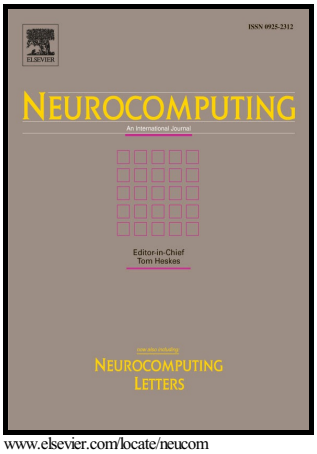

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Automated Mitosis Detection in Histopathology Based on Non-Gaussian Modeling of Complex Wavelet Coefficients

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Abstract

To diagnose breast cancer, the number of mitotic cells present in histology sections is an important indicator for examining and grading biopsy specimen. This study aims at improving the accuracy of automated mitosis detection by characterizing mitotic cells in wavelet based multi-resolution representations via a non-Gaussian modeling method. The potential mitosis candidates were decomposed into multi-scale forms by an undecimated dual-tree complex wavelet transform. Two non-Gaussian models (the generalized Gaussian distribution (GGD) and the symmetric alpha-stable (SαS) distributions) were used to accurately model the heavy-tailed behavior of wavelet marginal distributions. The method was evaluated on two independent data cohorts, including the benchmark dataset (MITOS), via a support vector machine classifier. The quantitative results shows that the bivariate SαS model achieved superior classification performance with the area under the curve value of 0.82 in comparison with 0.79 for bivariate GGD, 0.77 for

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