Computational Cultural Dynamics

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Computer technology is leading to sweeping changes in how we can reason about groups in diverse cultures. Examples include computer systems to help researchers gather data about different cultural groups, learn the intensity of those groups’ opinions on various topics, build or extract models of those groups’ behaviors, and continuously refine those behaviors through shared, multiperson learning experiences.

This new field of research is called “computational cultural modeling,” “computational social and behavioral modeling,” or the term we use here: computational cultural dynamics. Regardless of which name you use, this field is inherently interdisciplinary. It blends the behavioral and social sciences—fields such as political science, psychology, journalism, anthropology, and sociology—with technological fields such as computer science, computational linguistics, game theory, and operations research.

Icccd: A new international conference

The research communities we just mentioned are highly diverse and historically have been largely unconnected. To bring them together and help forge a common understanding of principles, techniques, and application areas, the annual International Conference on Computational Cultural Dynamics (Icccd) was inaugurated.

Icccd’s scope includes developing computational models for cultural dynamics and applying those models to enhance cultural sensitivity. Examples of the latter focus include

- understanding the social patterns that influence the spread of diseases,
- understanding other cultures to facilitate international collaboration,
- preventing crime and reducing conflict,
- understanding the performance of governmental and nongovernmental organizations,
- improving the quality of life among groups in diverse multiethnic societies,
- assessing aid programs’ effectiveness in a cultural context,
- aiding governmental missions involving contact with diverse cultural groups, and
- aiding recovery from conflicts and disasters.

The first Icccd was 27–28 August 2007 and was sponsored by the AAAI, which published the proceedings. The second Icccd will be 15–16 September 2008 at the University of Maryland; for details, see www.umiacs.umd.edu/conferences/iccdd2008.
**In this issue**

This special issue includes expanded versions of some of the best Icccd 2007 papers, as well as two opinion columns we subsequently solicited on related topics. These articles fall into the three following categories.

**Overviews**

Most readers are likely to be unfamiliar with computational cultural dynamics since it is a new and emerging field. Hence, this special issue includes two papers that provide general background information.

“Social Modeling as an Interdisciplinary Research Practice,” by Lucy Resnyansky, provides a social scientist’s perspective on how computational cultural modeling can be useful for social research on political violence, social conflicts, and cultural changes.

The opinion column “Culture, Models, and Games: Incorporating Warfare’s Human Dimension,” by Susan Numrich, explains game theory’s importance in computational cultural dynamics.

**Modeling cultural attributes**

This special issue includes two articles on one of the fundamental concerns of computational cultural dynamics: how to model various cultural characteristics.

“A Computational Approach to Etiquette: Operationalizing Brown and Levinson’s Politeness Model,” by Christopher Miller, Peggy Wu, and Harry Funk, describes a computational implementation of a well-known anthropological model of politeness.

“Modeling Dynamic Multiscale Social Processes in Agent-Based Models,” by Jonathan Ozik, David Sallach, and Charles Macal, discusses computational models of identity as it’s defined socially for individuals and groups.

**Data gathering and analysis**

Historically, data gathering in the behavioral and social sciences has been a time-consuming, labor-intensive process. One way in which computation can revolutionize the behavioral and social sciences is to provide tools to aid in data gathering. We have three articles on this topic.

“AVA: Adjective-Verb-Adverb Combinations for Sentiment Analysis,” by V.S. Subrahmanian and Diego Reforgiato, presents an algorithm for analyzing the strength of opinions expressed in text documents. The algorithm is part of a system being used by the World Bank and several other groups.

The opinion column “Behavioral Inference across Cultures: Using Telephones as a Cultural Lens,” by Nathan Eagle, looks at ways to gather cultural information from cell-phone usage data.

**Convex: Similarity-Based Algorithms for Forecasting Group Behavior,” by Vanina Martinez, Gerardo Simari, Amy Sliva, and V.S. Subrahmanian, describes an algorithm for building predictive models of what an organized group will do under various circumstances.

We believe that during the coming decade, computer science—and AI in particular—will be able to advance the behavioral and social sciences in a manner similar to how computing technology has supported biological research during the past decade. The articles in this special issue demonstrate that such advances are already beginning and illustrate promising directions for research and applications.

For more information on this or any other computing topic, please visit our Digital Library at www.computer.org/csdl.