

SOCIAL NETWORKS AND MULTIAGENT SYSTEMS SYMPOSIUM *SNAMAS'09*

AISB'09 Convention
Adaptive and Emergent Behaviour and Complex Systems

6th-9th April 2009, Heriot-Watt University, Edinburgh

1 Symposium Chairs

Jaime Sichman (University Sao Paulo)
Giulia Andrighetto (ISTC-CNR)
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2 Abstract

One of the most interesting research topics in the field of multiagent systems is the definition of models with the aim of representing social structures such as organizations and coalitions, to control the emergent behavior of open systems. Organizations and coalitions are composed by individuals that are related to each other by different possible kinds of relations such as dependencies on goals, conflicts on resources, similar beliefs and so on. One important issue is how to represent these relations. Moreover, like the human organizations, these social structures are characterized also by an high degree of dynamism.

In dealing with societal issues, the multiagent systems field took inspiration mostly from organizational theory in economics and legal theory, while less attention is devoted to the research area describing the relations among the individuals inside human organizations and their dynamics: *social network analysis*. Social network analysis has emerged as a key technique in modern sociology, anthropology, social psychology, communication studies, information science, organizational studies, economics as well as a popular topic of study.

Despite the common object of study, multiagent systems and social network analysis use concepts like agents, dependencies, etc. which often have only superficial similarities. The aim of this symposium is to underline the differences and the similarity points

between these social network analysis and multiagent systems in the representation of the social structures and their dynamics, and to promote the interchange of knowledge and methodologies among the two fields.

3 Case for Support

The SSAISB mission is to promote the study of artificial intelligence, simulation of behaviour and the design of intelligent system, and to facilitate co-operation and communication among those interested in these studies. This Symposium goes in the direction of interdisciplinarity in the study of social behavior, since both social networks analysis and multiagent systems develop techniques to capture the development of social systems, analyzing the behaviour of the individuals composing the systems and how and why does it change.

To give some more detail on social networks analysis, a social network is a social structure made of nodes (which are generally individuals or organizations) that are tied by one or more specific types of interdependency, such as values, visions, idea, financial exchange, friends, kinship, dislike, conflict, trade, web links, disease transmission (epidemiology). The resulting structures are often very complex. Social networks analysis plays a critical role in determining the way problems are solved, organizations are run, and the degree to which individuals succeed in achieving their goals. In its simplest form, a social network is a map of all of the relevant ties between the nodes being studied. These concepts are often displayed in a social network diagram, where nodes are the points and ties are the lines.

Social networks analysis has developed also the dynamics issue with the so called dynamic networks analysis. This is an emergent scientific field that brings together traditional social network analysis, link analysis and multi-agent systems. There are two aspects of this field. The first is the statistical analysis of dynamic networks analysis data. The second is the utilization of simulation to address issues of network dynamics. Dynamics networks vary from traditional social networks in that are larger dynamic and may contain varying levels of uncertainty. Whereas nodes in a traditional social networks analysis model are static, nodes in a dynamic networks analysis model have the ability to learn. Properties change over time, nodes can adapt: a company's employees can learn new skills and increase their value to the network. Illustrative problems of the dynamic networks analysis area are developing metrics and statistics to assess and identify change within and across networks, developing and validating simulations to study network change, evolution, adaptation, developing and validating formal models of network generation and evolution, developing and testing theory of network change, evolution, adaptation.

Multiagent systems, in contrast, aim at modelling, among other things, cognitive agents who interact in dynamic environments where they depend on each other to achieve their goals. The emphasis is not on the study and simulation of human behavior, but rather on constructing complex systems composed by artificial and human agents which are regulated and behave like human social systems. Most attention was given to the top-down development of organizations, rather than to the emergence of

coordination in social behavior based on the dependencies among agents and their dynamic.

Though the two fields consider similar issues, there is a huge gap, e.g., in techniques, either graph theory, or cognitive theory, or in perspectives: social networks adopt an external viewpoint, whereas agent theories adopt an internal or subjective viewpoint. Some interchange among the two fields already took place, like for example the use of dependence networks as a representation and reasoning framework in multiagent systems. This witnesses the fact that the two fields can benefit from an increase of exchange of knowledge. The communities are currently mostly separated (with the exception of events like AISB Symposia and the Multiagent-Based Simulation International Workshop Series (MABS)).

This workshop aims at promoting the interchange among the two communities to allow a transfer of methodologies, and to clarify the meaning of the respective terminologies which share many concepts but only at an informal level.

The Symposium aims not only at presentation of papers but also to promote the discussion about the following research questions:

- How to use social network analysis results for developing multiagent systems?
- Which insights can be gained from multiagent research as input for social network theory?

As concerns the first question, social networks can be used during the design of multiagent systems, or an explicit representation of social networks can be used by agents to reason about virtual communities on the web. As concerns the second question, one may argue that social networks can be made more detailed with a multiagent model, for example, extending the social network with a communication model, or recursive reasoning in a social network, to consider how agents can have a model of other agents.

Papers on the following non-exhaustive list of topics are solicited:

- Emergent behaviour in multiagent systems and social networks analysis
- Simulation of social systems
- Learning evolution and adaptation in multiagent systems and social networks analysis
- Artificial social systems
- Societal aspects
- Models of personality, emotions and social behaviour
- Organizations in Multiagent systems and Social Networks

4 Invited speaker

As invited speaker we have Prof. Kathleen Carley of Carnegie Mellon University (USA), one of the major researchers in the field of social networks analysis and the director of the center for Computational Analysis of Social and Organizational Systems (CASOS).

5 Important Dates

Paper submission deadline: December 23, 2008.

Notification of acceptance: TBA

Camera ready version: TBA

Symposium: April 6-7, 2008.

6 Programme Committee

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