

Electronics and ICT

Title

Quantitative analysis of immunohistochemical staining of liver slides.

Abstract

Hepatitis B is often detected by quantifying the intensity of hepatitis B surface antigen (HBsAg) in immunohistochemistry (IHC). According to previous studies, there may be a correlation between the intensity of HBsAg and the recurrence of liver cancer. The observational method is not only laborious but also subjective. Therefore, an automated statistical method for quantifying staining intensity is proposed, in which a convolutional neural network and image processing are combined to obtain information on cellular staining intensity in IHC-stained WSI. In addition, each pixel in the WSI is classified with a staining intensity of 0+~3+, where 0+ indicates the minimum HBsAg staining intensity and 3+ indicates the maximum HBsAg staining intensity. **In this study, a self-built dataset consisting of about 40 pathological slices (WSI) of patients with clinically diagnosed liver diseases was used to evaluate the feasibility of the proposed method.** Experimental results show that the proposed method has good detection quality and classification performance. Overall, this method provides a robust solution to the task of automating the quantification of HBsAg intensity in IHC-stained WSI.

Benefits

The current diagnosis of liver pathological tissue slices is still based on observation through a microscope with the naked eye, which is a time-consuming and laborious inspection process that not only requires a high degree of experience from the physician but also requires considerable concentration. Therefore, there is an urgent need for the development of automatic auxiliary analysis and diagnostic tools for pathological tissue slice images in current clinical pathological diagnosis.

1. Provide pathologists with the performance intensity score and proportion distribution of the IHC coloring of the entire slice.
2. The detection results of IHC (HbsAg) can provide physicians with more quantitative data to find the correlation with diseases or physiological phenomena and to develop innovative medical technologies.

Industry Categories

medical field, pharmaceutical factory

Keywords

Liver Pathology, Immunohistochemistry Staining, Image Processing, Stain Intensity Quantification

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