Computational Cell Segmentation in Immunohistochemically Image of Meningioma Tumor Using Fuzzy C-Means and Adaptive Vector Directional Filter

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Abstract : Diagnosing and interpreting manually from a large cohort dataset of immunohistochemically stained tissue of tumors using an optical microscope involves subjectivity and also is tedious for pathologist specialists. Moreover, digital pathology today represents more of an evolution than a revolution in pathology. In this paper, we develop and test an unsupervised algorithm that can automatically enhance the IHC image of a meningioma tumor and classify cells into positive (proliferative) and negative (normal) cells. A dataset including 150 images is used to test the scheme. In addition, a new adaptive color image enhancement method is proposed based on a vector directional filter (VDF) and statistical properties of filtering the window. Since the cells are distinguishable by the human eye, the accuracy and stability of the algorithm are quantitatively compared through application to a wide variety of real images.

Keywords : digital pathology, cell segmentation, immunohistochemically, noise reduction

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