

Segmenting nodules of lung tomography image with level set algorithm and neural network

ABSTRACT

Lung cancer is the main cause of death in the world. It is diagnosed generally by analysing a tissue cluster formation called 'nodule' inside the lung. Computer aided diagnosis (CAD) plays an important role in medical field which helps radiologists to detect and localise lung nodule. The aim of this research is to develop an image segmentation algorithm for nodule detection in computed tomography (CT) image. Performance of the developed segmentation algorithm is analysed through testing on the lung CT image obtained from public online database, Lung Image Database Consortium (LIDC). To segment the lung nodule, preprocessing techniques are applied on the CT image followed by segmentation approaches to segment the nodule inside the lung. In this research, median filter is applied to improve the quality and filter the background noise of the image. Segmentation technique which is level set method (LSM) is applied to segment the nodule. After that, feature extraction process is carried out to obtain the essential information of the segmented nodules for further analysis or classification purpose. Here, the features extracted including centroid, major and minor axis length and area of the nodule. Performance of the segmentation algorithms is analysed using 20 lung CT images from LIDC dataset. Lastly, classification step is done using Artificial Neural Network (ANN) to classify the segmented nodule to different categories. From the analysis, LSM technique performs better in cases of bigger nodule compared to smaller size nodule. The result shows that the proposed segmentation method can effectively segment the lung nodule.