

System and Method For 3D Printing Orthopaedic Anatomical Models

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ABSTRACT

A system and a method for 3D printing orthopaedic anatomical models are disclosed. This involves obtaining (S501) imaging data of a patient's anatomical region of interest from a scan and the region of interest; transmitting (S502) the obtained imaging data for processing; processing (S503) the imaging data with an AI-driven segmentation software to identify and segment the region of interest; filtering (S504) the segmented data using an automatic triangulation algorithm to generate a 3D mesh model of the region of interest; displaying (S505) the segmented 3D model for review and verification; configuring (S506) the 3D printing parameters, either manually or by the AI-driven segmentation software; converting (S507) the 3D mesh model into a suitable format for 3D printing and printing (S508) the 3D mesh model with pre-defined material and operational parameters specific to the anatomical structure.

KEY APPLICATION AREAS

1. Orthopaedic surgical planning.
2. Medical 3D printing and patient-specific anatomical modeling.
3. AI-assisted medical image segmentation.
4. Medical education and surgical training.
5. Healthcare visualization and preoperative planning (including VR).

POTENTIAL USE

1. Creating patient-specific bone and anatomical models from CT/MRI scans.
2. Preoperative planning and surgical rehearsal.
3. Medical training and anatomy education.
4. Custom implant design and prototyping.
5. Interactive VR-based visualization of patient anatomy.
6. Rapid anatomical model generation in hospitals and clinics without specialized 3D-printing expertise.