Agent-based approaches to modelling social systems

Robin Purshouse, ACSE

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Overview

- What is an agent-based model (ABM)?
- How are agent-based models used in the social sciences?
- What are the strengths and limitations of agent-based modelling?

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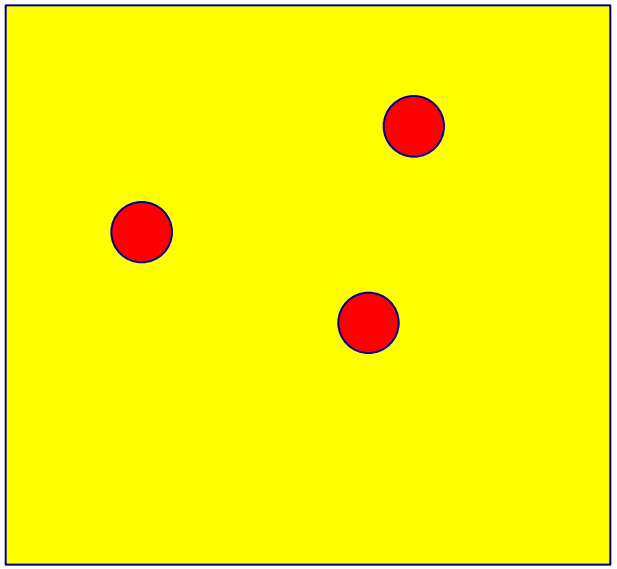
Agent-based models are a bottom-up approach for understanding and predicting social phenomena



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ABM in the social sciences (Gilbert 2008)

Abstract Models

Used in the development of general social theory, by forcing a complete description of social processes
e.g. process of segregation

Middle Range Models

Used to describe particular social phenomena in general terms
e.g. racial segregation in cities

Facsimile Models

Used to reproduce specific phenomena, with a view to prediction
e.g. racial segregation in Chicago, 1940-50.

Middle Range Model

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Where do the agent interaction dynamics come from?

- Very simple rules based on high-level abstractions of behaviour (e.g. segregation model)
- Rules based on sociology or social psychology theory (e.g. theory of planned behaviour)
- Elicitation of rules based on empirical observation in controlled conditions
- Non-prescription of rules, within some adaptive framework of bounded rationality...

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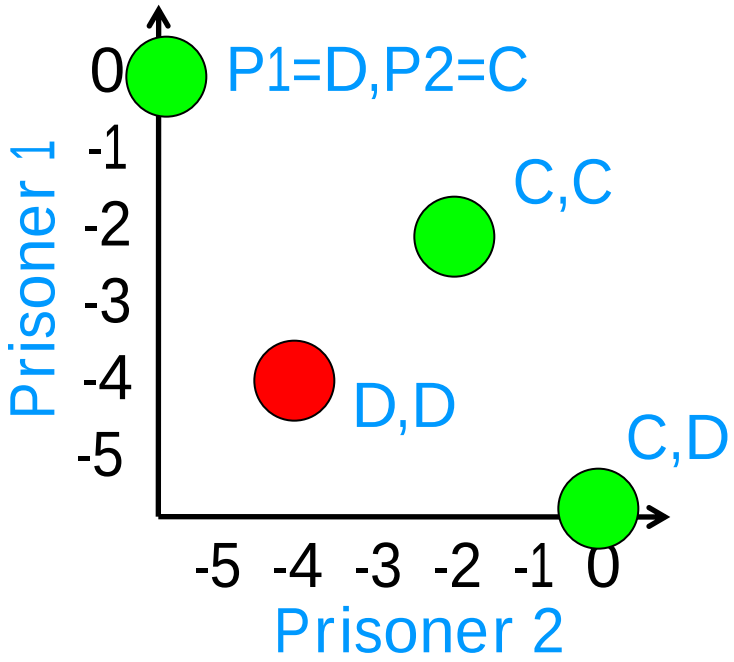
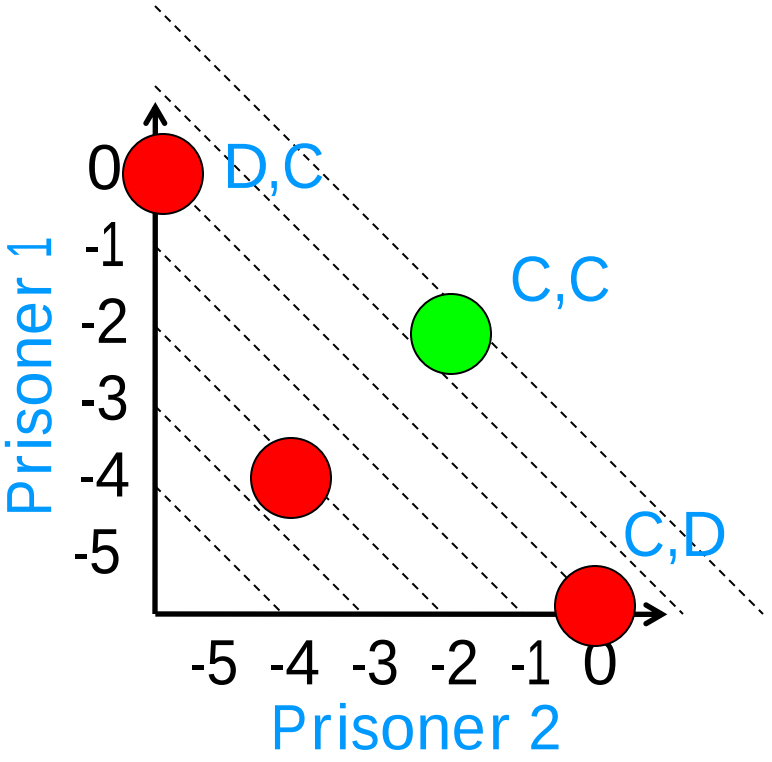
What is ‘socially’ optimal?





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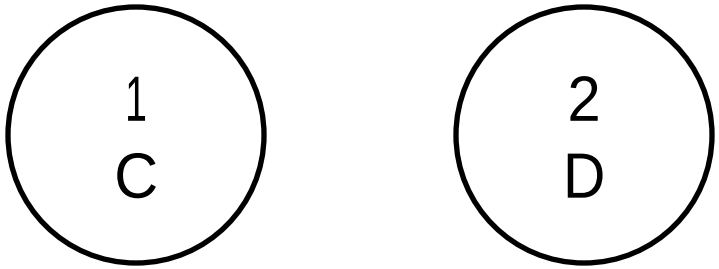
Formulate bounded rationality as automata



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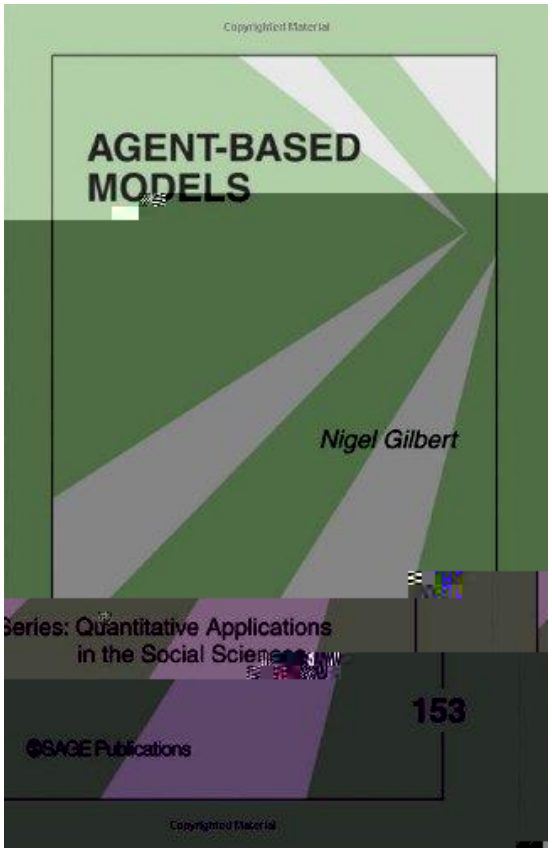
Critical evaluation of ABM

Strengths

- Explicit representation of dynamic causal processes
- No strong linearity assumptions
- Able to handle heterogeneity
- Permits bounded rationality and mistake-making by agents.

Further reading



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