

**AAAI 2004**

## **Spring Symposium Series**

March 22 – 24, 2004

Stanford University, California

### **Call for Participation**

Sponsored by the

American Association for Artificial Intelligence

445 Burgess Drive, Menlo Park, CA 94025

(650) 328-3123

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[www.aaai.org/Symposia/symposia.html](http://www.aaai.org/Symposia/symposia.html)

The American Association for Artificial Intelligence, in cooperation with Stanford University's Computer Science Department, is pleased to present its 2004 Spring Symposium Series, to be held Monday through Wednesday, March 22-24, 2004 at Stanford University in Stanford, California. The topics of the eight symposia in this symposium series are:

- Accessible Hands-on Artificial Intelligence and Robotics Education
- Architectures for Modeling Emotion: Cross-Disciplinary Foundations
- Bridging the Multi-agent and Multi-robotic Research Gap
- Exploring Attitude and Affect in Text: Theories and Applications
- Interaction between Humans and Autonomous Systems over Extended Operation
- Knowledge Representation and Ontology for Autonomous Systems
- Language Learning: An Interdisciplinary Perspective
- Semantic Web Services

An informal reception will be held on Monday, March 22. A general plenary session, in which the highlights of each symposium will be presented, will be held on Tuesday, March 23.

Symposia will be limited to between forty and sixty participants. Each participant will be expected to attend a single symposium. Working notes or AAAI technical reports will be prepared and distributed to participants in each symposium. In addition to invited participants, a limited number of interested parties will be able to register in each symposium on a first-come, first-served basis. Registration information will be available in December. To obtain registration information, write to:

- AAAI Spring Symposium Series  
445 Burgess Drive  
Menlo Park, CA 94025-3442 USA  
Voice: 650-328-3123  
Fax: 650-321-4457  
sss04@aaai.org  
[www.aaai.org/Symposia/symposia.html](http://www.aaai.org/Symposia/symposia.html)

### **Submission Dates**

- Submissions for the symposia are due on October 3, 2003
- Notification of acceptance will be given by November 7, 2003
- Material to be included in the working notes or technical report of the symposium must be received by January 30, 2004.

Please see the appropriate section in each symposium description for specific submission requirements.



## Accessible Hands-on Artificial Intelligence and Robotics Education

While robot platforms have played a role in artificial intelligence and robotics education for over 30 years, the cost and size of these platforms have limited their reach. Recently, low-cost robot platforms have matured sufficiently to become a standard tool for teaching AI and robotics to advanced undergraduate and beginning graduate students. Furthermore, the accessibility of low-cost platforms introduces the exciting prospect of expanding artificial intelligence and robotics educational opportunities outside the classroom, including non-traditional venues such as museums.

Incorporating hands-on exercises into classroom and public venues excites students and provides insights that are difficult to achieve otherwise. Unfortunately, it is extremely time-consuming to build and manage a course that includes hands-on robotics. The AI community will benefit from (1) an organized set of tested, refined laboratory exercises and (2) the insights of educators who have successfully designed and run such labs.

The purpose of this symposium is to gather instructional material and experiences in a form that can be directly used to build artificial intelligence curricula with hands-on robotics exercises. These materials may be further extended to engage the public. We are especially interested in contributions that provide (1) step-by-step instructions for using low-cost platforms to teach individual artificial intelligence topics; (2) detailed descriptions of low-cost platforms and first-hand classroom experiences with them; and/or (3) discussions of curricular development and the educational impact of inexpensive hardware within AI-related courses. Examples of the level of possible step-by-step hands-on AI and robotics topics include particle filtering, neural network learning and inference, and Bayesian network learning and inference. Example educational papers include ways to approach and evaluate hands-on AI education; the use of newer low-cost robotic platforms; the future of low-cost platforms; and the embedding of hands-on learning in nontraditional venues. Other topics not included in these examples are also welcome.

The symposium will include demonstrations of step-by-step robot exercises and video demonstrations of example robotics projects. Panel sessions will explore how to build a lab-based AI curriculum, and how to balance theoretical and hands-on material to achieve educational goals without overwhelming the students or instructor.

### Submission Information

Submissions should be 2-6 pages in length. Step-by-step lab exercises should include: educational objectives, background material, description of hardware and software required, step-by-step instructions (including pictures and other media), and how to evaluate results. Please e-mail submissions to [lgreenwa@cs.drexel.edu](mailto:lgreenwa@cs.drexel.edu). For more information visit <http://itcsl.cs.drexel.edu/ss2004>.

### Organizing Committee

Lloyd Greenwald, Drexel University ([lgreenwa@cs.drexel.edu](mailto:lgreenwa@cs.drexel.edu)); Zachary Dodds, Harvey Mudd College ([dodds@cs.hmc.edu](mailto:dodds@cs.hmc.edu)); Ayanna Howard, Jet Propulsion Laboratory ([howard@helios.jpl.nasa.gov](mailto:howard@helios.jpl.nasa.gov)); Sheila Tejada, University of New Orleans ([sheila@cs.uno.edu](mailto:sheila@cs.uno.edu)); Jerry Weinberg, Southern Illinois University at Edwardsville ([jweinbe@siue.edu](mailto:jweinbe@siue.edu)).



## Architectures for Modeling Emotion: Cross-Disciplinary Foundations

Recent years have witnessed increased interest in modeling emotion within cognitive and behavior-based (software and robotic) agent architectures and cognitive models of human behavior. This interest results in part from advances in agent technology, cognitive neuroscience, and emotion research that make such models possible, and in part from maturing applications that require, or benefit from, the inclusion of emotion-related aspects. This surge of interest has led to a number of emotion-based architectures and applications. However, this work is often carried in an ad hoc manner since, due to the short history of the field and the lack of appropriate frameworks for common reflection, there is a still very limited understanding of the mechanisms underlying such architectures, and of standards for a sound validation practice.

The objective of this symposium is to provide a discussion forum focusing on the ways in which neuroscience and psychology findings can motivate and inform the design of emotion models and architectures, constrain specific mechanisms and processes within these models, serve as a source of data for model and architecture validation, and benefit from the feedback provided by computational models and tools. In particular, we will solicit review and state-of-the-art contributions and will focus on two issues not contemplated in previous symposia and workshops: *validation of emotion models and architectures*, and relevance of recent findings from *affective neuroscience research*, in addition to existing research in psychology. We thus propose to bring together researchers from a variety of backgrounds, in particular: computer science, AI, robotics, neuroscience, cognitive science, and psychology.

To support the above objectives, we propose a focused and highly interactive symposium consisting of working groups, moderated panels, invited keynote addresses, poster and demo sessions, and general discussion sessions. Specific research questions and topics we propose to address include (but are not limited to) the following:

(1) *levels of model granularity*: possible alternatives, their relevance and applicability, etc.;

(2) *availability, adequacy and usability of empirical data*: data required to generate and validate models at different levels of granularity, and to support empirically motivated design and implementation choices;

(3) *model and architecture design and development*: advantages/disadvantages and uses of different design approaches; adequacy of different psychological/neuroscience theories, computational methods and representational formalisms for different types of architectures, components, and levels of granularity, etc.; and

(4) *model and architecture validation*: validation criteria and metrics for different levels of granularity, architectures, and phenomena modeled; suitable ways of coupling computational modeling and empirical research approaches for the purposes of data generation and hypothesis validation, etc.

### Submission Information

Potential participants should submit an extended abstract (1,500 to 2,500 words). Contributions should describe work in progress, completed work, positions, or give insight into the current state or perspectives of research in architectures for emotion modeling.

Contributions should be sent by e-mail (ASCII, attached PDF or PostScript files) to both co-chairs, Eva Hudlicka (evahud@earthlink.net) and Lola Canamero (L.Canamero@herts.ac.uk). For additional information about the symposium, and specific requirements for submission, see: <http://homepages.feis.herts.ac.uk/~comqlc/ame04>.

#### **Organizing Committee**

Eva Hudlicka, Psychometrix Associates, USA (chair); Lola Cañamero, University of Hertfordshire, UK (chair); Cynthia Breazeal, MIT, USA; Jean-Marc Fellous, The Salk Institute, USA; Joseph LeDoux, NYU, USA; Jonathan Gratch, USC-ICT, USA; Christine Lisetti, University of Central Florida, USA; Gerry Matthews, University of Cincinnati, USA; Paolo Petta, ÖFAI, Austria; Fiorella de Rosis, University of Bari, Italy; Craig Smith, Vanderbilt University, USA.



## **Bridging the Multi-Agent and Multi-Robotic Research Gap**

Research in multiagent systems (MAS) can be loosely characterized as the study of complex systems whose behavior can profitably be analyzed in terms of interactions between collections of elements individuated along a process-centered, or agent, dimension. Agent interactions originate from concerns over either the common good or the individual interests of agents. Within the MAS paradigm, a central area of study involves the development of algorithms through which agents can effectively coordinate their behavior. Similarly, a large segment of the multi-robotic systems (MRS) community is concerned with the development of robotic platforms that can work together in a coordinated fashion. At the surface, therefore, it would seem that considerable common ground should exist between the two endeavors so that much could be gained through joint research efforts. However, research in MRS has pursued specialized methods toward solving the coordination problem. Such a state of affairs, however, is neither healthy nor likely to be productive. The danger for MRS is that advances made in the MAS arena may unnecessarily be duplicated in the MRS world; the danger for the MAS community is that novel and important approaches put forward in MRS might be overlooked or that MRS as a domain for motivating MAS research might become marginalized. The goal of this symposium is to bring together researchers from these two fields in an effort to explore those areas that can benefit from joint research efforts.

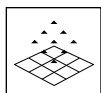
This symposium will be organized around a set of challenge problems, posed by representatives of both the MRS and MAS groups, together with a collection of accepted papers. At the symposium, each group will present suggested solutions to the challenge problems; the problems and approaches will be discussed in a set of panels. A joint session will also be organized with the symposium on Interaction between Humans and Autonomous Systems over Extended Operation.

### **Submission Information**

Please send either a full paper (a maximum of 6 pages according to the format guidelines at [www.aaai.org/Symposia/symposia.html](http://www.aaai.org/Symposia/symposia.html)) for presentation or an abstract including relevant research to [ortiz@ai.sri.com](mailto:ortiz@ai.sri.com). Submissions can be either PostScript or PDF files.

### **Organizing Committee**

Charlie Ortiz, SRI (chair); Lynne Parker, University of Tennessee; Gaurav Sukhatme, USC; and Milind Tambe, USC.



## Exploring Attitude and Affect in Text: Theories and Applications

Human language technology systems have typically focused on the factual aspect of content analysis. Other aspects, including pragmatics, point of view, and style, have received much less attention. However, to achieve an adequate understanding of a text, these aspects cannot be ignored.

In this symposium, we address computer-based analysis of point of view. Our goal is to bring together people from academia, government, and industry to explore annotation, modeling, mining, and classification of opinion, subjectivity, attitude, and affect in text, across a range of text management applications.

The symposium therefore addresses a rather wide range of issues, from theoretical questions and models, through annotation standards and methods, to algorithms for recognizing, clustering, characterizing, and displaying attitudes and affect in text. Despite growing interest in this area, with papers recently published in major conferences and new corpora developed, there has never been a workshop or symposium that targets a wide audience of researchers and practitioners on these topics.

We invite contributions on methodological, technical, and application-oriented aspects of this emerging subfield in text processing as follows. *Types and models of subjective information*: opinion, sentiment, point of view; affect, emotion; uncertainty, doubt, and related epistemic qualities. *Annotation*: categorization, and characteristics such as centrality, polarity, intensity; annotation at different levels of granularity; inter-annotator agreement studies; tools for annotation; bootstrapping using machine-learned classifiers. *Resources required for modeling subjectivity*: semantic lexicons; ontologies. *Methods for recognizing and modeling subjectivity*: classification models; identifying subjective / opinionated / affective expressions; contextual disambiguation of potentially subjective expressions; discourse segmentation; clustering techniques; summarization techniques; fusion of points of view. *Methods for displaying and visualizing subjectivity*: clustering techniques; visualization tools. *Evaluation*: as a component technology; as a standalone technology. *Applications*: government applications; opinion and affect question answering systems; affect and opinion retrieval and extraction systems; CRM (customer relation management) system.

### Submission Information

Submissions can be extended abstracts (three pages) or full papers (up to eight pages). PostScript/PDF-submissions in AAAI format should be sent to: EAAT2004@clairvoyancecorp.com. See also [www.clairvoyancecorp.com/Research/Workshops/AAAI-EAAT-2004/home.html](http://www.clairvoyancecorp.com/Research/Workshops/AAAI-EAAT-2004/home.html).

### Organizing Committee

Yan Qu, (cochair), Clairvoyance Corporation; James G. Shanahan, (cochair), Clairvoyance Corporation; Janyce Wiebe, (cochair), University of Pittsburgh; Claire Cardie, Cornell University; Edward Hovy, USC/Information Sciences Institute; and Elizabeth Liddy, Syracuse University



## Interaction between Humans and Autonomous Systems over Extended Operation

Autonomous systems are needed to reduce human workload, to increase efficiency, and to perform routine, monotonous, challenging, or dangerous operations for which humans are not cognitively or physically well suited. A key challenge for fielding such systems is supporting effective interaction between humans and these autonomous systems as situations and objectives change over extended operation. As the lifecycle of deployed autonomous systems lengthens, the need to support enhanced capabilities for human-interaction increases. This symposium will explore possible designs for enhanced capabilities such as human supervisory monitoring, response to unforeseen circumstances, requests for assistance, warnings for safety hazards, degraded performance, or departure from original objectives.

Interaction between humans and autonomous systems for effective extended operations entails balancing the needs to (1) detect and eliminate unproductive, annoying, or harmful interaction, (2) initiate needed interaction, (3) allow for graceful degradation in the absence of desired interactions, (4) produce efficient and meaningful interaction content, and (5) meet coordination and information needs on both sides. In this symposium we will look at designing autonomous systems to address these needs, covering research issues such as adjustable autonomy, learning from past experiences, neglect tolerance, teamwork and human-agent teaming as well as human supervision of agents, coordination among potentially distributed humans and autonomous systems, human-computer interaction (and human-agent / human-robot), visibility into autonomous system state and operations, designs for models in autonomous systems, reprioritizing goals, and accepting and responding to new goals on the fly, and differences in long-term versus short-term autonomous system operation.

The objective of this symposium is to gain insights into design challenges for human interaction by exploring both the similarities and differences across research applications such as control automation, robotics, and software agent-based systems. Presentations from these areas as well as human-computer interaction, psychology, sociology, and cognitive science will be encouraged to provide the best possible crossover of concepts, techniques, and methodologies among disciplines. This symposium continues and extends the topic of the very successful 2003 Spring Symposium on Human Interaction with Autonomous Systems in Complex Environments.

### Submission Information

Potential participants should e-mail a 2-page abstract or 6-page paper to James Gunderson at [gunders@acm.org](mailto:gunders@acm.org). Papers should focus on the issues of effective interaction between humans and autonomous systems across changing situations and objectives over extended operation. For more information, see [www.traclabs.com/~cmartin/sss04/](http://www.traclabs.com/~cmartin/sss04/).

### Organizing Committee

James Gunderson, Gunderson and Gunderson, Inc. (cochair) ([gunders@acm.org](mailto:gunders@acm.org)); Cheryl Martin, NASA JSC/Metrica Inc. (cochair) ([cmartin@traclabs.com](mailto:cmartin@traclabs.com)); Henry Hexmoor, Univ. of Arkansas ([hexmoor@uark.edu](mailto:hexmoor@uark.edu)); Alex Meystel, Drexel Univ. ([meystel@ece.drexel.edu](mailto:meystel@ece.drexel.edu)); Paul Scerri, USC/ISI ([scerri@isi.edu](mailto:scerri@isi.edu)); Debra Schreckenghost, NASA JSC/Metrica Inc. ([ghost@ieee.org](mailto:ghost@ieee.org)); Alan Schultz, Navy Center for Applied Research in AI ([schultz@aic.nrl.navy.mil](mailto:schultz@aic.nrl.navy.mil)).



# Knowledge Representation and Ontology for Autonomous Systems

For an autonomous system to behave appropriately in an uncertain environment, many researchers feel that the system must have an internal representation (world model) of entities, events, and situations that it perceives in the world. The term “autonomous systems” in this context refers to embodied intelligent systems that can operate for extended periods of time without human supervision. A major challenge for these systems is maintaining an accurate internal representation of pertinent information about the environment.

A large body of work exists in various knowledge representation, ontology, and data fusion areas, yet relatively little has been applied to real-time world modeling in autonomous systems. This symposium’s objective is to bring together colleagues in the autonomous systems, knowledge representation, ontology, and data fusion communities to explore leveraging existing knowledge technologies to benefit autonomous systems. Some topics of interest include: (1) applying knowledge representations to autonomous systems for representing parametric, spatial, dynamic and symbolic knowledge; (2) exploring the usefulness of different types of ontologies for autonomous systems; (3) representing a priori and in situ knowledge, value judgments, state information, history, plans, entities, events, situations, intent, task knowledge, and self-knowledge; (4) exploring which knowledge technologies work best for different challenges in autonomous systems, including corresponding performance measures; (5) exploring the requirements that subsystems (e.g., sensors, learning modules, planners, and operator control units) place on knowledge representations; (6) understanding and formalizing the interaction between disparate knowledge representations (e.g., images, maps, classes, and relationships) that provide complementary information about the same object or event; (7) understanding the role of knowledge in model-based perception and control; (8) exploring approaches to formalize the autonomous system’s internal representation; (9) exploring means to measure of the quality of knowledge within autonomous systems; (10) exploring the reusability of knowledge among disparate autonomous systems; (11) determining how data fusion technologies (which support autonomous system sensing capabilities) can be assisted by using knowledge technologies.

## Submission Information

The symposium will consist of formal paper presentations describing current research or visionary approaches, as well as interdisciplinary discussion sessions focusing on topics areas related to knowledge technologies for autonomous systems. Those interested in participating are invited to submit either a full paper (5,000 words maximum) or a 1-2 page statement of interest outlining their relevant research activities and how they would like to contribute to the symposium. Please submit papers in PDF format to Craig Schlenoff (craig.schlenoff@nist.gov).

## Organizing Committee

Craig Schlenoff (chair), National Institute of Standards and Technology (NIST), USA; Michael Uschold (cochair), Boeing; Benjamin Kuipers, Univ. of Texas at Austin; James Albus, NIST; Otthein Herzog, Univ. of Bremen; Charles Shoemaker, Army Research Lab; Illah Nourbakhsh, CMU; Hugh Durrant-Whyte, Univ. of Sydney; Elena Messina, NIST; James Crawford, NASA Ames Research Center; Stephen Balakirsky, NIST; Michael Gruninger, Univ. of Maryland, College Park.



## Language Learning: An Interdisciplinary Perspective

Language learning is a grand challenge problem for AI because it encompasses concept development and perceptual development, social learning and imitation, as well as learning the lexicon, the grammar, and other aspects of language; because it drives new technologies that apply widely to other kinds of sequential data; and because most of the world's knowledge is represented linguistically, so machines are limited by their inability to understand language.

The symposium is intended to bring together representatives of several communities—the corpus-based and grounded language learning communities, and the developmental psycholinguistics and language education communities—to assess progress in machine language learning and how what we know about human linguistic development might speed that progress.

Three kinds of interdisciplinary discussions are likely to be productive. In grounded language learning, language describes a present scene and is often learned in a language game of some sort with a competent language user. Corpus-based approaches work with corpora of language dissociated from a present scene and not generated in a language game that includes the learner. Learning rates may be higher for grounded language learning; corpus-based approaches may learn a wider range of word classes, including words with abstract semantics that do not refer to a present scene. Both approaches are inherently statistical and much can be shared between the practitioners of each. A second integration is between lexical acquisition and grammatical inference. Knowing word meanings can help one acquire grammatical rules, and the assignment of words to grammatical categories should help acquire their meanings. A third discussion is between language learning researchers and those who work on large, commonsense knowledge bases. Language is layered on a conceptual system, and depends on that system for its interpretation; and language conveys new concepts and distinctions; so language learning both depends on and extends commonsense knowledge.

### Submission Information

Submit short papers to Paul Cohen. Papers that integrate approaches to machine language learning, that inform these approaches with knowledge and theories of human language learning, and that describe empirical results, are most welcome; though other kinds of papers will be considered.

### Organizing Committee

Paul Cohen, University of Massachusetts, Amherst (cohen@cs.umass.edu); Andy Clark, University of Indiana (andy@indiana.edu); Eduard Hovy, University of Southern California, Information Sciences Institute (hovy@isi.edu); Tim Oates, University of Maryland, Baltimore County (oates@csee.umbc.edu); Michael Witbrock, Cycorp (witbrock@cyc.com)



## Semantic Web Services

Services, i.e. network pervasive programs or devices, facilitate interoperation by exposing their interfaces to each other. Such service-oriented research includes: (1) *web services*—standardized enterprise components offered across the Web; (2) *grid services*—scientific/computing resources that facilitate large-scale e-science research; (3) *multiagent systems*—heterogeneous agents that cooperate or compete to solve distributed AI problems.

Whilst services deliver dynamic, personalized, and relevant applications through discovery, invocation, and composition, a key remaining challenge is to support automated interoperability without necessitating human intervention. The inclusion and use of semantic web annotations promise to make web-based information and services both accessible and understandable to agents and other applications. Emerging ontologies (e.g. DAML-S) are being used to construct semantically rich service descriptions. Techniques for planning, composing, editing, reasoning, and analyzing about these descriptions are being investigated and deployed to resolve semantic interoperability between services within scalable, open environments.

Key research challenges in the area of web services, grid services and multiagent computing include the construction of ontologies for service description, ontologies of service types (i.e. describing classes of services), etc, as well as techniques that support the manipulation of service descriptions to automate service discovery, translation, composition, etc.

This proposed symposium aims to bring together researchers addressing many of these issues, and promote and foster a greater understanding of how the semantic web can assist grid, web services and multiagent system research. Topics of interest include:

- Ontologies that support service descriptions
- Ontologies for service classification
- Semantic interoperability and integration
- Quality of service and service level agreement management
- Semantic Web security policies, management and frameworks
- Semantic description, discovery, and selection of services
- Scaleable service composition for heterogeneous environments
- Knowledge Representation for Semantic Web Services
- DAML-S services
- Semantics in Agent Communication Languages
- Semantics for service delegation and knowledge aggregation
- Architectures for supporting Semantic Web Services
- Service enactment/invocation frameworks
- Service Negotiation
- Rules within Semantic Web Services

More information can be found at [www.daml.ecs.soton.ac.uk/SSS-SWS04.html](http://www.daml.ecs.soton.ac.uk/SSS-SWS04.html)

**Submission Information**

Those interested in participating should send either 1-3 page extended abstract, or an 8-page paper to Terry Payne (trp@ecs.soton.ac.uk) by the submission deadline. Electronic submissions (PostScript or PDF) in AAAI format preferred ([www.aaai.org/Publications/Author/authorinstructions.pdf](http://www.aaai.org/Publications/Author/authorinstructions.pdf)).

**Organizing Committee**

Terry Payne (chair) University of Southampton (trp@ecs.soton.ac.uk), Keith Decker, University of Delaware (decker@cis.udel.edu), Ora Lassila, Nokia Research Center, (ora.lassila@nokia.com), Sheila McIlraith, Stanford University (sam@ksl.stanford.edu), Katia Sycara, Carnegie Mellon University (katia@cs.cmu.edu).