

Abstract:

Agent-Based Modeling to Analyze Micromotives vs. Macrobehaviors

Scientists and scholars of many disciplines often deal with issues that occur on a macro-level. This refers to the idea of several individual parts coming together to form an aggregate outcome, which may or may not be the same outcome the individual parts aimed to accomplish. The analysis of these collective actions is a necessary tool to form policy, and also give insight to human behaviors. With the development of technology, the use of computer programs to aid in these analyses becomes increasingly prevalent and beneficial. One way to investigate such phenomena is known as agent-based modeling, or ABM. ABM is a set of computation-based models that, once given certain attributes, are utilized to simulate interactions and consequences of agent behavior. The goal of ABM is to assign parameters to these agents in an attempt to emulate and predict the features of real-life complex interactions. Through programming, this paper explores the Thomas Schelling height hypothesis, Paul Krugman's babysitting co-op, and Thomas Schelling's theory on racial segregation in neighborhoods. All instances show a clear contrast between individual decision incentives and the consequential, composite outcome of those decisions. These models provide visual evidence and insight to how personal choices very often lead to unintended aggregate effects on an entire group.

Keywords: behavioral economics, agent-based modeling, ABM, Thomas Schelling, Python, computer modeling, game theory