School of Data Science
香港城市大學
City University of Hong Kong

SDSC SEMINAR

Artificial Intelligence with/without Biological Intelligence: Some Tidbits (Interplay between AI and BI)

Date: 9 May 2024 (Thursday)

Time: 10:00am - 11:00am

Venue: Rm 6-211, Lau Ming Wai Academic Building, City University of Hong Kong

ABSTRACT

In this era of AI, often deep neural networks (DNNs) are viewed as an "all-cure" solution; their success in a wide range of problems needs no mention. Unfortunately, such systems are generally black boxes and somewhat related to biological neural networks (brains) which are claimed to develop "intelligence". Although it is hard to define "intelligence", achieving human-level performance (or even better) in different decision-making problems using systems with billions/trillions of free parameters trained on huge data sets may not necessarily make a system intelligent! In this seminar, we shall discuss how the design of some of the AI systems used inspiration from neuroscience knowingly or unknowingly. We argue that to realize human-like intelligence, a closer interaction between discoveries in neuroscience and the designing of AI systems is needed. However, we need to acknowledge that the brain is probably the most complex object in the known world with more unknowns than knowns, although we know a lot about it. Truly brain-inspired models may be able to put a brake on the apparently unsustainable philosophy of "bigger the better" – bigger architecture and bigger datasets. We shall then discuss some of our attempts to exploit neuroscience models/discoveries to develop pattern-recognition systems (intentionally we are avoiding the term AI). Particularly, we shall demonstrate that exploiting at a high level some findings from a cat's visual cortex can make a multilayer perceptron a bit more comprehensible. We shall also discuss how computational models of cells like Lateral Geniculate Nucleus (LGN) cells and Retinal Ganglion Cells can be used to extract features from images to use as inputs to CNNs to investigate if it can improve the complexity and performance of the system. The answers turn out to be affirmative.

Professor Nikhil R. Pal

GUEST SPEAKER'S PROFILE

Nikhil R. Pal was a Professor in the Electronics and Communication Sciences Unit and was the founding Head of the Center for Artificial Intelligence and Machine Learning of the Indian Statistical Institute. His current research interest includes brain science, computational intelligence, machine learning and data mining. He was the Editor-in-Chief of the IEEE Transactions on Fuzzy Systems for the period January 2005-December 2010. He has served/been serving on the editorial /advisory board/ steering committee of several journals including the International Journal of Approximate Reasoning, Applied Soft Computing, International Journal of Neural Systems, Fuzzy Sets and Systems, IEEE Transactions on Fuzzy Systems and the IEEE Transactions on Cybernetics. He is a Fellow of the West Bengal Academy of Science and Technology, Institution of Electronics and Tele Communication Engineers, National Academy of Sciences, India, Indian National Academy of Engineering, Indian National Science Academy, International Fuzzy Systems Association (IFSA), The World Academy of Sciences, and a Fellow of the IEEE, USA.

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All are welcome