Game AI, Statistical Search and Noisy Optimisation

Abstract:

Many problems in game AI can be viewed as noisy optimisation problems, where the noise or uncertainty can stem from many sources, including: games which are naturally stochastic, agents which follow stochastic policies (such us Monte Carlo Tree Search or Rolling Horizon Evolution), and noise when evaluating the quality of games. The problems arise when trying to optimise agents to play games well, and when trying to optimise games in order to meet a particular objective (such as a game where the player has to react quickly, or has to plan strategically).

The seminar will show examples of how these problems arise, and describe recent research in efficient noisy optimisation that uses novel model-based evolutionary optimisation algorithms (especially the N-Tuple Bandit Landscape Evolutionary Algorithm (NTBEA) to provide efficient and effective search. We will also see how these algorithms are well suited to hyper-parameter optimisation.

Short Bio:

Simon Lucas is a professor of Artificial Intelligence and Head of the School of Electronic Engineering and Computer Science at Queen Mary University of London where he also heads the Game AI Research Group. He holds a PhD degree (1991) in Electronics and Computer Science from the University of Southampton. He is the founding Editor-in-Chief of the IEEE Transactions on Games and co-founded the IEEE Conference on Computational Intelligence and Games. His research involves developing and applying computational intelligence techniques to build better game AI, use AI to design better games, provide deep insights into the nature of intelligence and work towards Artificial General Intelligence.