

Abstract

Automating the process of postmortem identification of individuals using dental records is receiving an increased attention in forensic science, especially with the large volume of victims encountered in mass disasters. Dental radiograph alignment is a key step required for automating the dental identification process. In this paper, we address the problem of dental radiograph alignment using a Multi-Resolution Genetic Algorithm (MR-GA) approach. We use location and orientation information of edge points as features; we assume that affine transformations suffice to restore geometric discrepancies between two images of a tooth, we efficiently search the 6D space of affine parameters using GA progressively across multi-resolution image versions, and we use a *Hausdorff* distance measure to compute the similarity between a reference tooth and a query tooth subject to a possible alignment transform. Testing results based on 52 teeth-pair images suggest that our algorithm converges to reasonable solutions in more than 85% of the test cases, with most of the error in the remaining cases due to excessive misalignments.