Distinguished Lecture Series on Data Analytics and Artificial Intelligence

Prof. Edwin R. Hancock

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8 March 2018 (Thursday) 10:30 - 11:30 a.m.
RRS905, Sir Run Run Shaw Building, Ho Sin Hang Campus, HKBU

Entropic Analysis of Time Evolving Networks

💬 Abstract

This talk focuses on how to use network entropy as a means of characterising network structure and investigating the relationship between changes in network structure and function with time. Examples are presented on network data extracted from the data for the New York Stock Exchange. We show how the entropic characterisation can be extended to develop Euler- Lagrange equations which describe the evolution of the node degree distribution, and can be used to predict the evolution of network structure with time. If time permits, we will also describe how to extend our model to include quantum spin statistics, and explore how Bose-Einstein and Fermi-Dirac statistics modify the evolution of network structure. We demonstrate some of the utility of the proposed methods on fMRI images of Alzheimer brains.

ⓘ Biography

Edwin R. Hancock holds a BSc degree in physics (1977), a PhD degree in high-energy physics (1981) and a D.Sc. degree (2008) from the University of Durham, and a doctorate Honoris Causa from the University of Alicante in 2015. From 1981-1991 he was at the Rutherford-Appleton Laboratory, working on high energy physics experiments at the Stanford Linear Accelerator Center (SLAC) providing the first measurements of charmed particle lifetimes. In 1991, he moved to the University of York as a lecturer in the Department of Computer Science, where he has held a chair in Computer Vision since 1998. He leads a group of some 25 faculty, research staff, and PhD students working in the areas of computer vision and pattern recognition. He has published about 180 journal papers and 650 refereed conference publications. He was awarded the Pattern Recognition Society medal in 1991 and an outstanding paper award in 1997 by the journal Pattern Recognition. He has also received best paper prizes at CAIP 2001, ACCV 2002, ICPR 2006, BMVC 2007 and ICIAP in 2009 and 2015. In 2009 he was awarded a Royal Society Wolfson Research Merit Award. In 1998, he became a fellow of the International Association for Pattern Recognition. He is also a fellow of the Institute of Physics, the Institute of Engineering and Technology, and the British Computer Society. In 2016 he became a fellow of the IEEE and was named Distinguished Fellow by the British Machine Vision Association. He is currently Editor-in-Chief of the journal Pattern Recognition. He has also been a member of the editorial boards of the journals IEEE Transactions on Pattern Analysis and Machine Intelligence, Pattern Recognition, Computer Vision and Image Understanding, Image and Vision Computing, and the International Journal of Complex Networks. He has been Conference Chair for BMVC in 1994 and Programme Chair in 2016, Track Chair for ICPR in 2004 and 2016 and Area Chair at ECCV 2006 and CVPR in 2008 and 2014, and in 1997 established the EMMCVPR workshop series. He has been a Governing Board Member of the IAPR since 2006, and is currently Vice President of the Association.