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Development of a computer-aided diagnosis system for chest x-ray helical CT images (in Japanese)

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A computerized detection scheme of lung nodules in helical x-ray CT images was developed for computer-aided diagnosis (CAD) systems. We propose a novel template-matching technique based on a genetic algorithm (GA template matching) for detecting nodules existing within the lung area; the GA was used to determine the target position in the observed image efficiently and to select an adequate template image from several reference patterns for quick template matching. In addition, a conventional template matching was employed to detect nodules existing on the lung wall area (lung wall template matching), where semicircular models were used as reference patterns; the semicircular models were rotated according to the angle of the target point on the contour of the lung wall. After initial detection of candidates using the two template-matching methods, we extracted a total of 13 feature values and used them to eliminate false-positive findings. Twenty clinical cases involving a total of 557 sectional images were used in this study. Seventy-one nodules out of 98 were correctly detected by our scheme (i.e., a detection rate of about 72%), with the number of false positives at approximately 1.1 per sectional image. An application of the CAD system for helical CT images with graphic user interface was developed.