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Title: Role of Color in Histological Image Analysis: Rough-Fuzzy Computing to Deep Learning

Abstract:
In histology, microscopic images of tissue sections are examined to study the manifestation of diseases under consideration. The most important property of histological images is the enormous density of data, more cellular details, compared to other imaging modalities, which makes computer-aided diagnosis more accurate than other modalities. To facilitate pathologists' examination, tissue samples are stained with multiple contrasting histochemical reagents, which in turn highlight different tissue structures and cellular features. Hence, color in pathology plays a pivotal role as a good indicator of histological components. One of the most common and primary problems of histological tissue analysis is the inadmissible inter and intra-specimen variation in stained tissue color. Consequently, numerical features extracted from histological images may lead to difficulty in image interpretation by automated systems, trained on a specific stain color appearance. Hence, the foremost and challenging task in stained histological image analysis is to reduce color variation present among images. In this talk, two recently introduced approaches for stain color normalization will be discussed. While the first approach is based on rough-fuzzy computing, the second one is developed around generative adversarial network. The merits and demerits of these two approaches will also be covered.

Biography:

Pradipta Maji is a Professor of Machine Intelligence Unit, Indian Statistical Institute, Kolkata. He has published more than 150 papers in international journals and conference proceedings. His research interests include machine learning, pattern recognition, computer vision, medical imaging, and bioinformatics. Professor Maji is a Fellow of the National Academy of Sciences, India. He received the 2008 Microsoft Young Faculty Award from Microsoft Research Laboratory India Pvt., the 2009 Young Scientist Award from the National Academy of Sciences, India, the 2011 Young Scientist Award from the Indian National Science Academy, India, and the 2015 Young Faculty Research Fellowship from the Ministry of Electronics and Information Technology, Government of India. He has been selected as the 2009 Young Associate of the Indian Academy of Sciences, India. He is the Senior Member of International Rough Set Society and The Institute of Electrical and Electronics Engineers, USA.