Propositions

Accompanying the dissertation "Learning against Learning – Evolutionary Dynamics of Reinforcement Learning Algorithms in Strategic Interactions" by Michael Kaisers

1. Frequency Adjusted Q-learning converges to stable points near Nash equilibria in two-agent two-action games (Chapter 3).

2. Relative competitiveness as described by the replicator dynamics drives evolution, swarm intelligence and learning (Chapter 4).

3. Reinforcement learning performs asynchronous stochastic gradient ascent on the payoff function (Chapter 5).

4. Having a short-term price forecast may be worse than having no forecast for trading in stock markets (Chapter 6).

5. Aggressive strategies dominate their passive counter-parts in poker (Chapter 6).

6. The inherent complexity of interactions between learning algorithms is irreducible and will remain a challenging research topic for years to come.

7. Non-trivial performance guarantees of an algorithm in strategic interactions also require assumptions about its opponents.

8. Monte-Carlo Tree Search is an excellent candidate to plan in domains with continuous states and actions by iteratively building function approximations with an adaptive resolution.

9. Open access to educative and scientific content empowers individuals to aspire and is an essential support for democracy.

10. The biggest societal challenge is not to develop policies that solve problems optimally, but to win elections with them.

11. True data-privacy is lost until client-server architectures are replaced by peer-to-peer networks that selectively sync data only with our own devices or those of friends we trust.