



Daniel Zeng, *University of Arizona*

Fei-Yue Wang, *Chinese Academy of Sciences*

Kathleen M. Carley, *Carnegie Mellon University*

Broadly stated, *social computing* takes a computational approach to the study and modeling of social interactions and communications. It also encompasses the development of information and communications technologies (ICTs) supporting these interactions. In recent years, we've seen social computing impact numerous technology fields.

It's attracted significant interest from not only researchers in computing and social sciences but also software and online game vendors, Web entrepreneurs, political analysts, and digital-government practitioners, among others.

Scope and applications

Early on, social-computing studies focused on technological and user acceptance issues surrounding computer-supported collaborative work and groupware. In the last 10 years, the scope of social-computing research and practice has expanded tremendously with the adoption of Web and mobile technologies and with the virtualization of many facets of everyday life.

From a methodological viewpoint, social computing is a crossdisciplinary field with theoretical underpinnings in computational and social sciences (see the March/April 2007 Trends & Controversies department). Social computing relies on frameworks and findings from areas such as human-computer interaction and communication as well as on sociological, economic, psychological, organizational, and behavioral theories. ICT fields such as Web computing, agents, and mobile and ubiquitous computing have

been providing platforms and specific technological components to enable social-computing implementation and applications.

Social computing plays a central role in developing current and next-generation social software, computerizing various aspects of human society such as community-based decision making, and helping analyze how changing technologies and policies affect political, social, and cultural behavior. Significant social-computing applications in recent years have focused on Web-supported online communities, games and interactive entertainment, e-business applications, and forecasting and decision making in the public sector. Social computing is a crucial next step, following personal computing, in computing's evolution.

In this issue

This special issue samples the state of the art in social-computing research from several perspectives:

- the overall paradigm of social-computing research;
- technological support for social-computing applications;
- cognitive modeling and architecture of agents and agent societies; and

- social-computing applications in areas such as terrorist network analysis, competitive business strategies, and agent behavior in financial markets.

Ubiquitous technology has reenergized interest in networking in physical social spaces. Dario Bottazzi, Rebecca Montanari, and Alessandra Toninelli articulate the need for a platform to support anytime, anywhere social-networking applications and propose a technological solution called the SAMOA framework. SAMOA consists of a place abstract model and a social-network model with various user and place profiles. It also includes semantic-based matching techniques that determine social networks. The authors discuss a Java-based middleware implementation and present a prototype application in viral marketing.

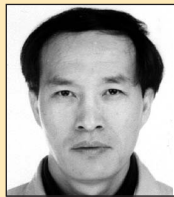
Ron Sun presents an overview of cognitive-architecture research, promoting a potentially fruitful area of study incorporating cognitive-science theory and experimental methodology in agent-based social simulation—an important social-computing modeling and analysis framework with wide applications. A *psychologically oriented cognitive architecture* is a domain-independent computational cognitive model targeted at agent behavioral modeling. Such an architecture could provide realistic models of agents' individual and social behavior. Sun offers an example cognitive architecture called CLARION and discusses how to apply it in social-simulation contexts. He also reviews three case studies: small-scale organizational decision making, academic publication, and tribal survival strategies under different environmental conditions.

The special issue's remaining articles focus on developing social-computing analysis tools in specific application contexts and on using them to derive domain-driven knowledge or facilitate decision making. Il-Chul Moon and Kathleen M. Carley present a multiagent simulation model that captures interactions on the basis of social relationships and geospatial considerations. Using a real-world terrorist network extracted from open source documents as the application backdrop, they study how the coevolution of social and geospatial relations can affect group behavior. They present specific measures and models concerning agent interaction based on relative similarity, relative expertise,

The Authors



Daniel Zeng is an associate professor and the director of the Intelligent Systems and Decisions Lab in the University of Arizona's Department of Management Information Systems. He's also an affiliated professor at the Institute of Automation, Chinese Academy of Sciences. His research interests include software agents and their applications, social computing, security informatics, infectious disease informatics, computational support for auctions and negotiations, and recommender systems. He received his PhD in industrial administration from Carnegie Mellon University. He's the IEEE Intelligent Transportation Systems Society's vice president for technical activities and chair of the INFORMS College on Artificial Intelligence. Contact him at the MIS Dept., Univ. of Arizona, 1130 E. Helen St., Tucson, AZ 85721; zeng@eller.arizona.edu.



Fei-Yue Wang is the director of the Key Laboratory of Complex Systems and Intelligence Science at the Chinese Academy of Sciences. He's also a professor in the University of Arizona's Systems & Industrial Engineering Department and the director of the university's Program in Advanced Research of Complex Systems. Contact him at feiyue@sie.arizona.edu.



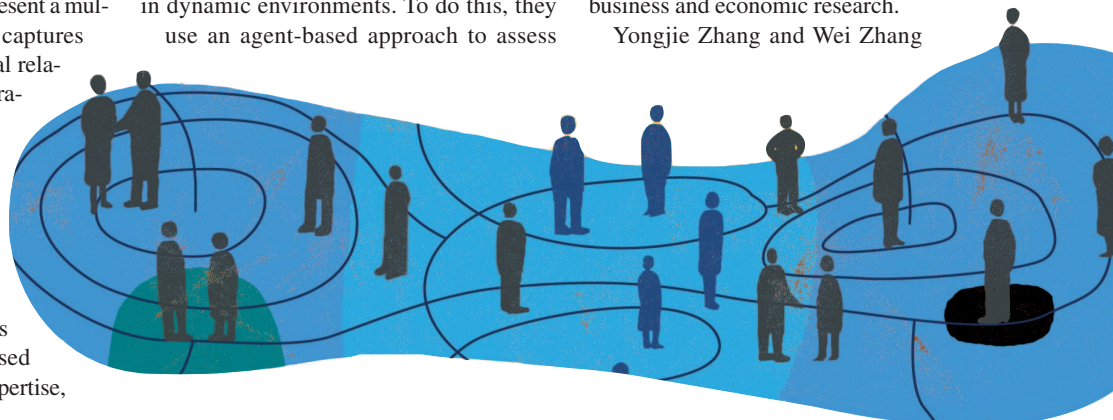
Kathleen M. Carley is a professor of computation, organizations, and society in the Institute for Software Research, School of Computer Science, at Carnegie Mellon University. She's also the director of the Center for Computational Analysis of Social and Organizational Systems (CASOS). Contact her at kathleen.carley@cs.cmu.edu.

social distance, spatial proximity, and agent relocation. Applying the developed model to the terrorist network data, the authors make observations about the dynamic changes in location criticality and agent criticality and relate the findings to possible predictions about terrorist network group behavior and evolution.

Nicholas S.P. Tay and Robert F. Lusch apply multiagent-based modeling to investigate organizational behavior in a completely different setting. They aim to gain a systematic understanding of competitive market processes and strategies and of their evolution in dynamic environments. To do this, they use an agent-based approach to assess

how a firm should balance exploiting its current competencies against developing new competencies (that is, develop *ambidexterity*). They model firms through a genetic fuzzy inference mechanism as autonomous agents with learning capabilities. These firms interact through a virtual market over time. Their study indicates that ambidextrous organizations will perform better in a more dynamic environment; in a relatively static environment, organizations should focus on leveraging existing competencies. The authors also share where we can effectively employ an agent-based approach in general business and economic research.

Yongjie Zhang and Wei Zhang



Intelligent Systems 2007

EDITORIAL CALENDAR

January/February: *AI's Cutting Edge*

This issue examines a variety of topics at the forefront of AI research, including natural language processing, data mining, planning systems, intelligent transportation systems, and evolutionary computing.

March/April: *Interacting with Autonomy*

For at least the foreseeable future, people will still need to interact with autonomous systems at various levels of involvement as conditions change dynamically. This special issue presents articles on human interaction with autonomous or semiautonomous physical systems such as ground-based robots, unmanned aerial vehicles, and assistive technologies.

May/June: *Recommender Systems*

Recommendation problems have a long history as a successful AI application area. The interest in such systems has dramatically increased owing to the demand for personalization technologies by large, successful e-commerce applications. This special issue reports on successful implementations and on future research directions in recommender technologies.

July/August: *Intelligent Educational Systems*

The distributed nature of 21st-century education poses strong demands for intelligent educational systems tailored to students' and teachers' individual needs. This special issue discusses novel methods, tools, and applications addressing this field's key challenges, such as semantic interoperability, context-sensitive feedback generation, and personalized content delivery and generation.

September/October: *Social Computing*

This special issue investigates the development and use of social software—tools and computing methods that support social interaction and communication in significant application domains. It also features articles describing general intelligent systems (not necessarily social software) that leverage insights and findings from social, organizational, cultural, and media theory.

November/December: *Argumentation Technology*

Formal models of argumentation have been gaining increasing importance in AI and have found a wide range of applications. This special issue will report on the state of the art of AI-based argumentation applications, focusing on deployed systems or pilot systems that provide promising techniques and ideas.

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apply social-computing methodology to finance. They focus on extending the traditional behavioral-finance research to include an agent-based computational approach, addressing the traditional approach's limitations. They describe an artificial stock market system and use it to investigate an interesting research question in finance: Will the BSV (Barberis, Shleifer, and Vishny) model—a well-received model of how behavioral investors form beliefs, producing both overreaction and mean-reversion—hold when adding rational investors to the market?

Finally, in the Expert Opinion column, Fei-Yue Wang presents his perspective on future social-computing research directions. He calls for a paradigm shift toward an integrated social-computing framework. This framework consists of modeling using artificial societies, analysis based on computational experiments, and control and management through parallel execution—the coevolution of real and artificial systems. He discusses this framework's philosophical foundation and presents its potential applications ranging from social-engineering systems to Web science applications.

Current social-computing research has focused on enabling technologies and specific applications, yet the field lacks a core set of general scientific principles and a framework to guide application development. Key future research directions include the intellectual grounding of this exciting field of study, its connection to related emerging fields such as Web science and dynamic network analysis, and the movement from social informatics to social intelligence, with an emphasis on generating and managing actionable social knowledge.

We express our sincere gratitude to all contributing authors and reviewers for their time and effort and hope that the perspectives, models, technological development, research findings, and case studies as presented in this special issue will help encourage exciting new and synergetic research in this important field of great practical impact. ■

Acknowledgments

We acknowledge the support of research grants from the National Natural Science Foundation of China (60573078 and 60621001), Chinese Academy of Sciences (2F05N01), Chinese Ministry of Science and Technology (2006CB705500 and 2004CB318103), and US National Science Foundation (IIS-0428241 and IIS-0527563).