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DETECTION OF GGO CANDIDATE REGIONS BY USING EDGE ENHANCEMENT FILTER AND STATISTICAL FEATURES

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Abstract. *Detection of abnormal areas such as lung nodule, ground glass opacity on multi detector computed tomography (MDCT) images is a difficult task for radiologists. It is because subtle lesions such as small lung nodules, ground glass opacity (GGO) tend to be low in contrast, and a large number of computed tomography (CT) images require a long visual screening times. To detect the abnormalities by use of computer aided diagnosis (CAD) system, some technical methods have been proposed. Despite of these efforts, their approach did not succeed because of difficulty of image processing in detecting of the GGO areas exactly. Thus they did not reach to the stage of automatic detection employing unknown thoracic MDCT data sets. In this paper, we develop a CAD system for automatic detecting of GGO candidates areas from thoracic MDCT images by use of a selective enhancement filter and statistical features which is obtained density features. The proposed technique applied to 29 MDCT image sets. From this database, classification rates of a true positive rate of 82%, false positive rate of 42.89% and number of false positive 2.6/slice under the receiver operating characteristic analysis were achieved. The aim of this study is segmentation of lungs region and detection of abnormal area using thoracic MDCT image sets. This study also tried to decrease the amount of false positive rates and increase the amount of true positive rates so that the accuracy of performance.*
Keywords: GGO, CAD, Selective enhancement filter

1. **Introduction.** The cancer is a leading cause of death worldwide. From a total of 58 million deaths worldwide in 2005, cancer accounts for 7.6 million (or 13%) of all deaths [1]. The main types of cancer leading to overall cancer mortality are lung, stomach liver, colon and breast. More than 70% of all cancer deaths in 2005 occurred in low and middle income countries. Deaths from cancer in the world are projected to continue rising, with an estimated 9 million people dying from cancer in 2015 and 11.4 million dying in 2030. The lung cancer occurs most often between the ages of 55 and 65. There are two major types of lung cancer, non-small cell lung cancer and small cell lung cancer. Each type of lung cancer grows and spreads in different ways, and each is treated differently. In this point, to prevent from having a cancer and to have visual screening in early stage are the most important tasks.

The computer aided diagnosis (CAD) is a method for detecting the lung abnormalities and tumors by use of a computed tomography (CT) image in the early stage. In recent years, optical devices produce digital images, such as CT or magnetic resonance imaging (MRI) that are highly efficient for extracting the abnormal shadows in the medical image processing field. The CT technology has proven to be a very successful tool for medical diagnosis in the visual screening. The multi-detector row CT (MDCT) system also known as the Multi Slice CT (MSCT) provides a large volume of scanning with good image quality, and at very short time of acquisition. Therefore, we are now able to obtain the