

# Contents

AAAI Organization / xix  
Conference Program Committees / xxi  
Outstanding Paper Award / xxiv  
Sponsoring Organizations / xxv  
Preface / xxvi  
Invited Talks / xxvii

## AAAI-2000 Technical Papers

### Agents

Inter-Layer Learning Towards Emergent Cooperative Behavior / 3  
*Shawn Arseneau, Wei Sun, Changpeng Zhao, and Jeremy R. Cooperstock, McGill University*

Coordination Failure and Congestion in Information Networks / 9  
*A. M. Bell, NASA Ames Research Center; W. A. Sethares and J. A. Bucklew, University of Wisconsin-Madison*

Non-Deterministic Social Laws / 15  
*Michael H. Coen, MIT Artificial Intelligence Lab*

Solving Combinatorial Auctions Using Stochastic Local Search / 22  
*Holger H. Hoos, University of British Columbia; Craig Boutilier, University of Toronto*

A Mechanism for Group Decision Making in Collaborative Activity / 30  
*Luke Hunsberger, Harvard University; Massimo Zancanaro, ITC-irst*

Cobot in LambdaMOO: A Social Statistics Agent / 36  
*Charles Lee Isbell, Jr., Michael Kearns, Dave Kormann, Satinder Singh, and Peter Stone, AT&T Shannon Labs*

Semantics of Agent Communication Languages for Group Interaction / 42  
*Sanjeev Kumar, Marcus J. Huber, David R. McGee, and Philip R. Cohen, Oregon Graduate Institute; Hector J. Levesque, University of Toronto*

Deliberation in Equilibrium: Bargaining in Computationally Complex Problems / 48  
*Kate Larson and Tuomas Sandholm, Washington University*

An Algorithm for Multi-Unit Combinatorial Auctions / 56  
*Kevin Leyton-Brown, Yoav Shoham, and Moshe Tennenholtz, Stanford University*

Maintainability: A Weaker Stabilizability Like Notion for High Level Control / 62  
*Mutsumi Nakamura, University of Texas at Arlington; Chitta Baral, Arizona State University; Marcus Bjärelund, Linköping University*

Agent Capabilities: Extending BDI Theory / 68  
*Lin Padgham, RMIT University; Patrick Lambrix, Linköpings Universitet*

Iterative Combinatorial Auctions: Theory and Practice / 74

*David C. Parkes and Lyle H. Ungar, University of Pennsylvania*

Preventing Strategic Manipulation in Iterative Auctions: Proxy Agents and Price-Adjustment / 82

*David C. Parkes and Lyle H. Ungar, University of Pennsylvania*

Improved Algorithms for Optimal Winner Determination in Combinatorial Auctions and Generalizations / 90

*Tuomas Sandholm and Subhash Suri, Washington University*

Some Tractable Combinatorial Auctions / 98

*Moshe Tennenholtz, Technion, Israel Institute of Technology*

Collective Intelligence and Braess' Paradox / 104

*Kagan Tumer and David Wolpert, NASA Ames Research Center*

Robust Combinatorial Auction Protocol against False-Name Bids / 110

*Makoto Yokoo, Yuko Sakurai, and Shigeo Matsubara, NTT Communication Science Laboratories*

## Cognitive Modeling

Self-Organization of Innate Face Preferences: Could Genetics Be Expressed through Learning? / 117

*James A. Bednar and Risto Miikkulainen, The University of Texas at Austin*

A Self-Organizing Neural Network for Contour Integration through Synchronized Firing / 123

*Yoonsuck Choe and Risto Miikkulainen, The University of Texas at Austin*

Anchoring Symbols to Sensor Data: Preliminary Report / 129

*Silvia Coradeschi and Alessandro Saffiotti, Örebro University*

Modeling Classification and Inference Learning / 136

*Bradley C. Love and Arthur B. Markman, The University of Texas at Austin; Takashi Yamauchi, University of Pittsburgh*

Reading a Robot's Mind: A Model of Utterance Understanding Based on the Theory of Mind Mechanism / 142

*Tetsuo Ono and Michita Imai, ATR Media Integration & Communications Research Laboratories*

Visual Event Classification via Force Dynamics / 149

*Jeffrey Mark Siskind, NEC Research Institute, Inc.*

## Constraint Satisfaction

Counting Models Using Connected Components / 157

*Roberto J. Bayardo Jr., IBM Almaden Research Center; J. D. Pehoushek, M.U.S.T. Centre*

DATALOG with Constraints — An Answer-Set Programming System / 163

*Deborah East and Mirosław Truszczyński, University of Kentucky*

Local Search with Constraint Propagation and Conflict-Based Heuristics / 169

*Narendra Jussien, École des Mines de Nantes; Olivier Lhomme, ILOG*

A Game-Theoretic Approach to Constraint Satisfaction / 175

*Phokion G. Kolaitis, University of California, Santa Cruz; Moshe Y. Vardi, Rice University*

Using Auxiliary Variables and Implied Constraints to Model Non-Binary Problems / 182

*Barbara Smith, University of Leeds; Kostas Stergiou, University of Strathclyde; Toby Walsh, University of York*

## Game Playing

The Game of Hex: An Automatic Theorem Proving Approach to Game Programming / 189  
*Vadim V. Anshelevich, Vanshel Consulting*

Combining Knowledge and Search to Solve Single-Suit Bridge / 195  
*Ian Frank, Electrotechnical Laboratory; David Basin, Universität Freiburg; Alan Bundy, University of Edinburgh*

On Pruning Techniques for Multi-Player Games / 201  
*Nathan R. Sturtevant and Richard E. Korf, University of California, Los Angeles*

## Human-Computer Interaction

Human-Guided Simple Search / 209  
*David Anderson, Emily Anderson, Neal Lesh, Joe Marks, Brian Mirtich, and David Ratajczak, MERL — Mitsubishi Electric Research Laboratory; Kathy Ryall, MERL — Mitsubishi Electric Research Laboratory and University of Virginia*

Predicting Future User Actions by Observing Unmodified Applications / 217  
*Peter Gorniak and David Poole, University of British Columbia*

Acquiring Problem-Solving Knowledge from End Users: Putting Interdependency Models to the Test / 223  
*Jihie Kim and Yolanda Gil, University of Southern California*

Predicting UNIX Command Lines: Adjusting to User Patterns / 230  
*Benjamin Korvemaker and Russell Greiner, University of Alberta*

Generation of Ideologically-Biased Historical Documentaries / 236  
*Michael Mateas, Carnegie Mellon University; Paul Vanouse, University of Buffalo; Steffi Domike, Chatham College*

Self-Supervised Learning for Visual Tracking and Recognition of Human Hand / 243  
*Ying Wu and Thomas S. Huang, University of Illinois at Urbana-Champaign*

Interactive Training for Synthetic Characters / 249  
*Song-Yee Yoon, Robert C. Burke, Bruce M. Blumberg, and Gerald E. Schneider, Massachusetts Institute of Technology*

## Knowledge Representation and Reasoning

### Boolean Satisfiability

Generating Satisfiable Problem Instances / 256  
*Dimitris Achlioptas, Microsoft Research; Carla Gomes, Cornell University; Henry Kautz, AT&T Research; Bart Selman, Cornell University*

Solving the Round Robin Problem Using Propositional Logic / 262  
*Ramón Béjar and Felip Manyà, Universitat de Lleida*

A Demand-Driven Algorithm for Generating Minimal Models / 267  
*Rachel Ben-Eliyahu – Zohary, Ben-Gurion University of the Negev*

Redundancy in Random SAT Formulas / 273  
*Yacine Bouffkhad and Olivier Roussel, Université d'Artois*

On 2-SAT and Renamable Horn / 279  
*Alvaro del Val, Universidad Autónoma de Madrid*

A Distributed Algorithm to Evaluate Quantified Boolean Formulae / 285  
*Rainer Feldmann, Burkhard Monien, and Stefan Schamberger, University of Paderborn*

Integrating Equivalency Reasoning into Davis-Putnam Procedure / 291  
*Chu Min Li, Univ. de Picardie Jules Verne*

Local Search Characteristics of Incomplete SAT Procedures / 297  
*Dale Schuurmans and Finnegan Southey, University of Waterloo*

MarketSAT: An Extremely Decentralized (but Really Slow) Algorithm for Propositional Satisfiability / 303  
*William E. Walsh and Michael P. Wellman, University of Michigan*

An Efficient Global-Search Strategy in Discrete Lagrangian Methods for Solving Hard Satisfiability Problems / 310  
*Zhe Wu and Benjamin W. Wah, University of Illinois at Urbana-Champaign*

## Case-Based Reasoning

Assessing Relevance with Extensionally Defined Principles and Cases / 316  
*Bruce M. McLaren and Kevin D. Ashley, University of Pittsburgh*

Dynamic Case Creation and Expansion for Analogical Reasoning / 323  
*Thomas Mostek, Kenneth D. Forbus, and Cara Meverden, Northwestern University*

Memory-Based Forecasting for Weather Image Patterns / 330  
*Kazuhiro Otsuka and Tsutomu Horikoshi, NTT Cyber Solutions Laboratories; Satoshi Suzuki, NTT East Corporation; Haruhiko Kojima, NTT Cyber Solutions Laboratories*

## Computational Complexity of Reasoning

The Complexity of Restricted Consequence Finding and Abduction / 337  
*Alvaro del Val, Universidad Autónoma de Madrid*

Tractable Classes for Directional Resolution / 343  
*Alvaro del Val, Universidad Autónoma de Madrid*

Compilability of Abduction / 349  
*Paolo Liberatore and Marco Schaerf, Università di Roma “La Sapienza”*

## Decision Theory

Decision-Theoretic, High-Level Agent Programming in the Situation Calculus / 355  
*Craig Boutilier, Ray Reiter, and Mikhail Soutchanski, University of Toronto; Sebastian Thrun, Carnegie Mellon University*

Making Rational Decisions Using Adaptive Utility Elicitation / 363  
*Urszula Chajewska, Daphne Koller, and Ronald Parr, Stanford University*

Back to the Future for Consistency-Based Trajectory Tracking / 370  
*James Kurien, NASA Ames Research Center; P. Pandurang Nayak, PurpleYogi.com and RIACS*

Sampling Methods for Action Selection in Influence Diagrams / 378  
*Luis E. Ortiz, Brown University and Leslie Pack Kaelbling, Massachusetts Institute of Technology*

## Logic

Answering Queries Using Views over Description Logics Knowledge Bases / 386  
*Diego Calvanese, Giuseppe De Giacomo, and Maurizio Lenzerini, Università di Roma “La Sapienza”*

A Consistency-Based Model for Belief Change: Preliminary Report / 392  
*James P. Delgrande, Simon Fraser University; Torsten Schaub, Universität Potsdam*

A Conjunctive Query Language for Description Logic ABoxes / 399  
*Ian Horrocks and Sergio Tessaris, University of Manchester*

## Nonmonotonic Reasoning

A Flexible Framework for Defeasible Logics / 405  
*G. Antoniou, D. Billington, G. Governatori, and M. J. Maher, Griffith University*

Towards a Logic-Based Theory of Argumentation / 411  
*Philippe Besnard, Université Paul Sabatier; Anthony Hunter, University College London*

Solving Advanced Reasoning Tasks Using Quantified Boolean Formulas / 417  
*Uwe Egly, Thomas Eiter, Hans Tompits, and Stefan Woltran, Technische Universität Wien*

Total Knowledge / 423  
*Ian Pratt-Hartmann, University of Manchester*

Computing Circumscriptive Databases by Integer Programming: Revisited / 429  
*Ken Satoh and Hidenori Okamoto, Hokkaido University*

## Ontology

Using Prior Knowledge: Problems and Solutions / 436  
*Vinay K. Chaudhri, Mark E. Stickel, Jerome F. Thomere, and Richard J. Waldinger, SRI International*

Dynamic Ontologies on the Web / 443  
*Jeff Heflin and James Hendler, University of Maryland*

PROMPT: Algorithm and Tool for Automated Ontology Merging and Alignment / 450  
*Natalya Fridman Noy and Mark Musen, Stanford University*

## Reasoning about Actions and Time

(De)Composition of Situation Calculus Theories / 456  
*Eyal Amir, Stanford University*

Disjunctive Temporal Reasoning in Partially Ordered Models of Time / 464  
*Mathias Broxvall and Peter Jonsson, Linköpings Universitet*

An Interval Algebra for Indeterminate Time / 470  
*Wes Cowley, University of South Florida; Dimitris Plexousakis, University of Crete and ICS-FORTH*

cc-Golog: Towards More Realistic Logic-Based Robot Controllers / 476  
*Henrik Grosskreutz and Gerhard Lakemeyer, Aachen University of Technology*

What Sensing Tells Us: Towards a Formal Theory of Testing for Dynamical Systems / 483  
*Sheila A. McIlraith, Stanford University; Richard Scherl, New Jersey Institute of Technology*

Execution of Temporal Plans with Uncertainty / 491  
*Paul Morris, Caelum Research Corporation / NASA Ames Research Center;  
Nicola Muscettola, NASA Ames Research Center*

Modeling Actions with Ramifications in Nondeterministic, Concurrent, and Continuous Domains  
— and a Case Study / 497  
*Michael Thielscher, Dresden University of Technology*

## Spatial Reasoning

Describing Rigid Body Motions in a Qualitative Theory of Spatial Regions / 503

*Brandon Bennett, Anthony G. Cohn, Paolo Torrini, and Shyamanta Hazarika, University of Leeds*

GeoRep: A Flexible Tool for Spatial Representation of Line Drawings / 510

*Ronald W. Ferguson and Kenneth D. Forbus, Northwestern University*

STA: Spatio-Temporal Aggregation with Applications to Analysis of Diffusion-Reaction Phenomena / 517

*Iván Ordóñez, The Ohio State University; Feng Zhao, Xerox Palo Alto Research Center*

## Uncertainty

On the Recognition of Abstract Markov Policies / 524

*Hung H. Bui, Svetha Venkatesh, and Geoff West, Curtin University of Technology*

Bayesian Fault Detection and Diagnosis in Dynamic Systems / 531

*Uri Lerner, Ronald Parr, and Daphne Koller, Stanford University; Gautam Biswas, Vanderbilt University*

Semantics and Inference for Recursive Probability Models / 538

*Avi Pfeffer, Harvard University; Daphne Koller, Stanford University*

Towards Feasible Approach to Plan Checking under Probabilistic Uncertainty: Interval Methods / 545

*Raúl Trejo and Vladik Kreinovich, University of Texas at El Paso; Chitta Baral, Arizona State University*

## Machine Learning and Data Mining

ADVISOR: A Machine Learning Architecture for Intelligent Tutor Construction / 552

*Joseph E. Beck, Beverly Park Woolf, and Carole R. Beal, University of Massachusetts*

Automatic Invention of Integer Sequences / 558

*Simon Colton and Alan Bundy, University of Edinburgh; Toby Walsh, University of York*

A Unified Bias-Variance Decomposition for Zero-One and Squared Loss / 564

*Pedro Domingos, University of Washington*

Generalizing Boundary Points / 570

*Tapio Elomaa, University of Helsinki; Juho Rousu, VTT Biotechnology*

Boosted Wrapper Induction / 577

*Dayne Freitag, Just Research; Nicholas Kushmerick, University College Dublin*

Information Extraction with HMM Structures Learned by Stochastic Optimization / 584

*Dayne Freitag and Andrew McCallum, Just Research*

Localizing Search in Reinforcement Learning / 590

*Greg Grudic and Lyle Ungar, University of Pennsylvania*

Recognizing End-User Transactions in Performance Management / 596

*Joseph L. Hellerstein, T. S. Jayram, and Irina Rish, IBM Thomas J. Watson Research Center*

ATMOSPHERE — Automatic Track Mining and Objective Satellite Pattern Hunting System Using Enhanced RBF and EGDLM / 603

*Raymond S. T. Lee and James N. K. Liu, Hong Kong Polytechnic University*

Learning the Common Structure of Data / 609

*Kristina Lerman and Steven Minton, University of Southern California*

Intuitive Representation of Decision Trees Using General Rules and Exceptions / 615

*Bing Liu, Mingqing Hu, and Wynne Hsu, National University of Singapore*

Selective Sampling with Redundant Views / 621

*Ion Muslea, Steven Minton, and Craig A. Knoblock, University of Southern California*

A Mutually Beneficial Integration of Data Mining and Information Extraction / 627

*Un Yong Nahm and Raymond J. Mooney, University of Texas at Austin*

Multivariate Clustering by Dynamics / 633

*Marco Ramoni, The Open University; Paola Sebastiani, Imperial College; Paul Cohen, University of Massachusetts*

Toward a Theory of Learning Coherent Concepts / 639

*Dan Roth and Dmitry Zelenko, University of Illinois at Urbana-Champaign*

Empirical Evaluation of a Reinforcement Learning Spoken Dialogue System / 645

*Satinder Singh, Michael Kearns, Diane J. Litman, and Marilyn A. Walker, AT&T Labs*

Unsupervised Learning and Interactive Jazz/Blues Improvisation / 652

*Belinda Thom, Carnegie Mellon University*

Restricted Bayes Optimal Classifiers / 658

*Simon Tong and Daphne Koller, Stanford University*

A Quantitative Study of Small Disjuncts / 665

*Gary M. Weiss and Haym Hirsh, Rutgers University*

## Natural Language Processing and Information Retrieval

Translating with Scarce Resources / 672

*Yaser Al-Onaizan, Ulrich Germann, Ulf Hermjakob, Kevin Knight, Philipp Koehn, Daniel Marcu, and Kenji Yamada, University of Southern California*

The Rules Behind Roles: Identifying Speaker Role in Radio Broadcasts / 679

*Regina Barzilay, Columbia University; Michael Collins, Julia Hirschberg, and Steve Witter, AT&T Labs — Research*

Cognitive Status and Form of Reference in Multimodal Human-Computer Interaction / 685

*Andrew Kehler, University of California, San Diego*

Class-Based Construction of a Verb Lexicon / 691

*Karin Kipper, Hoa Trang Dang, and Martha Palmer, University of Pennsylvania*

Preserving Ambiguities in Generation via Automata Intersection / 697

*Kevin Knight and Irene Langkilde, University of Southern California*

Statistics-Based Summarization — Step One: Sentence Compression / 703

*Kevin Knight and Daniel Marcu, University of Southern California*

Estimating Word Translation Probabilities from Unrelated Monolingual Corpora Using the EM Algorithm / 711

*Philipp Koehn and Kevin Knight, University of Southern California*

The Automatic Interpretation of Nominalizations / 716

*Maria Lapata, University of Edinburgh*

Predicting and Adapting to Poor Speech Recognition in a Spoken Dialogue System / 722

*Diane J. Litman, AT&T Labs — Research; Shimei Pan, Columbia University*

Social Choice Theory and Recommender Systems:

Analysis of the Axiomatic Foundations of Collaborative Filtering / 729

*David M. Pennock, NEC Research Institute; Eric Horvitz, Microsoft Research; C. Lee Giles, NEC Research Institute*

Learning Subjective Adjectives from Corpora / 735

*Janyce M. Wiebe, New Mexico State University*

## Planning and Scheduling

Iterative Flattening: A Scalable Method for Solving Multi-Capacity Scheduling Problems / 742  
*Amedeo Cesta and Angelo Oddi, IP-CNR, National Research Council of Italy; Stephen F. Smith, Carnegie Mellon University*

Planning as Satisfiability in Nondeterministic Domains / 748  
*Paolo Ferraris and Enrico Giunchiglia, DIST — Università di Genova*

Open World Planning in the Situation Calculus / 754  
*Alberto Finzi and Fiara Pirri, Università degli Studi di Roma “La Sapienza”; Ray Reiter, University of Toronto*

Discovering State Constraints in DISCOPLAN: Some New Results / 761  
*Alfonso Gerevini, Università di Brescia; Lenhart Schubert, University of Rochester*

A Logic for Planning under Partial Observability / 768  
*A. Herzig, J. Lang, D. Longin, and T. Polacsek, IRIT-UPS*

Graph Construction and Analysis as a Paradigm for Plan Recognition / 774  
*Jun Hong, University of Ulster at Jordanstown*

Solving a Supply Chain Optimization Problem Collaboratively / 780  
*Hoong Chuin Lau, Andrew Lim, and Qi Zhang Liu, National University of Singapore*

From Causal Theories to Successor State Axioms and STRIPS-Like Systems / 786  
*Fangzhen Lin, The Hong Kong University of Science and Technology*

TCBB Scheme: Applications to Single Machine Job Sequencing Problems / 792  
*Sakib A. Mondal, Infosys Technologies Limited, India; Anup K. Sen, New Jersey Institute of Technology*

Extracting Effective and Admissible State Space Heuristics from the Planning Graph / 798  
*XuanLong Nguyen and Subbarao Kambhampati, Arizona State University*

An Iterative Algorithm for Synthesizing Invariants / 806  
*Jussi Rintanen, Albert-Ludwigs-Universität Freiburg*

RealPlan: Decoupling Causal and Resource Reasoning in Planning / 812  
*Biplav Srivastava, Arizona State University*

Gridworlds as Testbeds for Planning with Incomplete Information / 819  
*Craig Tovey and Sven Koenig, Georgia Institute of Technology*

## Robotics

Performance Comparison of Landmark Recognition Systems for Navigating Mobile Robots / 826  
*Tom Duckett, University of Örebro; Ulrich Nehmzow, University of Manchester*

Active Audition for Humanoid / 832  
*Kazuhiro Nakadai and Tino Lourens, Japan Science and Technology Corporation; Hiroshi G. Okuno, Japan Science and Technology Corporation and Science University of Tokyo; Hiroaki Kitano, Japan Science and Technology Corporation and Sony Computer Science Laboratories, Inc.*

Property Mapping: A Simple Technique for Mobile Robot Programming / 840  
*Illah R. Nourbakhsh, Carnegie Mellon University*

A Method for Clustering the Experiences of a Mobile Robot that Accords with Human Judgments / 846  
*Tim Oates, Matthew D. Schmill, and Paul R. Cohen, University of Massachusetts*

Coordination for Multi-Robot Exploration and Mapping / 852

*Reid Simmons and David Apfelbaum, Carnegie Mellon University; Wolfram Burgard, University of Freiburg; Dieter Fox, Carnegie Mellon University; Mark Moors, University of Bonn; Sebastian Thrun and Håkan Younes, Carnegie Mellon University*

Monte Carlo Localization with Mixture Proposal Distribution / 859

*Sebastian Thrun and Dieter Fox, Carnegie Mellon University; Wolfram Burgard, University of Freiburg*

Appearance-Based Obstacle Detection with Monocular Color Vision / 866

*Iwan Ulrich and Illah Nourbakhsh, Carnegie Mellon University*

Multi-Fidelity Robotic Behaviors: Acting with Variable State Information / 872

*Elly Winner and Manuela Veloso, Carnegie Mellon University*

## Search

Dynamic Representations and Escaping Local Optima: Improving Genetic Algorithms and Local Search / 879

*Laura Barbulescu, Jean-Paul Watson, and L. Darrell Whitley, Colorado State University*

Localizing A\* / 885

*Stefan Edelkamp, Institut für Informatik; Stefan Schrödl, DaimlerChrysler Research and Technology*

Speeding up the Convergence of Real-Time Search / 891

*David Furcy and Sven Koenig, Georgia Institute of Technology*

Change Detection in Heuristic Search / 898

*Eyke Hüllermeier, IRIT — Université Paul Sabatier*

Preference-Based Search for Scheduling / 904

*Ulrich Junker, ILOG*

Divide-and-Conquer Frontier Search Applied to Optimal Sequence Alignment / 910

*Richard E. Korf, University of California, Los Angeles; Weixiong Zhang, USC Information Sciences Institute*

Asynchronous Search with Aggregations / 917

*Marius Calin Silaghi, Djamila Sam-Haroud, and Boi Faltings, Swiss Federal Institute of Technology*

A\* with Partial Expansion for Large Branching Factor Problems / 923

*Takayuki Yoshizumi, Teruhisa Miura, and Toru Ishida, Kyoto University*

Depth-First Branch-and-Bound versus Local Search: A Case Study / 930

*Weixiong Zhang, University of Southern California*

## Innovative Applications of Artificial Intelligence Papers

### Deployed Applications

SciFinance: A Program Synthesis Tool for Financial Modeling / 937

*Robert L. Akers, Ion Bica, Elaine Kant, Curt Randall, and Robert L. Young, SciComp Inc.*

Assentor<sup>®</sup>: An NLP-Based Solution to E-mail Monitoring / 945

*Chinatsu Aone, Mila Ramos-Santacruz, and William J. Niehaus, SRA International, Inc.*

Nurse Rostering at the Hospital Authority of Hong Kong / 951

*Andy Hon Wai Chun, City University of Hong Kong; Steve Ho Chuen Chan, Garbbie Pui Shan Lam, Francis Ming Fai Tsang, Jean Wong, and Dennis Wai Ming Yeung, Advanced Object Technologies Limited*

PTV: Intelligent Personalised TV Guides / 957  
*Paul Cotter and Barry Smyth, University College Dublin*

LifeCode™ – A Natural Language Processing System for Medical Coding and Data Mining / 965  
*Daniel T. Heinze, Mark L. Morsch, Ronald E. Sheffer, Jr., Michelle A. Jimmink, Mark A. Jennings, William C. Morris, and Amy E. W. Morsch, A-Life Medical, Inc.*

The Emergence Engine: A Behavior Based Agent Development Environment for Artists / 973  
*Eitan Mendelowitz, University of California, Los Angeles*

## Emerging Applications

The TheaterLoc Virtual Application / 980  
*Greg Barish, Craig A. Knoblock, Yi-Shin Chen, Steven Minton, Andrew Philpot and Cyrus Shahabi, University of Southern California*

Exploiting a Thesaurus-Based Semantic Net for Knowledge-Based Search / 988  
*Peter Clark, John Thompson, Heather Holmback, and Lisbeth Duncan, The Boeing Company*

ICARUS: Intelligent Content-Based Retrieval of 3D Scene / 996  
*Raffaella Colaci and Marco Schaerf, Università di Roma “La Sapienza”*

Integrating a Spoken Language System with Agents for Operational Information Access / 1002  
*Jody Daniels, Lockheed Martin Advanced Technology Laboratories*

DMML: An XML Language for Interacting with Multi-Modal Dialog Systems / 1008  
*Nanda Kambhatla, Malgorzata Budzikowska, Sylvie Levesque, Nicolas Nicolov, Wlodek Zadrozny, Charles Wiecha, and Julie MacNaught, IBM T. J. Watson Research Center*

Applying Learnable Evolution Model to Heat Exchanger Design / 1014  
*Kenneth A. Kaufman, George Mason University and Ryszard S. Michalski, George Mason University and Polish Academy of Sciences*

A Campus-Wide University Examination Timetabling Application / 1020  
*Andrew Lim, Ang Juay Chin, Ho Wee Kit, and Oon Wee Chong, National University of Singapore*

An Expert System for Recognition of Facial Actions and their Intensity / 1026  
*M. Pantic and L. J. M. Rothkrantz, Delft University of Technology*

AI for the Web — Ontology-Based Community Web Portals / 1034  
*Steffen Staab, University of Karlsruhe and ontoprise GmbH; Jürgen Angele, ontoprise GmbH; Stefan Decker, University of Karlsruhe; Michael Erdmann, Andreas Hotho, and Alexander Maedche, University of Karlsruhe; Hans-Peter Schnurr and Rudi Studer, University of Karlsruhe; York Sure, University of Karlsruhe*

Defining and Using Ideal Teammate and Opponent Agent Models / 1040  
*Peter Stone, AT&T Labs — Research; Patrick Riley and Manuela Veloso, Carnegie Mellon University*

Rapid Development of a High Performance Knowledge Base for Course of Action Critiquing / 1046  
*Gheorghe Tecuci, Mihai Boicu, Dorin Marcu, Michael Bowman, Florin Ciucu, and Cristian Levcovici, George Mason University*

A Case-Based Reasoning Application for Engineering Sales Support Using Introspective Reasoning / 1054  
*Ian Watson, University of Auckland*

## Student Abstracts

Identifying Words to Explain to a Reader: A Preliminary Study / 1061  
*Greg Aist, Carnegie Mellon University*

Speculative Execution for Information Agents / 1062  
*Greg Barish, Craig A. Knoblock, and Steven Minton, University of Southern California*

Heterogeneous Neuron Models Based on Similarity / 1063  
*Lluís A. Belanche Muñoz, Universitat Politècnica de Catalunya*

Mixed-Initiative Reasoning for Integrated Domain Modeling, Learning and Problem Solving / 1064  
*Mihai Boicu and Gheorghe Tecuci, George Mason University*

A Methodology for Modeling and Representing Expert Knowledge that Supports Teaching-Based Intelligent Agent Development / 1065  
*Michael Bowman, Gheorghe Tecuci, and Mihai Boicu, George Mason University*

Automated Learning of Pricing and Bundling Strategies in Information Economies / 1066  
*Christopher H. Brooks and Edmund H. Durfee, University of Michigan*

Incremental and Distributed Learning with Support Vector Machines / 1067  
*Doina Caragea, Adrian Silvescu, and Vasant Honavar, Iowa State University*

System that Identifies Writers / 1068  
*Sung-Hyuk Cha and Sargur N. Srihari, State University of New York at Buffalo*

Using Anytime Planning for Centralized Coordination of Multiple Robots in Real-Time Dynamic Environments / 1069  
*Gabriel J. Ferrer, Glenn S. Wasson, James P. Gunderson, and Worthy N. Martin, University of Virginia*

MURDOCH: Publish/Subscribe Task Allocation for Heterogeneous Agents / 1070  
*Brian P. Gerkey and Maja J. Mataric, University of Southern California*

Domain-Specific Knowledge Acquisition Using WordNet / 1071  
*Roxana Girju, Southern Methodist University*

Graph Based Concept Learning / 1072  
*Jesus A. Gonzalez, Lawrence B. Holder, and Diane J. Cook, University of Texas at Arlington*

An Adaptive Planner Based on Learning of Planning Performance / 1073  
*Kreshna Gopal and Thomas R. Ioerger, Texas A&M University*

Knowledge Representation on the Internet: Achieving Interoperability in a Dynamic, Distributed Environment / 1074  
*Jeff Heflin, University of Maryland*

Using Pattern Databases to Find Macro Operators / 1075  
*István T. Hernádvölgyi, University of Ottawa*

Autonomous Multi-Agent Docking Using Color Segmentation / 1076  
*Jeffrey Hyams, University of South Florida*

Ontology Integration in XML / 1077  
*Euna Jeong, National Taiwan University; Chun-Nan Hsu, Academia Sinica*

Graph-Based Hierarchical Conceptual Clustering in Structural Databases / 1078  
*Istvan Jonyer, Lawrence B. Holder, and Diane J. Cook, University of Texas at Arlington*

Situation Awareness with the Limited Visual Attention / 1079  
*Youngjun Kim, Randall W. Hill, Jr., and Jonathan Gratch, University of Southern California*

Language Learning in Large Parameter Spaces / 1080  
*Karen T. Kohl, MIT Artificial Intelligence Laboratory*

Reinforcement Learning for Algorithm Selection / 1081  
*Michail G. Lagoudakis, Duke University; Michael L. Littman, AT&T Labs — Research and Duke University*

- Tracing Dependencies of Strategy Selections in Agent Design / 1082  
*Dung N. Lam and K. S. Barber, University of Texas at Austin*
- Programming Robot Behavior Primitives through Human Demonstration / 1083  
*Amy Larson and Richard Voyles, University of Minnesota*
- An Implementation of the Combinatorial Auction Problem in ECL<sup>i</sup>PS<sup>e</sup> / 1084  
*Robert Menke and Rina Dechter, University of California, Irvine*
- A Semi-Complete Disambiguation Algorithm for Open Text / 1085  
*Rada Mihalcea, Southern Methodist University*
- Combining Classification and Temporal Learning / 1086  
*Matthew Winston Mitchell, Monash University*
- Deriving and Using Abstract Representation in Behavior-Based Systems / 1087  
*Monica N. Nicolescu and Maja J. Mataric, University of Southern California*
- Model-Based-Diagnosis for Fault Management in Telecommunications Networks / 1088  
*Aomar Osmani, LIPN*
- Representation and Evolution of Lego-Based Assemblies / 1089  
*Maxim Peysakhov, Vlada Galinskaya, and William C. Regli, Drexel University*
- Intelligent Monitoring in a Robotic Assistant for the Elderly / 1090  
*Sailesh Ramakrishnan and Martha E. Pollack, University of Pittsburgh*
- Towards Efficient Negotiation Mechanisms for Collaboration / 1091  
*Timothy Rauenbusch, Harvard University*
- Behavior Acquisition and Classification: A Case Study in Robotic Soccer / 1092  
*Patrick Riley and Manuela Veloso, Carnegie Mellon University*
- “Small-World” Networks of Mobile Robots / 1093  
*Stergios I. Roumeliotis and Maja J. Mataric, University of Southern California*
- Towards Approximately Optimal Poker / 1094  
*Jie fu Shi and Michael Littman, Duke University*
- Team-Aware Multirobot Strategy for Cooperative Path Clearing / 1095  
*Gita Sukthankar, Carnegie Mellon University*
- Interfacing Issues for Information Extraction / 1096  
*Peter Vanderheyden and Robin Cohen, University of Waterloo*
- Clustering with Instance-Level Constraints / 1097  
*Kiri Wagstaff and Claire Cardie, Cornell University*
- An ILP Method Based on Instance Graph / 1098  
*Runqi Zhang, State University of New York at Buffalo*

## SIGART/AAAI Doctoral Consortium

- Helping Children Learn Vocabulary during Computer Assisted Oral Reading / 1100  
*Greg Aist, Carnegie Mellon University*
- Adaptive Learning Systems: A Model for Business Entrepreneurs to Implement IT / 1102  
*Dessa David, City University of New York*
- Automatic Generation of Memory Based Search Heuristics / 1103  
*István T. Hernádvölgyi, University of Ottawa*

Reasoning and Acting in Time / 1104

*Haythem O. Ismail, State University of New York at Buffalo*

Ontology Integration in XML / 1105

*Euna Jeong, National Taiwan University, Chun-Nan Hsu, Academia Sinica*

Belief Revision in a Deductively Open Belief Space / 1106

*Frances L. Johnson, State University of New York at Buffalo*

Selective Sampling with Co-Testing: Preliminary Results / 1107

*Ion Muslea, Steven Minton, and Craig A. Knoblock, University of Southern California*

Grounding State Representations in Sensory Experience for Reasoning and Planning by Mobile Robots / 1108

*Daniel Nikovski, Carnegie Mellon University*

Online Ensemble Learning / 1109

*Nikunj C. Oza, University of California, Berkeley*

Learning Landmarks for Robot Localization / 1110

*Robert Sim and Gregory Dudek, McGill University*

Refining Inductive Bias in Unsupervised Learning via Constraints / 1112

*Kiri Wagstaff, Cornell University*

Artificial Intelligence-Based Computer Modeling Tools for Controlling Slag Foaming in Electric Furnaces / 1113

*Eric Wilson, University of Alabama*

## Intelligent Systems Demos

Sensible Agents: Demonstration of Dynamic Adaptive Autonomy / 1115

*K. S. Barber, A. Goel, D. C. Han, J. Kim, D. N. Lam, T. H. Liu, C. E. Martin, and R. McKay, The University of Texas at Austin*

The Systems Engineering Process Activities (SEPA) Methodology and Tool Suite / 1117

*K. Suzanne Barber, Thomas Graser, Paul Grisham, Stephen Jernigan, and Sutirtha Bhattacharya, The University of Texas at Austin*

Qualitative Spatial Interpretation of Course-of-Action Diagrams / 1119

*Ronald W. Ferguson, Northwestern University; Robert A. Rasch, Jr., Battle Command Battle Lab (BCBL); William Turmel and Kenneth D. Forbus, Northwestern University*

TV Content Recommender System / 1121

*Srinivas Gutta, Kaushal Kurapati, KP Lee, Jacquelyn Martino, John Milanski, J. David Schaffer, and John Zimmerman, Philips Research*

The Chimaera Ontology Environment / 1123

*Deborah L. McGuinness and Richard Fikes, Stanford University; James Rice, CommerceOne; Steve Wilder, Stanford University*

Matchmaking to Support Intelligent Agents for Portfolio Management / 1125

*Massimo Paolucci, Zhendong Niu, Katia Sycara, Constantine Domashnev, Sean Owens, and Martin Van Velsen, Carnegie Mellon University*

Adaptive User Interfaces through Dynamic Design Automation / 1127

*Robin R. Penner and Erik S. Steinmetz, University of Minnesota; Christopher L. Johnson, Honeywell Technology Center*

User Interface Softbots / 1129

*Robert St. Amant and Luke S. Zettlemoyer, North Carolina State University*

O-Plan: A Web-Based AI Planning Agent / 1131  
*Austin Tate, Jeff Dalton, and John Levine, The University of Edinburgh*

Customer Coalitions in the Electronic Marketplace / 1133  
*M. Tsvetovat, K. Sycara, Y. Chen, and J. Ying, Carnegie Mellon University*

Non-Axiomatic Reasoning System (Version 4.1) / 1135  
*Pei Wang, Intelligenesis Corporation and Indiana University*

Untangle: A New Ontology for Card Catalog Systems / 1137  
*Christopher Welty and Jessica Jenkins, Vassar College*

## Robot Competition and Exhibition

Symbol Recognition and Artificial Emotion for Making an Autonomous Robot Attend the AAAI Conference / 1140  
*François Michaud, Dominic Létourneau, Jonathan Audet, and François Bélanger, Université de Sherbrooke*

The Blue Swarm / 1142  
*Dan Stormont, Utah State University*

## Invited Talks

Decision Making under Uncertainty: Operations Research Meets AI (Again) / 1145  
*Craig Boutilier, University of Toronto*

Why Do We Need a Body Anyway? / 1151  
*Justine Cassell, MIT Media Lab*

Structure, Duality, and Randomization: Common Themes in AI and OR / 1152  
*Carla P. Gomes, Cornell University*

Modeling High-Dimensional Data by Combining Simple Experts / 1159  
*Geoffrey E. Hinton, University College London*

Recent Progress in the Design and Analysis of Admissible Heuristic Functions / 1165  
*Richard E. Korf, University of California, Los Angeles*

Human-Level AI's Killer Application: Interactive Computer Games / 1171  
*John E. Laird and Michael van Lent, University of Michigan*

The Games Computers (and People) Play / 1179  
*Jonathan Schaeffer, University of Alberta*

Conceptual Indexing: Practical Large-Scale AI for Efficient Information Access / 1180  
*William A. Woods, Sun Microsystems Laboratories*

Index / 1186