H157   3D Anatomical Model Acquisition and Reproduction of Human Organs: Which Perspectives for Forensic Pathology?

Antonio Guajana, Palermo 90149, ITALY; Francesco Di Paola, University of Palermo, Palermo, ITALY; Marco Arrigo, Palermo 90145, ITALY; Stefania Zerbo, MD, Via Del Vespro, 127, Palermo 90100, ITALY; Elvira Ventura Spagnolo, MD*, University of Palermo, Palermo 90127, ITALY; Gennaro Baldino, Patti, ITALY; Daniele Daricello, MD, University of Palermo, Palermo 90127, ITALY; Dario Saguto, MD, Palermo, ITALY; Mariella Farella, MD, Palermo, ITALY; Giosue' Lo Bosco, PhD, Universita' degli studi di Palermo, Palermo 90123, ITALY; Fabio Bucchieri, MD, Palermo, ITALY; Francesco Cappello, Palermo, ITALY; Antonina Argo, Palermo 90100, ITALY

Learning Overview: The goal of this presentation is to draw attention to obtaining virtual 3D models of human organs, which can help to visualize gross and micro-anatomical features from a 360° perspective that could be used as strong evidence during cross examination in trial.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by drawing attention to obtaining virtual 3D models of human organs.

This technology was initiated to support university medical students in their learning activities during a human anatomy laboratory. In literature, there are several examples of virtual reality models and systems developed to teach about human anatomy and some of them are an excellent reproduction of the reality. However, these supports do not address one very important aspect: touch and handle the reality.[1,2]

The use of such technology has turned out to be an excellent innovative instrument for the scientific community, not only for learning purposes, but making it possible to visualize gross and micro-anatomical features from a 360° perspective that could be used as strong evidence during cross-examination in trial.

This system has a built-in database of 3D human organ models. This database was used to map the models for augmented reality recognition steps to anchor the educational tags and to reproduce real human organs with a 3D printer. Furthermore, to achieve proper virtual representation of the models, this study has conducted an accurate digital acquisition with latest generation instruments and, consequently, the data processing. The process begun on the physical model is defined as reverse engineering, and digital resolution up to 0.1mm was realized using a 3D portable scanning system with a structured light flash bulb, permitting a highly detailed digital model to be produced. Non-invasive technology has proved particularly suitable in relation to the physical characteristics of the real organs, including the dimensions, the complexity of the external surfaces, and the constraints on manipulation.

The application to a real case of the hanging of a young female victim allowed the guarantee of an augmented reality and 3D reconstruction of the anatomical structures of the neck for permanent visualization and peer-review evaluation in court, worthy of mention as tools for cross examination.

Reference(s):
1.   Argo A., Arrigo M., Bucchieri F., et al. Augmented Reality Gamification for Human Anatomy [Article in press].
2.   Hackett M., Proctor M. Three-Dimensional Display Technologies for Anatomical Education: A Literature Review. *Journal of Science Education and Technology* 25(4), 641–654 (2016).

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