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Modelling natural action selection

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Published September 2007

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Action selection, at its simplest, is the problem that every human and animal faces at each instant of "what to do next?". To scientists this problem raises a plethora of further questions: How do we know how to do the right thing? Why is it that we sometimes make poor choices? How do we plan ahead for complex tasks and remember what we are trying to do as we go along? Are there central decision-making mechanisms in the brain or do actions somehow 'select themselves' through the interaction of many concurrent brain processes? What happens when different parts of the brain want to do different things? How do the actions selected by individuals shape and change the social groups in which they live?

This theme issue addresses these questions by focusing on a particular strategy for finding scientific explanations - computer modelling. The contributions employ state-of-the-art modelling techniques ranging from large networks of simulated brain cells, through to models of individuals (people or animals) viewed as agents operating in simulated worlds. The research has broad applications, from understanding brain disorders such as Parkinson's disease and attention deficit/hyperactivity disorder, to explaining how we choose which political parties we vote for, and how they adapt to increase their appeal to us.

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Full contents are listed overleaf…

Contents