

Automatic Detection of the Pulmonary Nodules from CT Images

Omnia Elsayed, Khaled Mahar, Mohamed Kholief
College of Computing and Information Technology Dept.
Arab Academy for Science and technology
Alexandria, Egypty eng.omniaaly@gmail.com,
khmahar@aast.edu, kholief@aast.edu

Hatem A. Khater
Research & Development Department
Egyptian Naval Forces
Alexandria, Egypty
hatem.a.khater@gmail.com

Abstract—This paper presents a complete approach for automatic detection and classification of pulmonary nodules through applying several techniques on chest CT images. The proposed approach starts by multi segmentation techniques followed by nodule extraction and then classification of the extracted features. The first step of is the preprocessing by converting the pixel values into Hounsfield units, and then applying a region growing technique to isolate the human body from other items. After that, the lung segmentation process takes place, which initially starts by thresholding the image followed by Hessian method for vascular tree segmentation. The application of multi segmentation methods allowed the precise extraction of the nodule features, which facilitate the classification. After this stage, several classifiers with their combination had been applied to perform the classification of malignant nodule and benign. The combination of these classifiers are used to evaluate and then enhance the classification accuracy of malignant nodule and benign. CT study of 200 patients, each with 150 to 500 images, is used to evaluate the proposed technique. The results are promising and achieved 98% classification accuracy.

Keywords— *Image processing; Segmentation; Classification*
