

STAINED SLIDES SCANNING BASED ON LED ILLUMINATION

By

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ABSTRACT

Stained slides are widely used in pathology and biomedical study for disease diagnosis and analysis. Many kinds of abnormal cells have special features in the nuclei. Extraction of the nuclei features based on color analysis is the prerequisite for automatic slides scanning and analysis. Because of the inconsistency of the staining quality, color variation of the same kind of dye and low color contrast between different dyes are the major challenges of nuclei feature extraction.

The linear color unmixing algorithm is the first order approximation of Lambert Beer's law for transparent slides, and it is an appropriate color analysis method for stained slides. Unsupervised linear color unmixing method is improved to adapt the color variation, and actively tuned multi color LED array is used as illumination source for higher dynamic range imaging and higher color contrast. Moreover, low cost multi spectrum imaging has been demonstrated by spectral transmittance reconstruction based on active LED illumination. The color analysis generates the image of the nuclei, and features are extracted by image processing for further analysis.