

IEEE Computational Intelligence Society Distinguished Lecturer Program (www.ieee-cis.org) - Distinguished Lecturer Series "Leon the Mathematician" at the Department of Informatics, Aristotle University of Thessaloniki Greece (<http://dls.csd.auth.gr>)



INVITED LECTURE

Professor Xin Yao (Fellow IEEE), Director of the Centre of Excellence for Research in Computational Intelligence and Applications, School of Computer Science, The University of Birmingham, who is a Distinguished Lecturer of the IEEE Computational Intelligence Society, is going to lecture on

Co-evolution, games, and social behaviors

at the **Auditorium of the Central Library** of the Aristotle University of Thessaloniki **on Tuesday November 2nd, 2010 at 12:00.**

ABSTRACT

The iterated prisoner's dilemma (IPD) game has been used extensively in modelling various real-world situations. This talk is concerned with the evolutionary approach to the IPD game. Firstly, we generalise the game from the classical 2 player case to N ($N > 2$) players and investigate the impact of the group size on the evolution. Secondly, we study a more realistic IPD game where more than two levels of cooperation are allowed. Surprisingly, more choices appear to discourage cooperation among players. Possible reasons for this are discussed. Thirdly, we introduce reputation into the IPD game and study its impact on the evolution of cooperation. It turns out that the reputation of a player is an important factor in encouraging cooperative behaviours. Lastly, the importance of generalisation in co-evolution is emphasised and a general theoretical framework is proposed.

S. Y. Chong, P. Tiño and X. Yao, "Relationship between generalization and diversity in coevolutionary learning," *IEEE Transactions on Computational Intelligence and AI in Games*, 1(3):214-232, September 2009.

S. Y. Chong, P. Tino and X. Yao, "Measuring Generalization Performance in Co-evolutionary Learning," *IEEE Transactions on Evolutionary Computation*, 12(4):479-505, August 2008.

P. Darwen and X. Yao, "Co-Evolution in Iterated Prisoner's Dilemma with Intermediate Levels of Cooperation: Application to Missile Defense," *International Journal of Computational Intelligence and Applications*, 2(1):83-107, 2002.

X. Yao and P. J. Darwen, "How Important Is Your Reputation in a Multi-Agent Environment," in Proc. 1999 *IEEE Conference on Systems, Man, and Cybernetics*, IEEE Press, Piscataway, NJ, USA, pp.II-575 - II-580, October 1999.

X. Yao and P. Darwen, "An experimental study of N-person iterated prisoner's dilemma games," *Informatica*, 18(4):435--450, 1994.

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Xin Yao is a professor of computer science from the University of Birmingham, UK. He was also a Distinguished Visiting Professor of the University of Science and Technology of China (USTC), P. R. China, and a visiting professor of three other universities. He is a Fellow of the IEEE, Editor-in-Chief (2003-08) of IEEE Transactions on Evolutionary Computation, an associate editor or an editorial board member of 11 other journals. He is the editor of the World Scientific book series on "Advances in Natural Computation". He was the winner of 2001 IEEE Donald G. Fink prize paper award and several other best paper awards. His research interests include evolutionary computation, neural network ensembles, and their applications. He has more than 300 refereed publications in those areas. He is currently the Director of the Centre of Excellence for Research in Computational Intelligence and Applications (CERCIA) (www.cercia.com), which is focused on applied research and knowledge transfer to industry. He obtained his BSc in 1982 from USTC, MSc in 1985 from the North China Institute of Computing Technology (Beijing) and PhD in 1990 from USTC, all in computer science. He was a postdoctoral research fellow at the Australian National University in Canberra and CSIRO in Melbourne in 1990-92, and a lecturer, senior lecturer and associate professor at the Australian Defence Force Academy, University College, the University of New South Wales, in Canberra in 1992-99. Attracted by the English weather, he moved to Birmingham as a Chair of Computer Science on the April Fool's Day in 1999.