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Abstract
Thyroid nodules are prevalent among endocrine diseases. The image features and morphological differentiation of cells and thyroid tissue are the defining characteristics for various diseases. Observation and examination of microscopic histological tissue images can help in understanding the cause and pathogenesis of the disease. The procedures are redundant and heavily depend on the experiments of the pathologist. The results are very subjective, and to be only semantic described. The aim of this study was to quantify the histological image features of microscopic thyroid images in order to classify varying tissue types and to release the work for clinical examination. Five typical histological thyroid tissues were characterized using defined image features. Multiple discriminant analysis and Markrv random field were then used to classify the features. Training phase and recognition phase were included in the schematism of the algorithm. In training phase, the image features of the thyroid tissue samples were evaluated and the classification rules were established based on statistical techniques. And then the transition probability matrix for modification module was estimated. In the recognition phase, the test microscopic images containing heterogeneous tissue are analyzed by the well-trained tissue classifier and modification module. 100 random selected clinical image samples were employed for the evaluation of system performance. They were separated to be training group and testing group. The results show that accuracy of the system is about 96%. It proves that our algorithm has good performance, and the high capability of differentiating histological tissue types.
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