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Paper Title:	Alignment of 3D dentition data using principal component analysis
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Abstract

The manual rotation of 3D teeth data alignment is a process of aligning the data to the appropriate plane and position before performing morphological measurements of the teeth or planning dental treatment. The manual process is not precise and requires much time for experts. To improve the efficiency of data alignment and reduce errors, this paper proposes a method for aligning dentition from 3D data using the principal component analysis (PCA). Our method consists of three steps: 1) Principal component analysis of 3D data, 2) 3D data position alignment, and 3) 3D data flipping. First, to create axes of 3D data using principle component analysis. Second, the 3D data is aligned using a rotation matrix to correct the direction of PCA axes. Finally, the model is flipped to a standard position regarding to the variance of the data. In this experiment, we use 50 datasets of the upper and lower teeth 3D model to evaluate the performance of the proposed method. The results show that the median of error value for lower teeth and the upper teeth are 6.02 degrees, and 5.50 degrees, respectively.
