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Dataset

A photorealistic collection of *Homo sapiens* crania for research and dissemination

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Abstract

This contribution contains the 3D models described and figured in the following publications:
- Marini E., Lussu P., 2020. A virtual physical anthropology lab. Teaching in the time of coronavirus, in prep.;
- Lussu P., Bratzu D., Marini E., 2020. Cloud-based ultra close-range digital photogrammetry: validation of an approach for the effective virtual reconstruction of skeletal remains, in prep.

Keywords: distance learning, photogrammetry, teaching, validation

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Inv. nr	Taxon	Description
MSAE 59	*Homo sapiens*	cranium
MSAE 62	*Homo sapiens*	cranium
MSAE 63	*Homo sapiens*	cranium
MSAE 78	*Homo sapiens*	cranium
MSAE 95	*Homo sapiens*	cranium
MSAE 1852	*Homo sapiens*	cranium
MSAE 6426	*Homo sapiens*	cranium
MSAE 6428	*Homo sapiens*	cranium
MSAE 6992	*Homo sapiens*	cranium
MSAE 7688	*Homo sapiens*	cranium

Table 1. List of cranium models. All crania come from Bono, Sardinia, Italy, and belong to the Museo Sardo di Antropologia ed Etnografia, University of Cagliari, Italy

INTRODUCTION

The present 3D dataset contains 10 3D *Homo sapiens* crania (splanchnocranium) models with photorealistic appearance (Fig. 1 and table 1), produced via cloud-based ultra close-range digital photogrammetry (UCR-DP) (Lussu & Marini, 2020) and exported in OBJ format. The 3D models are suitable for research, teaching, distance learning, and dissemination. They have been used in a validation study of UCR-DP against standard osteometry and CT-scanning techniques (Lussu et al., 2020) and have been published to support biological anthropology distance learning (Marini & Lussu, 2020).

METHODS

Ten well-preserved human skulls dating back to the XIX century were selected from the osteological collection of the Museo Sardo di Antropologia ed Etnografia (University of Cagliari, Italy). For three-dimensional reconstruction specimens were placed in front of two digital single-lens reflex cameras, at a recording distance of 50 cm, inside a lightbox equipped with softboxes ensuring uniform daylight (5500 K) illumination (Lussu et al., 2020). Perspective changes were achieved by placing the specimens in 5 different positions, and then rotating them using a white turntable with marked poses. In each position, the specimen was rotated to achieve 10 perspective views from each camera; a total of 100 photographs were acquired for each specimen. Both cameras were connected to a notebook PC via USB 3.0 cables and hub, and the image acquisition was controlled via digiCamControl (http://digicamcontrol.com). The resulting photographs were processed using Autodesk ReCap Photo (Autodesk Inc., USA) cloud services. A linear distance (∼10 cm) parallel to the sagittal plane was defined on each specimen between two arbitrary landmarks and measured three times. 3D models were scaled to their real dimensions using ReCap Photo *Scale by Value* function, inputting the average measurement. Postprocessing was performed with ReCap Photo (mesh cleaning and hole filling) and Krita (https://krita.org; texture editing).

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Figure 1. Lateral view of cranium MSAE 6426 3D model, oriented along the Frankfurt plane.

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