NONSUBSAMPLED CONTOURLET TRANSFORM AND ITERATIVE POINT CORRESPONDENCE FOR REGISTRATION ON DENTAL PERIAPICAL RADIOGRAPHS

By : Ahmad Afif Supianto
Student Identity Number : 5109201012
Supervisor : Dr. Agus Zainal Arifin, S.Kom, M.Kom
Co-Supervisor : Arya Yudhi Wijaya, S.Kom, M.Kom.

ABSTRACT

Image registration is the process of finding the optimal transformation of a different image data into spatial correspondence, so that the same anatomical structures occupy the same spatial location. Image registration in the periodontal field, especially dental periapical radiographs has been developed to evaluate the alveolar bone. The method has been developed to locate feature points on the registration process is done in spatial domain, where it is difficult to separate the weak edges by noise in the image. On the other hand, dental radiographs are dominated by low brightness levels.

In this study we proposed Nonsubsampled Contourlet Transform and Iterative Point Correspondence for image registration on periapical dental radiographs. This method begins with feature extraction using Nonsubsampled Contourlet Transform to produce a robust feature point. Then Iterative Point Correspondence conducted to find corresponding points between the reference image and floating image. Floating image is a reference image that has a geometry transformation or image taken after periodontal therapy. Registration is done by using the geometric transformation parameters through correspondence estimates obtained from the corresponding points.

Tests carried out on eight grayscale dental periapical radiographs. Testing results show that the proposed method successfully registering with an accuracy 95.96% achieved with thresholding parameters of 4, window size 3x3, and a minimum of 400 iterations.

Keywords : Image Registration, Nonsubsampled Contourlet Transform, Iterative Point Correspondence, Dental Periapical Radiographs.