Tag Based Co-operation in Artificial Societies

by

David Hales

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Department of Computer Science
University of Essex
Wivenhoe Park
Colchester CO4 3SQ
Essex, U.K.

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Abstract

In human society behaviour is often shaped within and directed towards groups. What role can groups play in the evolution and maintenance of co-operation between simple boundedly rational agents? Such questions can now be addressed using artificial societies of agents on computers.

Three computational simulations of artificial societies have been constructed and experimentation performed. In the first society (the SwapShop) a cellular automata model demonstrates, for the first time, that simple cultural learning rules produce high levels of altruism. This is compared with more traditional genetic modes of evolution. In the second society (the StereoLab) a more complex cultural learning scenario, based on culturally learned stereotypes, is explored. Key parameters of the society were searched in order to locate those regions giving high co-operation between agents. Several regions were located. Finally a third society was constructed (TagWorld II) which abstracted the process found in one of the more interesting regions located in the StereoLab. In the TagWorld II society, pairs of agents play the one-shot Prisoner's Dilemma. Agents bias their game interactions towards those with identical tags (observable markers). This turns out to be sufficient to sustain high levels of co-operation. The underlying process involves the formation and dissolution of groups of agents sharing identical tags. It is concluded that the cultural group formation process demonstrated can play a major role in the emergence and maintenance of co-operation and altruism when agents are boundedly rational cultural learners. Such processes have potential applications in multi-agent systems engineering and may aid understanding of human societies.

For my mother, Irene Hales.

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