Social Modeling and Simulation Symposium

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Abstract

The following discussion provides an introduction to the set of five papers that follow. All of these papers focus on social modeling and simulation approaches and were presented in a symposium at CAA 2006 organized by the author. The results of this symposium demonstrate that while researchers can agree on the value of simulation modeling as a tool, they may not agree on the best approach to that modeling process.

1 Introduction to Symposium

CAA 2006 organized a modeling and simulation session devoted to looking at current and various approaches applied to understanding social processes. This symposium was organized in order to both present the state of the art to a general computationally and mathematically inclined audience and to have a forum to debate and discuss recent trends in social modeling approaches. Scholars were asked to not only discuss their modeling approach as it applies to their particular research topic, but the presenters were challenged to search for general applicability of their approach to broader theoretical concepts in archaeology and anthropology.

2 Papers Presented

Six papers were presented in the three-hour symposium. Most papers argued for the applicability of agent-based modeling, a form of modeling that creates autonomous agents that respond to local conditions and operate under certain rules. Agent-based modeling has become popular as an approach for providing insights in problems that require testing theoretical assumptions for socio-behavioral phenomena. Advocating for another style of modeling approach, one paper attempted to show the utility of formal mathematical models in searching for meaningful relationships between different social or ecological variables.

John Murphy, the first speaker, presented a paper on an agent-based simulation of Hohokam water management that argued for collaborative approaches to modeling that seek to recreate critical behaviors and variables in order to explore possible states and outcomes of past social strategies to enhance understanding of theory. Luke Premo then presented a paper on Plio-Pleistocene hominid food gatherers, which argued that agent-based models should be used principally as exploratory tools within a discrete dynamics modeling approach. Mark Altaweel followed this presentation by arguing for the need of a holistic agent-based approach that couples multiple models in order to better understand long-term socio-ecological changes. Todd Surovell, who was unable to submit a paper for this volume, presented a paper advocating that formal mathematical models used in a behavioral ecological framework have the potential to elucidate many aspects of prehistoric economies, as demonstrated by data for Australian and New World Paleo-Indian contexts. Brandon Gabler used an agent-based model to show the strength of inter-agent interactions using a few key parameters, including power differential, ethnocentrism, and competition, demonstrating agent clustering along ethnic identities. Finally, using an agent-based approach, Shawn Grahm and James Steiner attempted to demonstrate settlement networks from distribution map data created by interactions of individuals that travel to sites based on a function of assigned settlement importance and the number of other agents traveling to given settlements relative to the distance of these settlements from the agent.

3 Results from Symposium

Several results were achieved through this symposium. Since many of the concepts and ideas introduced by the speakers were generally new concepts for audience members, the presentations had the effect of educating many in the audience to the approaches discussed as they are applied to issues in both archaeology and anthropology. For the speakers, the symposium provided an opportunity for like-minded researchers investigating archaeological and anthropological problems for very different social systems to meet and share their ideas. The variety of ideas presented helped the presenters to discuss and debate the validity of their approach to the particular problems investigated. From the presentations and discussion held at the end of the paper presentations, several issues were raised. The primary contention that many of the arguments centered on was the applicability of having modeling approaches that are more reductionist, or models using relatively few variables, vs. approaches that incorporate numerous variables encapsulated by multiple models. Despite the agreement that agent-based modeling can be useful in providing insights and formalizing conceptual frameworks, the research benefits of various approaches within this type of modeling framework were not agreed upon. Another issue raised included the argument that formal mathematical models not applying

direct human agency and using relatively few variables can, in many cases, be just as beneficial as other approaches in showing relationships of particular social or environmental variables to observed results. The speakers were able to comprehend the reasoning behind the approaches advocated, but the applicability of the approaches to a broader range of problems proved to be a contentious issue. Although the debated issues are not easily resolvable, the other benefit of this symposium is that a social modeling community in archaeology can now better develop and continue to debate and discuss social modeling and simulation research in future CAA forums.