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AUTOMATIC DETECTION OF GGO CANDIDATE REGIONS BY USING DENSITY AND SHAPE FEATURES

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Abstract. *Various imaging equipments have been introduced into medical fields. Especially, high resolution helical computed tomography (HRCT) is one of the most useful diagnosis systems because it provides a high resolution image to medical doctors as a clear image. Radiologist can easily detect abnormalities by use of the clear images. Detection of abnormal areas such as lung nodule, ground glass opacity on multi detector computed tomography images is a difficult task for radiologists. It is because subtle lesions such as small lung nodules tend to be low in contras, and a large number of computed tomography images require a long visual screening times. To detect the abnormalities by use of computer aided diagnosis (CAD) system, some technical methods for detecting the abnormalities have been proposed in medical field. Despite of these efforts, their approach did not succeed because of difficulty of image processing in detecting the ground glass opacity (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 areas from thoracic MDCT images by use of five statistical features which are obtained four density features and one shape feature. The proposed technique applied on 31 MDCT image sets. 79.4 [%] of recognition rates and 1.07 of false positive rates was achieved. Some experimental results are shown along with a discussion.*

Keywords: Ground glass opacity, Computer aided diagnosis, MDCT

1. **Introduction.** During the last decades, various imaging equipments have been introduced into medical fields. Especially, high resolution helical computed tomography (HRCT) is one of the most useful diagnosis systems because it provides a high resolution image to medical doctors as a clear image. Radiologist can easily detect abnormalities by use of the clear images which is obtained HRCT and MR imaging, etc. However, radiologists should spend a lot of time for visual screening than the past. To overcome this problem, many related image processing techniques have been proposed into medical fields for extraction of abnormal area.

Lung cancer is one of the most common malignant tumors in the world [1]. The lung cancer tends to be increase every year. It has been reported that lung cancer became the first leading cause of death from the malignancy in Japan. After 1993, the lung cancer is the top reason of death by a cancer in the male. At last it is the top leading cause of death by a cancer in the male and female in 1998. Furthermore the death by the lung cancer has increased as many as 20 times than in 1955. In order to detect/evaluate the lung cancer including the detection of lung cancer, small nodules and segmentation of the region of interest, many techniques are developed [2-5]. Some of them are provided as a