

**11th International Conference
on Autonomous Agents and
Multiagent Systems 2012
(AAMAS 2012)**

Innovative Applications Track

**Valencia, Spain
4-8 June 2012**

Volume 1 of 2

ISBN: 978-1-62748-156-4

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2012) by the International Foundation for Autonomous Agents and Multiagent Systems
All rights reserved.

Printed by Curran Associates, Inc. (2013)

For permission requests, please contact IFAAMAS
at the address below.

info@ifaamas.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

Volume 1

SESSION 1A – INNOVATIVE APPLICATIONS

PROTECT: A Deployed Game Theoretic System to Protect the Ports of the United States	1
<i>Eric Shieh, Bo An, Rong Yang, Milind Tambe, Craig Baldwin, Joseph Direnzo, Ben Maule, Garrett Meyer</i>	
SAVES: A Sustainable Multiagent Application to Conserve Building Energy Considering Occupants	9
<i>Jun-Young Kwak, Pradeep Varakantham, Rajiv Maheswaran, Milind Tambe, Farrokh Jazizadeh, Geoffrey Kavulya, Laura Klein, Burcin Becerik-Gerber, Timothy Hayes, Wendy Wood</i>	
Active Malware Analysis using Stochastic Games	17
<i>Simon Williamson, Pradeep Varakantham, Debin Gao, Ong Chen Hui</i>	
Agents vs. Pirates: Multi-agent Simulation and Optimization to Fight Maritime Piracy	25
<i>Michal Jakob, Ondrej Vanek, Ondrej Hrstka, Michal Pechoucek</i>	
Improving Building Energy Efficiency with a Network of Sensing, Learning and Prediction Agents	33
<i>Sunil Mamidi, Yu-Han Chang, Rajiv Maheswaran</i>	

SESSION 1B – TEAMWORK I

Coordination Guided Reinforcement Learning	41
<i>Qiangfeng Peter Lau, Mong Li Lee, Wynne Hsu</i>	
On Coalition Formation with Sparse Synergies	49
<i>Thomas Voice, Sarvapali Ramchurn, Nick Jennings</i>	
Decentralised Channel Allocation and Information Sharing for Teams of Cooperative Agents	57
<i>Sebastian Stein, Simon Williamson, Nick Jennings</i>	
A New Approach to Betweenness Centrality Based on the Shapley Value	65
<i>Piotr Szczepanski, Tomasz Michalak, Talal Rahwan</i>	
Maintaining Team Coherence under the Velocity Obstacle Framework	73
<i>Andrew Kimmel, Andrew Dobson, Kostas Bekris</i>	

SESSION 1C – LEARNING I

V-MAX: Tempered Optimism for Better PAC Reinforcement Learning	81
<i>Karun Rao, Shimon Whiteson</i>	
Reinforcement Learning Transfer via Sparse Coding	89
<i>Haitham Bou Ammar, Karl Tuyls, Matthew Taylor, Kurt Driessen, Gerhard Weiss</i>	
Learning in a Small World	97
<i>Arun Tejasvi Chaganty, Prateek Gaur, Balaraman Ravindran</i>	
Just Add Pepper: Extending Learning Algorithms for Repeated Matrix Games to Repeated Markov Games	104
<i>Jacob Crandall</i>	
Strong Mitigation: Nesting Search for Good Policies Within Search for Good Reward	112
<i>Jeshua Bratman, Satinder Singh, Richard Lewis, Jonathan Sorg</i>	

SESSION 1D – SOCIAL CHOICE I

Strategyproof Approximations of Distance Rationalizable Voting Rules	120
<i>Travis Service, Julie Adams</i>	
Campaigns for Lazy Voters: Truncated Ballots	128
<i>Dorothea Baumeister, Piotr Faliszewski, Jérôme Lang, Jörg Rothe</i>	
Possible and Necessary Winners of Partial Tournaments	136
<i>Haris Aziz, Markus Brill, Felix Fischer, Paul Harrenstein, Jérôme Lang, Hans Georg Seedig</i>	
Communication Complexity of Approximating Voting Rules	144
<i>Travis Service, Julie Adams</i>	

SESSION 1E – GAME THEORY I

Existence of Stability in Hedonic Coalition Formation Games	152
<i>Haris Aziz, Florian Brandl</i>	
Stability Scores: Measuring Coalitional Stability	160
<i>Michal Feldman, Reshef Meir, Moshe Tennenholtz</i>	
Coalitional Stability in Structured Environments	168
<i>Georgios Chalkiadakis, Vangelis Markakis, Nick Jennings</i>	
Overlapping Coalition Formation Games: Charting the Tractability Frontier	176
<i>Yair Zick, Georgios Chalkiadakis, Edith Elkind</i>	
Handling Negative Value Rules in MC-net-based Coalition Structure Generation	184
<i>Suguru Ueda, Takato Hasegawa, Naoyuki Hashimoto, Naoki Ohta, Atsushi Iwasaki, Makoto Yokoo</i>	

SESSION 1F – PLANNING

Probabilistic Planning with Non-Linear Utility Functions and Worst-Case Guarantees	192
<i>Stefano Ermon, Carla Gomes, Bart Selman, Alexander Vladimirov</i>	
Heuristic Search of Multiagent Influence Space	200
<i>Stefan Witwicki, Frans Oliehoek, Leslie Kaelbling</i>	
A Hierarchical Goal-Based Formalism and Algorithm for Single-Agent Planning	208
<i>Vikas Shivashankar, Ugur Kuter, Dana Nau, Ron Alford</i>	
DiscoverHistory: Understanding the Past in Planning and Execution	216
<i>Matthew Molineaux, Ugur Kuter, Matthew Klenk</i>	
Time Bounded Adaptive A*	224
<i>Carlos Hernández, Jorge Baier, Tansel Uras, Sven Koenig</i>	

SESSION 2A – VIRTUAL AGENTS

Bayesian Model of the Social Effects of Emotion in Decision-Making in Multiagent Systems	232
<i>Celso De Melo, Peter Carnevale, Stephen Read, Dimitrios Antos, Jonathan Gratch</i>	
Towards Building a Virtual Counselor: Modeling Nonverbal Behavior during Intimate Self-Disclosure	240
<i>Sin-Hwa Kang, Jonathan Gratch, Candy Sidner, Ron Artstein, Lixing Huang, Louis-Phillippe Morency</i>	
A Sequential Recommendation Approach for Interactive Personalized Story Generation	248
<i>Hong Yu, Mark Riedl</i>	
Evaluating the Models & Behaviour of 3D Intelligent Virtual Animals in a Predator-Prey Relationship	256
<i>Deborah Richards, Michael J. Jacobson, John Porte, Charlotte Taylor, Meredith Taylor, Anne Newstead, Iwan Kelaiah, Nader Hanna</i>	
Model of the Perception of Smiling Virtual Character	264
<i>Magalie Ochs, Catherine Pelachaud</i>	

SESSION 2B – DISTRIBUTED PROBLEM SOLVING

Stochastic Dominance in Stochastic DCOPs for Risk Sensitive Applications	272
<i>Duc Thien Nguyen, William Yeoh, Hoong Chuin Lau</i>	
Max/Min-sum Distributed Constraint Optimization through Value Propagation on an Alternating DAG	280
<i>Roie Zivan, Hilla Peled</i>	
Improving BnB-ADOPT+-AC	288
<i>Patricia Gutierrez, Pedro Meseguer</i>	
Optimal Decentralised Dispatch of Embedded Generation in the Smart Grid	296
<i>Sam Miller, Sarvapali Ramchurn, Alex Rogers</i>	
DCOPs and Bandits: Exploration and Exploitation in Decentralised Coordination	304
<i>Ruben Stranders, Long Tran-Thanh, Francesco Maria Delle Fave, Alex Rogers, Nick Jennings</i>	

SESSION 2C – LEARNING II

Decentralized Bayesian Reinforcement Learning for Online Agent Collaboration	312
<i>Luke Teacy, Georgios Chalkiadakis, Alessandro Farinelli, Alex Rogers, Nick Jennings, Sally McClean, Gerard Parr</i>	
Shaping Fitness Functions for Coevolving Cooperative Multiagent Systems	320
<i>Mitchell Colby, Kagan Tumer</i>	
Dynamic Potential-Based Reward Shaping	328
<i>Sam Devlin, Daniel Kudenko</i>	
Learning and Predicting Dynamic Networked Behavior with Graphical Multiagent Models	336
<i>Quang Duong, Michael Wellman, Satinder Singh, Michael Kearns</i>	

SESSION 2D – SOCIAL CHOICE II

Lot-based Voting Rules	344
<i>Toby Walsh, Lirong Xia</i>	
Convergence of Iterative Voting	352
<i>Omer Lev, Jeffrey Rosenschein</i>	
Optimal Manipulation of Voting Rules	360
<i>Svetlana Obraztsova, Edith Elkind</i>	
Manipulation Under Voting Rule Uncertainty	368
<i>Edith Elkind, Gábor Erdélyi</i>	
Voter Response to Iterated Poll Information	376
<i>Annemieke Reijngoud, Ulle Endriss</i>	

SESSION 2E – GAME THEORY II

Short Sight in Extensive Games	384
<i>Davide Grossi, Paolo Turrini</i>	
New Results on the Verification of Nash Refinements for Extensive-Form Games	392
<i>Nicola Gatti, Fabio Panozzo</i>	
Playing Repeated Stackelberg Games with Unknown Opponents	400
<i>Janusz Marecki, Gerry Tesauro, Richard Segal</i>	
Repeated Zero-Sum Games with Budget	408
<i>Troels Sørensen</i>	
Efficient Nash Equilibrium Approximation through Monte Carlo Counterfactual Regret Minimization	416
<i>Michael Johanson, Nolan Bard, Marc Lanctot, Richard Gibson, Michael Bowling</i>	

SESSION 2F – KNOWLEDGE REPRESENTATION & REASONING

Memory Formation, Consolidation, and Forgetting in Learning Agents	424
<i>Budhitama Subagdja, Wenwen Wang, Ah-Hwee Tan, Yuan-Sin Tan, Loo-Nin Teow</i>	
Improved Use of Partial Policies for Identifying Behavioral Equivalence	432
<i>Yifeng Zeng, Yinghui Pan, Hua Mao, Jian Luo</i>	
Learning and Reasoning about Norms using Neural-Symbolic Systems	440
<i>Guido Boella, Silvano Colombo Tosatto, Artur D'Avila Garcez, Valerio Genovese, Perotti Alan, Leendert Van Der Torre</i>	
On Supervising Agents in Situation-Determined ConGolog	448
<i>Giuseppe De Giacomo, Yves Lespérance, Christian Muise</i>	
Generalized and Bounded Policy Iteration for Finitely-Nested Interactive POMDPs: Scaling Up	456
<i>Ekhlas Sonu, Prashant Doshi</i>	

SESSION 3A – ROBOTICS I

Supervised Morphogenesis - Morphology Control of Ground-based Self-Assembling Robots by Aerial Robots	464
<i>Nithin Mathews, Alessandro Stranieri, Alexander Scheidler, Marco Dorigo</i>	

Decentralized Active Robotic Exploration and Mapping for Probabilistic Field Classification in Environmental Sensing	472
<i>Kian Hsiang Low, Jie Chen, John Dolan, Steve Chien, David Thompson</i>	
Robot Exploration with Fast Frontier Detection: Theory and Experiments	480
<i>Matan Keidar, Gal Kaminka</i>	
Dynamic Reconfiguration in Modular Robots using Graph Partitioning-based Coalitions	488
<i>Prithviraj Dasgupta, Vladimir Ufimtsev, Carl Nelson, S. G. M. Hossain</i>	
UT Austin Villa 2011: A Champion Agent in the RoboCup 3D Soccer Simulation Competition	496
<i>Patrick Macalpine, Daniel Urieli, Samuel Barrett, Shivaram Kalyanakrishnan, Francisco Barrera, Adrian Lopez-Mobilia, Nicolae Sturcea, Victor Vu, Peter Stone</i>	

SESSION 3C – HUMAN-AGENT INTERACTION

A Cultural Sensitive Agent for Human-Computer Negotiation	504
<i>Galit Haim, Ya'akov (Kobi) Gal, Sarit Kraus, Michele Gelfand</i>	
Giving Advice to People in Path Selection Problems	512
<i>Amos Azaria, Zinovi Rabinovich, Sarit Kraus, Claudia Goldman, Omer Tsimhoni</i>	
Combining Human and Machine Intelligence in Large-scale Crowdsourcing	520
<i>Ece Kamar, Severin Hacker, Eric Horvitz</i>	
Reinforcement Learning from Simultaneous Human and MDP Reward	528
<i>W. Bradley Knox, Peter Stone</i>	
Automatic Task Decomposition and State Abstraction from Demonstration	536
<i>Luis C. Cobo, Charles L. Isbell Jr., Andrea Thomaz</i>	

Volume 2

SESSION 3D – ECONOMIES & MARKETS I

Rational Market Making with Probabilistic Knowledge	544
<i>Abraham Othman, Tuomas Sandholm</i>	
Can a Zero-Intelligence Plus Model Explain the Stylized Facts of Financial Time Series Data?	552
<i>Imon Palit, Steve Phelps, Wing Lon Ng</i>	
A Scoring Rule-based Mechanism for Aggregate Demand Prediction in the Smart Grid	560
<i>Harry Rose, Alex Rogers, Enrico Gerding</i>	
A Model-Based Online Mechanism with Pre-Commitment and its Application to Electric Vehicle Charging	568
<i>Sebastian Stein, Enrico Gerding, Valentin Robu, Nick Jennings</i>	
Efficient Crowdsourcing Contests	576
<i>Ruggiero Cavallo, Shaili Jain</i>	

SESSION 3E – GAME THEORY III

Computing Optimal Strategy against Quantal Response in Security Games	584
<i>Rong Yang, Fernando Ordóñez, Milind Tambe</i>	
A Unified Method for Handling Discrete and Continuous Uncertainty in Bayesian Stackelberg Games	592
<i>Zhengyu Yin, Milind Tambe</i>	
Multi-Objective Optimization for Security Games	600
<i>Matthew Brown, Bo An, Christopher Kiekintveld, Fernando Ordóñez, Milind Tambe</i>	
Strategy Purification and Thresholding: Effective Non-Equilibrium Approaches for Playing Large Games	608
<i>Sam Ganzfried, Tuomas Sandholm, Kevin Waugh</i>	
Solving Non-Zero Sum Multiagent Network Flow Security Games with Attack Costs	616
<i>Steven Okamoto, Noam Hazan, Katia Sycara</i>	

SESSION 3F – AGENT-BASED SOFTWARE DEVELOPMENT

Measuring Plan Coverage and Overlap for Agent Reasoning	624
<i>John Thangarajah, Sebastian Sardina, Lin Padgham</i>	

Programming Norm-Aware Agents	632
<i>Natasha Alechina, Mehdi Dastani, Brian Logan</i>	
Metamodel-Based Metrics for Agent-Oriented Methodologies	640
<i>Noélie Bonjean, Antonio Chella, Massimo Cossentino, Marie-Pierre Gleizes, Frédéric Migeon, Valeria Seidita</i>	
Comma: A Commitment-Based Business Modeling Methodology and its Empirical Evaluation	648
<i>Pankaj Telang, Munindar Singh</i>	
Revising Conflicting Intention Sets in BDI Agents	656
<i>Steven Shapiro, Sebastian Sardina, John Thangarajah, Lawrence Cavedon, Lin Padgham</i>	

SESSION 4A – ROBOTICS II

Property-driven Design for Swarm Robotics	664
<i>Manuele Brambilla, Carlo Pinciroli, Mauro Birattari, Marco Dorigo</i>	
Multi-robot Collision Avoidance with Localization Uncertainty	672
<i>Daniel Hennes, Daniel Claes, Wim Meeussen, Karl Tuyls</i>	
Decision-Theoretic Approach to Maximizing Observation of Multiple Targets in Multi-Camera Surveillance	680
<i>Prabhu Natarajan, Trong Nghia Hoang, Kian Hsiang Low, Mohan Kankanhalli</i>	
Segregation in Swarms of e-puck Robots Based On the Brazil Nut Effect	688
<i>Jianing Chen, Melvin Gauci, Michael J. Price, Roderich Groß</i>	
Model-Driven Behavior Specification for Robotic Teams	696
<i>Alexandros Paraschos, Nikolaos Spanoudakis, Michail Lagoudakis</i>	

SESSION 4B – AGENT SOCIETIES

A Multiagent Evolutionary Framework based on Trust for Multiobjective Optimization	704
<i>Siwei Jiang, Jie Zhang, Yew-Soon Ong</i>	
A Qualitative Reputation System for Multiagent Systems with Protocol-based Communication	712
<i>Emilio Serrano, Michael Rovatsos, Juan Botia</i>	
PRep: A Probabilistic Reputation Model for Biased Societies	720
<i>Yasaman Haghpanah, Marie Desjardins</i>	
A Decision-Theoretic Characterization of Organizational Influences	728
<i>Jason Sleight, Ed Durfee</i>	
Reasoning under Compliance Assumptions in Normative Multiagent Systems	736
<i>Max Knobbout, Mehdi Dastani</i>	

SESSION 4C – ARGUMENTATION & NEGOTIATION

Quantifying Disagreement in Argument-based Reasoning	744
<i>Richard Booth, Martin Caminada, Mikolaj Mikolaj, Iyad Rahwan</i>	
Cooperative Dialogues with Conditional Arguments	752
<i>Samy Sá, João Alcântara</i>	
Defeasible Argumentation for Multi-Agent Planning in Ambient Intelligence Applications	760
<i>Sergio Pajares Ferrando, Eva Onaindia</i>	
Personalizing Communication about Trust	768
<i>Andrew Koster, Jordi Sabater-Mir, Marco Schorlemmer</i>	
From Axiomatic to Strategic Models of Bargaining with Logical Beliefs and Goals	776
<i>Bao Vo, Minyi Li</i>	

SESSION 4D – ECONOMIES & MARKETS II

Identifying Influential Agents for Advertising in Multi-agent Markets	784
<i>Mahsa Maghami, Gita Sukthankar</i>	
Predicting Your Own Effort	792
<i>David F. Bacon, Yiling Chen, Ian Kash, David Parkes, Malvika Rao, Manu Sridharan</i>	
Optimal Incentive Timing Strategies for Product Marketing on Social Networks	800
<i>Pankaj Dayama, Aditya Karnik, Yadati Narahari</i>	
Optimizing Kidney Exchange with Transplant Chains: Theory and Reality	808
<i>John Dickerson, Ariel Procaccia, Tuomas Sandholm</i>	

Fair Allocation Without Trade	816
<i>Avital Gutman, Noam Nisan</i>	

SESSION 4E – GAME THEORY IV

Task Routing for Prediction Tasks	824
<i>Haoqi Zhang, Eric Horvitz, Yiling Chen, David Parkes</i>	
Mastering Multi-player Games	832
<i>Yossi Azar, Uriel Feige, Michal Feldman, Moshe Tennenholtz</i>	
Game-theoretic Resource Allocation for Malicious Packet Detection in Computer Networks	840
<i>Ondrej Vanek, Zhengyu Yin, Manish Jain, Branislav Bošanský, Milind Tambe, Michal Pechoucek</i>	
Sustaining Cooperation on Networks: An Analytical Study based on Evolutionary Game Theory	848
<i>Raghunandan Ananthasayanam, Subramanian Chandrasekarapuram</i>	
Behavioral Game Theoretic Models: A Bayesian Framework For Parameter Analysis	856
<i>James Wright, Kevin Leyton-Brown</i>	

SESSION 4F – LOGICS FOR AGENCY

Action Models for Knowledge and Awareness	864
<i>Hans Van Ditmarsch, Tim French, Fernando R. Velázquez-Quesada</i>	
Epistemic Coalition Logic: Completeness and Complexity	872
<i>Thomas Ågotnes, Natasha Alechina</i>	
Group Synthesis for Parametric Temporal-Epistemic Logic	880
<i>Andrew Jones, Michal Knapik, Alessio Lomuscio, Wojciech Penczek</i>	
A Logic of Revelation and Concealment	888
<i>Wiebe Van Der Hoek, Petar Iliev, Michael Wooldridge</i>	
State and Path Coalition Effectivity Models for Logics of Multi-Player Games	896
<i>Valentin Goranko, Wojciech Jamroga</i>	

SESSION 5A – ROBOTICS III

Active Visual Sensing and Collaboration on Mobile Robots using Hierarchical POMDPs	904
<i>Shiqi Zhang, Mohan Sridharan</i>	
What Am I Doing? Automatic Construction of an Agent's State-transition Diagram Through Introspection	912
<i>Constantin Berzan, Matthias Scheutz</i>	
Learning from Demonstration with Swarm Hierarchies	920
<i>Keith Sullivan, Sean Luke</i>	
Autonomous Robot Dancing Driven by Beats and Emotions of Music	928
<i>Guangyu Xia, Junyun Tay, Roger Dannenberg, Manuela Veloso</i>	

SESSION 5B – TEAMWORK II

Leading Ad Hoc Agents in Joint Action Settings with Multiple Teammates	936
<i>Noa Agmon, Peter Stone</i>	
Comparative Evaluation of MAL Algorithms in a Diverse Set of Ad Hoc Team Problems	944
<i>Stefano Albrecht, Subramanian Ramamoorthy</i>	
An Analysis Framework for Ad Hoc Teamwork Tasks	952
<i>Samuel Barrett, Peter Stone</i>	
Modeling and Learning Synergy for Team Formation with Heterogeneous Agents	960
<i>Somchaya Liemhetcharat, Manuela Veloso</i>	

SESSION 5C – EMERGENCE

Crowd IQ - Aggregating Opinions to Boost Performance	968
<i>Yoram Bachrach, Thore Graepel, Gjergji Kasneci, Michal Kosinski, Jurgen Van-Gael</i>	
Efficient Opinion Sharing in Large Decentralised Teams	976
<i>Oleksandr Prymak, Alex Rogers, Nick Jennings</i>	

Agents of Influence in Social Networks	984
<i>Amer Ghanem, Srinivasa Vedanarayanan, Ali Minai</i>	
The Emergence of Commitments and Cooperation	992
<i>The Anh Han, Luís Moniz Pereira, Francisco C. Santos</i>	

SESSION 5D – AUCTION & MECHANISM DESIGN

Mixed-bundling Auctions with Reserve Prices	1000
<i>Pingzhong Tang, Tuomas Sandholm</i>	
Eliciting Forecasts from Self-interested Experts: Scoring Rules for Decision Makers	1008
<i>Craig Boutilier</i>	
Worst-Case Optimal Redistribution of VCG Payments in Heterogeneous-Item Auctions with Unit Demand	1016
<i>Mingyu Guo</i>	
False-name-proofness in Online Mechanisms	1024
<i>Taiki Todo, Takayuki Mouri, Atsushi Iwasaki, Makoto Yokoo</i>	

SESSION 5E – GAME & AGENT THEORIES

Scaling Simulation-Based Game Analysis through Deviation-Preserving Reduction	1032
<i>Bryce Wiedenbeck, Michael Wellman</i>	
Towards Tractable Boolean Games	1040
<i>Paul Dunne, Michael Wooldridge</i>	
A Framework for Modeling Population Strategies by Depth of Reasoning	1048
<i>Michael Wunder, Michael Kaisers, John Robert Yaros, Michael Littman</i>	
Detection of Suspicious Behavior from a Sparse Set of Multiagent Interactions	1056
<i>Boštjan Kaluža, Gal Kaminka, Milind Tambe</i>	

SESSION 5F – LOGIC AND VERIFICATION

A Logic of Emotions: from Appraisal to Coping	1064
<i>Mehdi Dastani, Emiliano Lorini</i>	
Automatic Verification of Epistemic Specifications under Convergent Equational Theories	1072
<i>Ioana Boureau, Andrew Jones, Alessio Lomuscio</i>	
Semantics and Verification of Information-Based Protocols	1080
<i>Munindar Singh</i>	
Author Index	