

Agent-Based Social Simulation with Coalitions in Social Reasoning

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Abstract. There is a growing belief that the agents' cognitive structures play a central role on the enhancement of predicative capacities of decision-making strategies. This paper analyses and simulates the construction of cognitive social structures in the process of decision making with multiple actors. In this process it is argued that the agent's rational choices may be assessed by its motivations, according to different patterns of social interactions. We first construct an abstract model of social dependence between agents, and define a set of social structures that are easily identifiable according to potential interactions. We then carry out a set of experiments at micro-social levels of analysis, where the agents' cognitive structures are explicitly represented. These experiments indicate that different social dependence structures imply distinct structural patterns of negotiation proposals, which appear to have diverse patterns of complexity in the search space. It is subsequently shown that this observation emerges as an issue of ambiguity in the regulation of different decision-making criteria, relative to motivation-oriented and utility-oriented choices. In the scope of this ambiguity, we finally make some conjectures relative to further analytical and empirical analysis around the relation between patterns of complexity of social structures and decision-making.

1 Introduction

The problems encountered in the implementation of autonomous agents that decide and adopt goals on behalf of other agents, have determined a growing need to implement different degrees of social reasoning abilities in the individual agent's machinery [26]. The need for an increasing autonomy in Multi-Agent Systems (MAS) shares some of the difficulties encountered in explanatory models of purposive action [18,20] in the social sciences. These models rest on the assumption that actors in a dynamic social world are purposive, and act in ways that produce intended and/or beneficial results. By advancing the postulate that individual action is goal directed the prevalent question runs around the way people, given their values, beliefs and