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Estimation method of severity degree for emphysema using segmentation of lung lobectomy

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Many studies have been reported in diagnosis of emphysema. From the relation between the location of emphysema and the respiratory function, the methods of emphysema analysis are reported by dividing the lung into some sub-volumes. However, that method does not reflect the lung structure. Therefore, in this study, we perform lobe-segmentation for the lung is proposed to recognize the lung structure more precisely and improve the accuracy of classification. In particular, since the false-negative is important, our purpose is that the possibility of false-negative will be to 0. In the previous study, the vessel and bronchus are extracted to estimate the bounding area of lobes from the shape of extracted tissue. In our method, we assume the structural features that major tissues do not intersect beyond the border area of the lobes. The k-means clustering method is performed to the vessel image obtained by projection, to divide vessel into lobe-vessel. Next, the lobe-segmentation is performed by region-growing processing to each lobe-vessel. For measuring the effect of the lung-lobe-segmentation, the following experiment was performed. Firstly, some features are extracted by conventional division method and the number of feature dimension is reduced by stepwise forward selection. Then we selected the corresponding features to proposed division (lobe-segmentation) and classified the severity on each data to compare the results. Next, we compared both conventional and proposed classification method in the corresponding features. As the results, classification with proposed method has better results than that of conventional method.

Biography

Toshiyuki Tanaka received B.E., M.E. and Dr. Eng. degrees in Instrumentation Engineering from Keio University, Yokohama, Japan, in 1982, 1984 and 1989, respectively. He is now a Professor in the Department of Applied Physics and Physico-Informatics, Keio University. His research interests are in medical image processing, biometric authentication, non-destructive inspection. He is a member of IEEE, SICE, IEEJ and IEICE and so on.

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