Machine learning aided classification and grading of biopsy sample

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Abstract

Grading histopathological tissue is crucial for identifying and treating diseases. Due to the complexity of living entities, manual tissue grading is a laborious and time-consuming operation that necessitates a skilled pathologist in order to produce an accurate result. Additionally, manual analysis is rather arbitrary. An autonomous, quick, and reliable image analysis technique that produces well-processed images with specified image quality criteria is desired to get around these constraints. One such area of research is machine learning (ML), which uses numerous multivariate analytical techniques to achieve statistical learning. These techniques assist in locating important features during ML algorithm training that may then be used to categorize or predict test data sets. In the current study, we used discrete wavelet transform (DWT) and grey level co-occurrence matrix (GLCM) features to train machine learning (ML) based image classification models in order to analyze the morphology of tissue biopsy images.

Keywords: Optical microscopy, image classification, machine learning, discrete wavelet transform and gray level co-occurrence matrix