

Automated segmentation and description of the internal morphology of human permanent teeth by means of micro-CT

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High-resolution micro-computed tomography is a powerful tool to analyze and visualize the internal morphology of human permanent teeth. It is increasingly used for investigation of epidemiological questions to provide the dentist with the necessary information required for successful endodontic treatment. We present an image processing workflow to automate most parts of the work needed to fully describe the internal morphology of human permanent teeth.

One hundred and four human teeth were scanned on a SkyScan 1272 using its automatic sample changer. Python code in a Jupyter notebook was used to verify and process the scans, to prepare the datasets for description of the internal morphology and to measure the apical region of the tooth.

The presented method offers an easy, non-destructive, rapid and efficient approach to scan, check and preview tomographic datasets of a large number of teeth. It is a helpful tool for the detailed description and characterization of the internal morphology of human permanent teeth using automated segmentation by means of micro-CT with full reproducibility and high standardization.

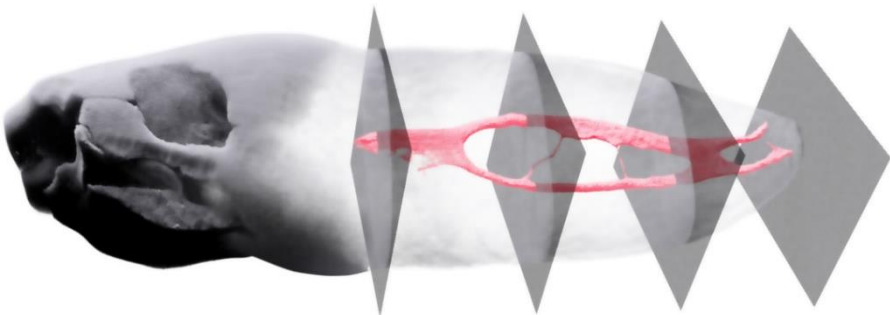


Figure 1: Overview image of the extracted features of one of the teeth from the large cohort