

ABSTRACT

In recent years, brain tumor detection and segmentation has created an interest on research areas. The process of identifying and segmenting brain tumor is a very tedious and time consuming task, since human physique has anatomical structure naturally. In the first stage of the research work, a novel hybrid energy-efficient method is proposed for automatic tumor detection and segmentation. Here, the system follows K-means clustering, integrated with the Fuzzy C-Means (KMFCM) and active contour by level set for tumor segmentation. An effective segmentation, edge detection and intensity enhancement can detect brain tumor easily. The performance of the proposed approach has been evaluated in terms of white pixels, black pixels, tumor detected area, and the processing time. This technique can deal with a higher number of segmentation problem and minimum execution time by ensuring segmentation quality. Additionally, tumor area length in vertical and horizontal positions was determined to measure sensitivity, specificity, accuracy, and similarity index values. Further, tumor volume was computed. In the second stage of the research work, brain tumor detection was done by using machine learning algorithms. Here, a solution was presented for brain tumor segmenting by using the Adaptive Deep Neural Network (ADNN) with a novel SKFCM with machine learning based Penguin Search Optimization Algorithm (PeSOA). This was carried out to diminish the complexity in the computational procedure and to enhance the diagnostic exactness of tumor detection and segmentation. Additionally, tumor area was estimated by using the surface areas of different shapes with its location, which helps to determine whether tumor information is malignant or not. Thus, the knowledge of tumor information is helpful for physicians for effective diagnosing in the tumor for treatments.