

## Computer Simulation in Sociology Response Paper

In Moretti's paper, computer simulation and its application in scientific research, especially in sociology, are discussed from a unique perspective. According to Moretti, Computer simulation provides a new approach to conduct analysis and explore theories in scientific research with their capacity to include the dynamics of the social phenomena. However, there is a weakness of this new technique: the potential lack of "validity" of the simulative model and the theory. Among the four models the author introduced in the paper, multiagent systems and cellular automata are both under the potential risk of lacking "validity". In the following two paragraphs, I will briefly discuss about the weakness in validity that the two models potentially face.

In multiagent systems, the first weakness in validity is the potential use of theories and models of rationality that are unrealistic, not understandable and cannot be applied to the case of limited knowledge, especially the unavailability to be extended to learning and adaptation. In addition, the systems lack the formalization of all the aspects of psychological theories, including emotions, motivations, desire, intent and consciousness. Last but not least, one of the principal weakness of multiagent systems is the lack of formalization of knowledge. Whether it is indeed possible to formalize all types of knowledge and what would be the best formalization are still left to be discussed.

Cellular automata faces the same problem of potential lack of validity. The first weakness is the use of synchronous updating of status. This assumption may not reflect the real social processes as the individuals may not modify their attitudes and opinions simultaneously. Another weakness is the unrealistic assumption that each individual interacts only with a subset of the whole population. To resolve this problem, considerations about how to define the neighborhood of a unit, especially the role of the media in real life and how the neighborhood could change over time should be given.

Despite the potential weakness in the validity of computer simulation, there are still a good number of successful applications of simulation models in both engineering and the sciences. The author provides a couple of examples of simulations with dynamic feedback in the paper. One example from sociology is the case of dynamic social impact, where researchers have studied, heuristically, what the necessary and sufficient conditions are that cause the clustering and the polarization of opinions. In this model, the tendency for people to be more influenced by nearby rather than faraway people gives rise to local patterns of consensus in attitudes, values, practices, identities, and meanings that can be interpreted as subcultures (Latané, 1996; Nowak & Lewenstein, 1996). The way people are influenced by others' behavior in this model is an example of the dynamic feedback.

Dynamic feedback also exists in other fields such as political science. One example could be of different racial groups' engagement in the US political system. If a certain racial group is little engaged in the political system, there will be less representatives of their groups in the system and less of their opinions to be expressed. The less represented groups may feel more distant to the political system, which might in turn cause their less participation.

## Reference

Latané, B. (1996). Dynamic social impact. In R. Hegselmann, U. Mueller, & K. G. Troitzsch (Eds.), *Modelling and simulation in the social sciences from the philosophy of science point of view* (pp. 285-308). Dordrecht, the Netherlands: Kluwer Academic.