A computer aided diagnostic tool for Evaluation of Rheumatoid Arthritis in Hand Thermal images

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Abstract

Objectives:

The aim of the study was to develop a computer aided diagnostic tool for evaluation of Rheumatoid arthritis in hand thermal images.

Methods:

The skin surface temperature measurement and heat distribution index was analyzed in whole hand thermal image of rheumatoid arthritis patients (RA) and controls. K means algorithm was compared with EM algorithm in evaluation of RA in hand thermal images. Finally a computer aided diagnostic tool was made using Matlab for diagnosing the rheumatoid arthritis.
Results:
In evaluation of skin surface temperature measurements, 3rd and 4th Metacarpophalangeal joints, 3rd Proximal Interphalangeal joints and 3rd Distal Interphalangeal joints shows highly significant difference in temperature than other joints between RA patients and healthy controls (p<0.01). K means algorithm provided better segmentation results compared to EM algorithm in evaluating the disease.

Conclusion:

The developed computer aided diagnostic tool provided better prediction of rheumatoid arthritis with key interpretation in hand thermal images in the total population studied.

KEYWORDS:

Skin surface temperature measurements, heat distribution index, rheumatoid arthritis, k means algorithm, Expectation Maximization algorithm