

AAI Advanced Analytics Seminar Series on 06/07/2012

Seminar Title: Optimization made Smarter with Memetic Computation

Speaker: Professor Ong Yew Soon, School of Computer Engineering, Nanyang Technological University, Singapore

Date and Time: 1:30pm to 3:00pm, the 6th of July 2012 (Friday)

Seminar Room: UTS Blackfriars Campus Building 5 CC05.GD.02 (5 minutes walk from the Tower Building CB01 of UTS)

Seminar Chairman: Longbing Cao (longbing.cao@uts.edu.au)

Abstract: We are in an era where a plethora of computational problem-solving methodologies are being invented to tackle the diverse problems that are of interest to researchers. Some of these problems have emerged from real-life scenarios while some are theoretically motivated and created to stretch the bounds of current computational algorithms. Regardless, it is clear that in this new millennium a unifying concept to dissolve the barriers among these techniques will help to advance the course of algorithmic research. Interestingly, there is a parallel that can be drawn in memes from both socio-cultural and computational perspectives. The platform for memes in the former is the human minds while in the latter, the platform for memes is intelligent algorithms for problem-solving. In this context, memes can culminate into representations that enhance the problem-solving capability of algorithms. The phrase Memetic Computing has surfaced in recent years; emerging as a discipline of research that focuses on the use of memes as units of information which is analogous to memes in a social and cultural context. It is often unassumingly taken to mean the same thing as memetic algorithms in a synonymous manner. Clearly, such a narrow and restrictive notion or perception of Memetic computing does not do justice to the expanse of this research discipline. Memetic computing offers a much broader scope, perpetuating the idea of memes into concepts that capture the richness of algorithms that defines a new generation of intelligent computational optimization methodologies. It is defined as a paradigm that uses the notion of meme(s) as units of information encoded in computational representations for the purpose of problem solving. In this course, a comprehensive multi-facet survey and the roles of "meme" in computational intelligence is first reviewed. Subsequently, we take a peek into several state-of-the-art memetic algorithms and examined some recent frameworks and theoretic studies of memetic computation. Last but not least, some successful applications of memetic computing methodologies for solving complex real world problems in the field of arts, science and engineering are showcased.

Short biography of the speaker: Yew-Soon Ong received the BS and MS degrees in electrical and electronics engineering from Nanyang Technological University (NTU), Singapore, in 1998 and 1999, respectively. He received the PhD degree on artificial intelligence in complex design from the Computational Engineering and Design Center, University of Southampton, UK in 2003. He is currently an Associate Professor and Director of the Center for Computational Intelligence at the School of Computer

Engineering, NTU. His research interest in computational intelligence spans across memetic computing, evolutionary design, machine learning, agent-based systems and cloud computing. He has coauthored over 140 refereed publications comprising of 55 refereed journals, 85 refereed conference papers and 5 book chapters, excluding 5 edited books, 3 edited special issues and 2 patents filed. His research grants in the last five years amounts to a total of more than 4 million Singapore dollars. These comprises of external research funding from both national and international partners that includes National Grid Office, A*STAR, Singapore Technologies Dynamics, Boeing Research & Development (USA), Rolls-Royce Singapore and Honda Research Institute Europe (Germany), National Research Foundation and Media Development Authority-Singapore-MIT GAMBIT Lab.

Dr. Ong is the founding Technical Editor-in-Chief of Memetic Computing Journal, Chief Editor of the Springer book series on studies in adaptation, learning, and optimization, Associate Editor of IEEE Computational Intelligence Magazine, the IEEE Transactions on Systems, Man and Cybernetics - Part B, Information Sciences, Soft Computing, International Journal of System Sciences and many others. He also Chairs the IEEE Computational Intelligence Society Emergent Technology Technical Committee and has served as Guest Editors of several journals including the IEEE Transactions on Evolutionary Computation. His research work in 2004 was featured by Thomson Scientific's Essential Science Indicators as one of the most cited emerging area of research in August 2007. Recently, he also received the 2012 IEEE Transactions on Evolutionary Computation Outstanding Paper Award. His paper citation counts exceed 2600 in Google Scholar, 1500 in Scopus, and 1000 in Web of Sciences database. In teaching, he has also received numerous awards including the Nanyang Excellence Award for Teaching in 2008, Most Popular Lecturer Award 2009, and recently invited as Fellow of Renaissance Engineering Programme at Nanyang Technological University.

Overview to This Seminar Series

The Advanced Analytics Seminar Series presents the latest theoretical advancement and empirical experience in a broad range of interdisciplinary and business-oriented analytics fields. It covers topics related to data mining, machine learning, statistics, bioinformatics, behavior informatics, marketing analytics and multimedia analytics. It also provides a platform for the showcase of commercial products in ubiquitous advanced analytics. Speakers are invited from both academia and industry. It opens regularly on every Friday afternoon at the garden-like UTS Blackfriars Campus. You are warmly welcome to attend this seminar series.

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