

Guided Self Organisation in the social sciences

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Abstract

This paper proposes that the social sciences are legitimate candidates for Guided Self Organisation applications and describes an approach which goes beyond the traditional agent based modelling of social processes.

Politics, decision making, law making, social engagement, lobbying, even scientists interacting with stakeholders, can be seen as attempting to guide a section of the population so that it organises and functions in a desired fashion. Under a strong top-down, rule-based, ‘authoritarian’ approach this could be seen as a fairly simple and predictable endeavour. If however the aim is to be inclusive and to facilitate and encourage change rather than impose it, then approaches which incorporate natural human propensities, including social attitudes, competition, collaboration, adaptation and information sharing may prove more valuable. Just like a GSO scientist, a politician or social leader then needs to ‘engineer’ policies in order to achieve community-wide outcomes with the understanding that the relation between the policies (which act at the local scale of the agent) and the aimed outcomes (at the global scale of a community) is not trivial and likely difficult to predict.

When it comes to modelling, this type of problems is usually addressed via ABM. These are often criticised on a number of accounts. First, context-dependence, including path dependence, the role of the social environment and of the ordering in the sequence of actions, can be dealt only via a-priori conditional probabilities, which are difficult to define and can limit the range of actions available to the agent. Also, uncertainty is modelled only as the modeller’s ignorance of the agent’s behaviour, rather than as the agent’s genuine uncertainty on what action to take. As a result, contradictory or irrational behaviours which are often noticed in human decision making are modelled mostly as random variation on the pre-defined rule-based behaviour. However, both the social and cognitive sciences tell us that these behaviours can have a profound impact on decision making both at the agent and community level.

In a previous work, we have shown how a geometric approach based on a Hilbert representation of the agent’s decision space can circumvent the drawbacks mentioned above. This provides i) a way to model certain examples of contradictory and apparently irrational decision making, ii) an effective way to model the role of the social context on the agents’ decision and iii) a way to model the impact of the agents’ decisions on the future state of the context, thereby simulating a two-way interaction between social context and agents behaviour. We showed how agents’ self-organisation into different ideologies could be modelled solely as a response to the agents’ desire to minimise cognitive dissonance.

Further improvement in this direction can occur by parameterising the agents with a realistic set of cognitive attitudes and by testing how different mixes of these attitudes affect the community outcomes. Increasingly large data sets collected on the general public’s attitude towards climate change and other environmental issues provide a valuable resource, not only to carry out such a parameterisation but also to evaluate the model by comparing observed vs modelled community behaviours. In this talk, we discuss this approach, the challenges and opportunities provided by the data available in the social science literature and present new results in this direction.