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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.

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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