Automatic Detection of Malignant Masses in Digital Mammograms Based on a MCET-HHO Approach

Erick Rodríguez-Esparza, Laura A. Zanella-Calzada, Daniel Zaldivar and Carlos E. Galván-Tejada

Abstract Digital image processing techniques have become an important process within medical images. These techniques allow the improvement of the images in order to facilitate their interpretation for specialists. Within these are the segmentation methods, which help to divide the images by regions based on different approaches, in order to identify details that may be complex to distinguish initially. In this work, it is proposed the implementation of a multilevel threshold segmentation technique applied to mammography images, based on the Harris Hawks Optimization (HHO) algorithm, in order to identify regions of interest (ROIs) that contain malignant masses. The method of minimum cross entropy thresholding (MCET) is used to select the optimal threshold values for the segmentation. For the development of this work, four mammography images were used (all with presence of a malignant tumor), in their two views, craniocaudal (CC) and mediolateral oblique (MLO), obtained from the Digital Database for Screening Mammography (DDSM). Finally, the ROIs calculated were compared with the original ROIs of the database through a series of metrics, to evaluate the behavior of the algorithm. According to the results obtained, where it is shown that the agreement between the original ROIs and the calculated ROIs is significantly high, it is possible to conclude that the proposal of the MCET-HHO algorithm allows the automatic identification of ROIs containing malignant tumors in mammography images with significant accuracy.

E. Rodríguez-Esparza (✉) · D. Zaldivar
Universidad de Guadalajara, CUCEI, Blvd. Gral. Marcelino García Barragán 1421, Olímpica, 44430 Guadalajara, Jalisco, Mexico
e-mail: erick.rodrigueze@alumno.udg.mx

D. Zaldivar
e-mail: daniel.zaldivar@cucei.udg.mx

L. A. Zanella-Calzada (✉)
University of Lorraine, LORIA, Campus Scientifique, 615 Rue du Jardin-Botanique, 54506 Vandœuvre-lès-Nancy, Lorraine, France
e-mail: laura.zanella-calzada@univ-lorraine.fr

C. E. Galván-Tejada
Universidad Autónoma de Zacatecas "Francisco García Salinas", Jardín Juárez 147, Centro, 98000 Zacatecas, Zacatecas, Mexico
e-mail: ericgalvan@uaz.edu.mx

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