Explicit Knowledge Representation in Archaeological ABMs

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Abstract

In current agent-based models (ABM) in archaeology individuals often do not interact directly. Instead, the environment acts as a mediator (Chliaoutakis and Chalkiadakis, 2016), similar to the *price* mechanism in neo-classical economics. In Schaff (2016) I argued that an explicit knowledge representation in economic ABMs is necessary to understand how the price mechanism works, instead of taking it for granted. Such a theory needs to account for the distribution of individual knowledge (von Hayek, 1937). If we want to understand e.g. settlement phenomena in archaeology, the same reasons apply.

To these ends, each software agent embodies its own representation (i.e. model) of the geophysical reality, but also social and other relevant reality and in turn bases its decisions only upon this internal model. Because this internal representation is a construction based on the personal history of the agent, *sameness* becomes an affair of the internal agent's "mind", as demanded by Georgescu-Roegen (1967, p. 37l). On the system level, we need to model agent communication and the general network of interaction to understand the propagation mechanisms for knowledge. The social network, as a consequence, cannot be fixed but must be emergent, too.

In order to test the relevance of this idea for archaeological ABM we use the model of Janssen (2010) as a starting point. The model is a) exceptionally well documented (code published at openabm.org), b) generic (as opposed to data-driven), and c) together with similar works (Axtell et al., 2002, Janssen, 2009) well-known in the society.

Keywords: ABM; Methodology; Knowledge Representation

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