

Abstract

Dental biometrics utilizes dental radiographs for human identification. The dental radiographs provide information about teeth, including tooth contours, relative positions of neighboring teeth, and shapes of the dental work (e.g., crowns, fillings, and bridges). The proposed system has two main stages: feature extraction and matching. The feature extraction stage uses anisotropic diffusion to enhance the images and a Mixture of Gaussians model to segment the dental work. The matching stage has three sequential steps: tooth-level matching, computation of image distances, and subject identification. In the tooth-level matching step, tooth contours are matched using a shape registration method, and the dental work is matched on overlapping areas. The distance between the tooth contours and the distance between the dental work are then combined using posterior probabilities. In the second step, the tooth correspondences between the given query (postmortem) radiograph and the database (antemortem) radiograph are established. A distance based on the corresponding teeth is then used to measure the similarity between the two radiographs. Finally, all the distances between the given postmortem radiographs and the antemortem radiographs that provide candidate identities are combined to establish the identity of the subject associated with the postmortem radiographs.

Keywords: Dental radiographs, curve alignment, shape registration, spline, biometrics.