

# Model Maker 1: Using Model Based Ontologies for Agent Based Estimation and Learning of R Packages

Jeff Cromwell

Agent Based Modeling is a new flourishing field in social sciences. It allows developing /testing new theories in a quasi experimental setting and enables the emergence of macro structures /regularities which are not envisaged or intended. This field may communicate quite well with many subfields ranging from pre-history to anthropology . In its essence agent based models require to design basic agents which behave in accordance with some simple rules but always with a degree of stochasticity. When large number of such agents interact in a virtual environment the resulting (and gradually emerging) macro level consequences are temporally and spatially recorded , analyzed and manipulated. This simultaneous control of micro level action and macro level outcomes allows to scrutinize the degree to which intentionality is required for regularities to appear at both levels. This paper explores the power of R-language in generating agent based models by using two examples: First model answers the question: is it possible that a moral society would emerge by itself if only three types of individuals existed (hawks, doves and moralists) and imitated in accordance with the degree of their success from one generation to the next? Second model scrutinizes the following issue: is it possible that under a certain dominant culture and as a result of some temporal organization principles (of cities) immigrants will be integrated without transmitting their cultural codes? Two different approaches to agent modeling are operationalized in order to tackle these questions and their strengths and weaknesses are revealed. The paper ends with the framing of the basic challenge: establishing an R package for agent based models which may accommodate wide range of agent and environment choices.