ABSTRACT

The most killing disease in the world is known as breast cancer, which is occurred in women only. Earlier detection, segmentation and diagnosis prevent the death. Hence, there is a requirement for developing a fully automatic methodology for screening the cancer regions in breast. In this research work, the stages of BC are identified using Artificial Neural Network – Enhanced Fruit Fly (ANN-EFF) classification approach. Initially, the mammogram images from Mammographic Image Analysis data-base Society (MIAS) database are pre-processed using Fuzzy- Contrast Limited Adaptive Equalizations (CLAHE), furthermore, Pectoral Muscle (PM) in the mammography image is removed using otsu's thresholding algorithm. Second, clustering of the image (pre-processed) is performed using an optimized k -means algorithm to acquire a tumor image. In this step, the k -means algorithm is optimized utilizing a Genetic Algorithm (GA). Thirdly, Feature Extraction (FE) of the clustered image is performed. Finally, the extracted features are given to the ANN-EFF classifier for identifying the benign, malignant and normal mammogram images.

This research work also develops a fully automatic methodology for breast cancer detection and segmentation using Adaptive Neuro Fuzzy Inference System (ANFIS) classification approach. This proposed method consists of four stages as preprocessing, feature extraction, classifications and segmentation. In this research work, wavelet based enhancement technique is used as the preprocessing method. Further, texture and statistical features have been extracted from the enhanced image, which are followed by the ANFIS classifier in order to classify the mammogram image into normal case, benign case and malignant case. Then, morphological processing is applied on the malignant mammogram images in order to segment the cancer regions. The performance analysis and comparisons are made with conventional methods.

This research work also develops a methodology for detecting and diagnosing the tumor regions in mammogram images using deep learning algorithm. The methodology consists of data augmentation, transform, and Convolutional Neural Networks (CNN) classifier with segmentation process for detecting the malignant mammogram image from the benign mammogram image. Then, the malignant mammogram image is analyzed for its severity levels using CNN classifier. The proposed system diagnosed the malignant case mammogram images into either Early or Advance using the developed CNN architecture. The simulation results of the proposed methods are compared with respect to other similar studies in this field.