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Characterization of tissue histology through unsupervised feature learning

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Image-based classification of histology sections, in terms of distinct components (e.g., tumor, stroma, normal), provides a series of indices for tumor composition. Furthermore, aggregation of these indices, from each whole slide image (WSI) in a large cohort, can provide predictive models of the clinical outcome. However, performance of the existing techniques is hindered as a result of large technical variations and biological heterogeneities that are always present in a large cohort. On the other hand, in the machine learning community, deep learning techniques have recently emerged as strong candidates for applications, including decision support systems, voice recognition, and improved search engines. The unsupervised nature of deep learning techniques enables the automatic discovery of underlying complex patterns in the data, thus is desirable for large-scale scientific applications. The application of deep learning methods in the field of histopathology enables the leaning of high-level complex morphometric patterns preserved in the vast amount of WSIs, and as a result, leads to computational systems that are highly robust in the presence of large amount of technical variations and biological heterogeneities, and extensible to different tumor types.

Biography

Hang Chang has completed his PhD at the age of 27 years from Institution of Automation, Chinese Academy of Sciences. He is currently a career research scientist at the Life Sciences Division, Lawrence Berkeley National Laboratory. He has published more than 35 papers in reputed journals and conferences.

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