

AUTOMATED PLACEMENT OF ANTHROPOMETRIC LANDMARKS: PRELIMINARY STUDY

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Background: Anthropometric analysis of cranial structures plays a crucial role in fields such as forensic science and biological anthropology. The precise identification and placement of anthropometric landmarks are essential for accurate measurements and comparative analyses. However, manual annotation is time-consuming and subject to variability. Therefore, the development of automated methods for landmark detection has become an important area of research, aiming to improve efficiency, reproducibility, and objectivity in cranial analysis.

Objective: The aim of the study was to verify the viability of a deep learning-based method for automatically placing anthropometric landmarks on 3D models of skulls.

Subjects and methods: The study was carried out on 30 skull models derived from computed tomography scans; All the skulls came from a mediaeval archaeological site. The landmark detection task was performed using three independent deep learning models. Each model was trained individually on the complete training set. The preselection criterion was based on the completeness of the subject. Each model used for training was manually labelled by a subject expert using Blender software.

Results and conclusions: The preliminary results indicate that the proposed approach enables the effective automatic placement of selected anthropometric landmarks on cranial models. Additionally, the algorithm showed potential for reducing processing time and minimizing user-dependent variability. Further analysis and validation on larger datasets are required to confirm the robustness and general applicability of the developed solution.

Keywords: Facial reconstruction; Soft tissue markers; Anthropometry.