luigi Calori teratologo e il metodo scientifico in: Luigi Calori, una vita dedicata alla scienza (a cura di A. Ruggeri) - Medimond editore, 2007
[9] Mancini, C., Roiati S., Giuliani Piccari G., Todero, A., Leonardi, L. - Multi-layer spiral CT with 2D and 3D volume rendered electronic reconstructions of wax models presumably dating back to the 16th century and the Bologna School - 68° CONGRESSO NAZIONALE SIAI Ancona 2014

Keywords

Diagnostic Investigation; Computed Tomography; Wax Anatomical Model; Museum Enjoyment; Multimedia contents; Museum Enjoyment.