

21st International Conference on Automated Planning and Scheduling

Conference Program

June 11-16, 2011 Freiburg, Germany



Adventium Labs



ATRiCS Advanced Traffic Solutions



Robert Bosch GmbH



European Coordinating Committee for Artificial Intelligence (ECCAI)



Artificial Intelligence Journal



David E. Smith



Deutsche Forschungs-



European Office of Aerospace Research & Development

IBM Research



European Space Agency (ESA)



Florida Institute for Human & Machine Cognition

gemeinschaft (DFG) A



SICK AG

SIFT





Institute for Computational Sustainability (ICS)



National ICT Australia Limited



National Science Foundation (NSF)



Reaching Into The Future Of Robotics

TRACLabs Inc.



University of Freiburg

VENUE OF SATELLITE EVENTS



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The satellite program (doctorial consortium, workshops and tutorials) will be hosted at

Building 101 Computer Science Campus Georges-Köhler-Allee 101 79110 Freiburg



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ORGANIZING COMMITTEE

Conference Chairs

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Jeremy Frank (NASA Ames Research Center, USA) Bernhard Nebel (University of Freiburg, Germany)

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LOCAL SUPPORT

kongress & kommunikation gGmbH Katja Lemke

Volunteers

Yusra Alkhazraji Manuela Ortlieb Silvan Sievers Tiago Stegun Vaquero

ICAPS 2011 Awards

Best Paper Award

Automatic Construction of Efficient Multiple Battery Usage Policies Maria Fox, Derek Long, Daniele Magazzeni

Best Student Paper Award

Planning to Perceive: Exploiting Mobility For Robust Object Detection Javier Velez, Garrett Hemann, Albert S. Huang, Ingmar Posner, Nicholas Roy

Computing All-Pairs Shortest Paths by Leveraging Low Treewidth Léon Planken, Mathijs de Weerdt, Roman van der Krogt (Honorable Mention)

Trade-Offs in Sampling-Based Adversarial Planning Raghuram Ramanujan, Bart Selman (Honorable Mention)

Influential Paper Award

Algorithms for Propagating Resource Constraints in Al Planning and Scheduling: Existing Approaches and New Results Philippe Laborie, ECP 2001

Best Dissertation Award

Implicit Abstraction Heuristics for Cost-Optimal Planning Michael Katz

Effective Search Techniques for Non-Classical Planning via Reformulation Jorge Baier (Honorable Mention)

Foundations and Applications of Generalized Planning Siddharth Srivastava (Honorable Mention)

Jason D. Williams Spoken Dialog Systems as an Application of Planning under Uncertainty

Tuesday, June 14, 2011, 09:00-10:00

Abstract: Spoken dialog systems present a classic example of planning under uncertainty. In a spoken dialog system, a computer is trying to help a person accomplish something, using spoken language as the communication medium. A key challenge is that speech recognition errors are ubiquitous and impossible to detect reliably, so the state of the conversation can never be known with certainty. Another challenge is that people do not behave deterministically. Despite these challenges, the system must choose actions to make progress to a long term goal. As such, decision theory presents an attractive approach to building spoken dialog systems. Initial work on "toy" dialog systems validated benefits, but also found that straightforward formulations could not scale to real-world problems. Subsequent work by a number of research teams has shown how to scale to industrial-scale systems, how to incorporate high-fidelity user simulations, and how to synthesize commercial development practices with automatic optimization. This talk traces the evolution of this application of planning under uncertainty, comments on progress toward use in industry, and suggests future avenues of research relevant to researchers interested in planning under uncertainty.

Bio: Jason Williams is Principal Member of Technical Staff at AT&T Labs - Research. His research interests include spoken dialog systems, planning under uncertainty, spoken language understanding, and speech recognition. He is on the Scientific Committee of SigDial (the Special Interest Group on Dialog and Discourse), is an elected member of the IEEE Speech and Language Technical Committee (SLTC), and is on the board of directors of the Association for Voice Interaction Design (AVIxD). Jason holds a PhD and Masters in Speech and Language Processing from Cambridge University (UK), and a BSE in Electrical Engineering from Princeton University (USA). Before joining AT&T Labs, he held positions in industry where he built spoken dialog systems which have since fielded millions of phone calls.

Pascal Van Hentenryck Last-Mile Disaster Preparedness and Recovery

Wednesday, June 15, 2011, 09:00-10:00

Abstract: Every year, natural disasters cause infrastructure damages and power outages that have considerable impacts on both quality of life and economic welfare. Mitigating the effects of disasters is an important but challenging task, given the underlying uncertainty, the need for fast response, and the complexity and scale of the infrastructures involved, not to mention the social and policy issues. This talk describes how to use planning and scheduling technologies to address these challenges in a rigorous and principled way. In particular, we present the first optimization solutions to last-mile disaster preparedness and recovery for a single commodity (e.g., water) and for the electrical power network. The optimization algorithms were compared to existing practice on disaster scenarios based on the U.S. infrastructure (at the state scale) and generated by state-of-theart hurricane simulation tools. Some of our algorithms are deployed as part of the Los Alamos National Laboratories operational tools and provide recommendations to the U.S. Department of Homeland Security.

Bio: Pascal Van Hentenryck is a Professor of Computer Science at Brown University. He is a fellow of the Association for the Advancement of Artificial Intelligence, the recipient of the 2002 ICS INFORMS award, the 2006 ACP Award, an honorary degree from the University of Louvain, and the Philip J. Bray award for teaching excellence. He is the author of five MIT Press books and most of his research in optimization software systems has been commercialized and is widely used in academia and industry.

Michael P. Wellman Empirical Game-Theoretic Analysis and the Behavior of Software Agents

Thursday, June 16, 2011, 09:00-10:00

Abstract: The games agents play – in markets, conflicts, or most other contexts – often defy strict game-theoretic analysis. Games may be unmanageably large (combinatorial or infinite state or action spaces), and present severely imperfect information, which could be further complicated by partial dynamic revelation. Moreover, the game may be specified procedurally, for instance by a simulator, rather than in an explicit game form.

With colleagues and students over the past few years, I have been developing a body of techniques for strategic analysis, adopting the gametheoretic framework but employing it in domains where direct "model-and-solve" cannot apply. This empirical game-theoretic methodology embraces simulation, approximation, statistics and learning, and search. Through applications to canonical auction games, and rich trading scenarios, we demonstrate the value of empirical methods for extending the scope of game-theoretic analysis. This perspective also sheds insight into behavioral models and bases for predicting joint action in complex multiagent scenarios. Bio: Michael P. Wellman is Professor of Computer Science & Engineering at the University of Michigan. He received a PhD from the Massachusetts Institute of Technology in 1988 for his work in gualitative probabilistic reasoning and decision-theoretic planning. From 1988 to 1992, Wellman conducted research in these areas at the USAF's Wright Laboratory. For the past 18+ years, his research has focused on computational market mechanisms for distributed decision making and electronic commerce. As Chief Market Technologist for TradingDynamics, Inc. (now part of Ariba), he designed configurable auction technology for dynamic business-to-business commerce. Wellman previously served as Chair of the ACM Special Interest Group on Electronic Commerce (SIGecom), and as Executive Editor of the Journal of Artificial Intelligence Research. He is a Fellow of the Association for the Advancement of Artificial Intelligence and the Association for Computing Machinery.

WORKSHOPS

Sunday, June 12, 2011

| Heuristics for Domain-independent Planning (HDIP) Hall 101-00-026 | 7 |
|--|----|
| Knowledge Engineering for Planning and Scheduling (KEPS) Hall 101-00-036 | 8 |
| Monte-Carlo Tree Search: Theory and Applications (MCTS) Hall 101-00-010/014 | 10 |
| Goal, Activity and Plan Recognition (GAPRec) Hall 101-01-009/013 | 11 |

Monday, June 13, 2011

| Planning and Learning (PAL) Hall 101-00-026 | 12 |
|--|----|
| Constraint Satisfaction Techniques for Planning and Scheduling Problems (COPLAS) Hall 101-00-010/014 | 13 |
| Scheduling and Planning Applications woRKshop (SPARK) Hall 101-00-036 | 14 |
| Verification and Validation of Planning and Scheduling Systems (VVPS) Hall 101-01-009/013 | 16 |

All workshops are held in building 101 on the computer science campus.

Heuristics for Domain-independent Planning (HDIP)

Organizers: Alan Fern, Patrik Haslum, Jörg Hoffmann, Michael Katz **Date and Location:** June 12, 2011, Hall 101-00-026 Computer Science Campus

| 08:50-09:00 | Welcome |
|-------------|---|
| | Heuristics I |
| 09:00-09:30 | Heuristics with Choice Variables: Bridging the Gap between Planning and Graphical Models Emil Keyder, Miquel Ramirez, Hector Geffner |
| 09:30-10:00 | Landmark-Aware Strategies for Hierarchical Planning Mohamed Elkawkagy, Pascal Bercher, Bernd Schattenberg, Susanne Biundo |
| 10:00-10:30 | Computing Perfect Heuristics in Polynomial Time: On Bisimulation and Merge-and-Shrink Abstractions in Optimal Planning Raz Nissim, Jörg Hoffmann, Malte Helmert |
| | Coffee Break |
| | Heuristics II |
| 11:00-11:30 | Incremental Lower Bounds for Additive Cost Planning Problems Patrik Haslum, John Slaney, Sylvie Thiebaux |
| 11:30-12:30 | Invited Talk: Learning Search Heuristics Alan Fern |
| | Lunch Break |
| | Search I |
| 14:00-14:30 | Living on the Edge: Safe Search with Unsafe Heuristics Erez Karpas, Carmel Domshlak |
| 14:30-15:00 | Enhancing Search for Satisficing Temporal Planning with Objective-driven Decisions J. Benton, Patrick Eyerich, Subbarao Kambhampati |
| 15:00-15:30 | Cost Based Satisficing Search Considered Harmful William Cushing, J. Benton, Subbarao Kambhampati |
| | Coffee Break |
| | Search II |
| 16:00-16:30 | Planning with SAT, Admissible Heuristics and A* Jussi Rintanen |
| 16:30-17:00 | Exploiting Problem Symmetries in State-Based Planners Nir Pochter, Aviv Zohar, Jeffrey Rosenschein |
| 17:00-17:30 | On Satisficing Planning with Admissible Heuristics Roei Bahumi, Carmel Domshlak, Michael Katz |

Knowledge Engineering for Planning and Scheduling (KEPS)

Organizers: Roman Barták, Simone Fratini, Lee McCluskey, Tiago Stegun Vaquero **Date and Location:** June 12, 2011, Hall 101-00-036 Computer Science Campus

| 09:00-09:15 | Welcome |
|-------------|---|
| | Oral Presentations |
| 09:15-09:40 | A Brief Review of Tools and Methods for Knowledge Engineering for Planning & Scheduling Tiago Stegun Vaquero, José Reinaldo Silva, J. Christopher Beck |
| 09:40-10:05 | Acquisition and Re-use of Plan Evaluation Rationales on Post-Design Tiago Stegun Vaquero, José Reinaldo Silva, J. Christopher Beck |
| 10:05-10:30 | The Challenge of Grounding Planning in Simulation in an Interactive Model Development Environment Bradley J. Clement, Jeremy D. Frank, John M. Chachere, Tristan B. Smith, Keith Swanson |
| | Coffee Break |
| | Oral Presentations |
| 11:00-11:25 | Finding Mutual Exclusion Invariants in Temporal Planning Domains Sara Bernardini, David E. Smith |
| 11:25-11:50 | Using Planning Domain Features to Facilitate Knowledge Engineering Gerhard Wickler |
| 11:50-12:15 | Fluent Merging for Classical Planning Problems Jendrik Seipp, Malte Helmert |
| 12:15-12:40 | Heuristic Search-Based Planning for Graph Transformation Systems HChristian Estler, Heike Wehrheim |
| | Lunch Break |
| 14:00-15:30 | Panel Discussion — Proposal(s) for ICKEPS 2012 |
| | Coffee Break |
| 16:00-17:30 | Poster and Demo Session |

KEPS Demos

An Interactive Tool for Plan Visualization, Inspection and Generation Alfonso E. Gerevini, Alessandro Saetti

VisPlan – Interactive Visualisation and Verification of Plans Radoslav Glinský, Roman Barták

An Extended HTN Knowledge Representation Based on a Graphical Notation Francisco Palao, Juan Fdez-Olivares, Luis Castillo, Oscar García

KEPS Posters

Cooperated Integration Framework of Production Planning and Scheduling based on Order Life-cycle Management Shigeru Fujimura

Relational Approach to Knowledge Engineering for POMDP-based Assistance Systems with Encoding of a Psychological Model Marek Grzes, Jesse Hoey, Shehroz Khan, Alex Mihailidis, Stephen Czarnuch, Dan Jackson, Andrew Monk

JPDL: A Fresh Approach to Planning Domain Modelling Michael Jonas

Open-Ended Domain Model for Continual Forward Search HTN Planning Dominik Off, Jianwei Zhang

Automatic Polytime Reductions of NP Problems into a Fragment of STRIPS Aldo Porco, Alejandro Machado, Blai Bonet

Taking Advantage of Domain Knowledge in Optimal Hierarchical Deepening Search Planning Pascal Schmidt, Florent Teichteil-Königsbuch, Patrick Fabiani

A Conceptual Framework for Post-Design Analysis in Al Planning Applications Tiago Stegun Vaquero, José Reinaldo Silva, J. Christopher Beck

Monte-Carlo Tree Search: Theory and Applications (MCTS)

Organizers: Chris Mansley, Alan Fern, Michael Littman, Sergiu Goschin **Date and Location:** June 12, 2011, Hall 101-00-010/014 Computer Science Campus

| 09:00-09:15 | Welcome |
|-------------|---|
| | Keynote Speaker |
| 09:15-10:30 | Hierarchical Bandits for Sequential Decision Making Remi Munos |
| | Coffee Break |
| 11:00-11:30 | <i>Repeated-task Canadian Traveler Problem</i> Zahy Bnaya, Ariel Felner, Dror Fried, Solomon Eyal Shimony, Olga Maksin |
| 11:30-12:00 | On the Behavior of UCT in Synthetic Search Spaces Raghuram Ramanujan, Ashish Sabharwal, Bart Selman |
| 12:00-12:30 | Approaching Bayes-optimality using Monte-Carlo Tree Search John Asmuth, Michael Littman |
| | Lunch Break |
| 14:00-14:30 | Guiding Combinatorial Optimization with UCT Ashish Sabharwal, Horst Samulowitz |
| 14:30-14:45 | Optimistic Planning for Sparsely Stochastic Systems Lucian Busoniu, Remi Munos, Bart De Schutter, Robert Babuska |
| 14:45-15:00 | UCT-Treesplit – Parallel MCTS on Distributed Memory Lars Schaefers, Marco Platzner, Ulf Lorenz |
| 15:00-15:30 | Poster Session |
| | Coffee Break |
| 16:00-16:30 | Poster Session |
| 16:30-17:30 | Panel Discussion |

Goal, Activity and Plan Recognition (GAPRec)

Organizers: Christopher Geib, Derek Long, David Pattison **Date and Location:** June 12, 2011, Hall 101-01-009/013 Computer Science Campus

| 09:00-09:15 | Welcome |
|-------------|--|
| 09:15-09:40 | Corpus-Based Incremental Intention Recognition via Bayesian Network Model Construction Anh Han The, Luís Moniz Pereira |
| 09:40-10:05 | Towards a System Architecture for Recognizing Domestic Activity by Leveraging a Naturalistic Human Activity Model Michele Dominici, Myriam Fréjus, Julien Guibourdenche, Bastien Pietropaoli, Frédéric Weis |
| 10:05-10:30 | Accurately Determining Intermediate and Terminal Plan States Using Bayesian Goal Recognition David Pattison, Derek Long |
| | Coffee Break |
| 11:00-11:20 | Modeling the Human Operator's Cognitive Process to Enable Assistant System Decisions Ruben Strenzke |
| 11:20-11:45 | Goal Recognition over POMDPs: Inferring the Intention of a POMDP Agent Miquel Ramírez, Hector Geffner |
| 11:45-12:25 | Panel Session Are we ready for a plan recognition competition and what can be learnt from the IPC? |
| 12:25-12:30 | Wrap up |

Planning and Learning (PAL)

Organizers: Sergio Jiménez Celorrio, Erez Karpas, Subbarao Kambhampati **Date and Location:** June 13, 2011, Hall 101-00-026 Computer Science Campus

| 08:55-09:00 | Opening Remarks |
|-------------|--|
| | Parameter and Portfolio Tuning |
| 09:00-09:20 | Instance-Based Parameter Tuning and Learning for Evolutionary AI Planning Matyas Brendel, Marc Schoenauer |
| 09:20-10:00 | FD-Autotune: Domain-Specific Configuration using Fast Downward Chris Fawcett, Malte Helmert, Holger Hoos, Erez Karpas, Gabriele Röger, Jendrik Seipp + |
| | Generating Fast Domain-Specific Planners by Automatically Configuring a Generic Parameterised Planner Mauro Vallati, Chris Fawcett, Alfonso E. Gerevini, Holger H. Hoos, Alessandro Saetti |
| 10:00-10:20 | Fast Downward Stone Soup: A Baseline for Building Planner Portfolios Malte Helmert, Gabriele Röger, Erez Karpas |
| 10:20-10:30 | Discussion |
| | Coffee Break |
| | Learning for Domains |
| 11:00-11:25 | Learning Domain Control Knowledge for TLPIan and Beyond Tomas de la Rosa, Sheila McIlraith |
| 11:25-11:50 | Efficient Learning of Action Models for Planning Neville Mehta, Prasad Tadepalli, Alan Fern |
| 11:50-12:15 | <i>Reactive, Proactive, and Passive Learning about Incomplete Actions</i> Christopher Weber, Daniel Bryce |
| 12:15-12:30 | Discussion |
| | Lunch Break |
| | Innovations in Learning and Planning |
| 14:00-14:25 | Planning in Robocup-Soccer Narratives Hannaneh Hajishirzi, Eyal Amir |
| 14:25-14:50 | Cost-Based Learning for Planning Srinivas Nedunuri, William R. Cook, Douglas R. Smith |
| 14:50-15:15 | Learning and Application of High-Level Concepts with Conceptual Spaces and PDDL Richard Cubek, Wolfgang Ertel |
| 15:15-15:30 | Discussion |

Constraint Satisfaction Techniques for Planning and Scheduling Problems (COPLAS)

Organizers: Miguel A. Salido, Roman Barták, Nicola Policella **Date and Location:** June 13, 2011, Hall 101-00-010/014 Computer Science Campus

| 09:00-09:05 | Welcome |
|-------------|---|
| | Planning and SAT |
| 09:05-09:35 | Optimization of Partial-Order Plans via MAXSAT Christian Muise, Sheila McIlraith, J. Christopher Beck |
| 09:35-10:05 | Exploiting MaxSAT for Preference-Based Planning Farah Juma, Eric Hsu, Sheila McIlraith |
| 10:05-10:35 | A SAT Compilation of the Landmark Graph Vidal Alcazar, Manuela Veloso |
| | Coffee Break |
| | Scheduling and Resource Allocation |
| 11:00-11:30 | A Logic-Based Benders Approach to Scheduling with Alternative Resources and Setup Times Tony T. Tran, J. Christopher Beck |
| 11:30-12:00 | Applying Iterative Flattening Search to the Job Shop Scheduling Problem with Alternative Resources and Sequence Dependent Setup Times Angelo Oddi, Riccardo Rasconi, Amedeo Cesta, Stephen F. Smith |
| 12:00-12:30 | Solving Resource Allocation/Scheduling Problems with Constraint Integer Programming Stefan Heinz, J. Christopher Beck |
| | Lunch Break |
| | Modelling and Real-life Problems |
| 14:00-14:30 | A Constraint-based Approach for Planning and Scheduling Repeated Activities Irene Barba, Carmelo Del Valle |
| 14:30-15:00 | A CFLP Approach for Modeling an Optimization Scheduling Problem Ignacio Castiñeiras, Fernando Sáenz-Pérez |
| 15:00-15:30 | The Distance-Optimal Inter-League Schedule for Japanese Pro Baseball Richard Hoshino, Ken-ichi Kawarabayashi |

Scheduling and Planning Applications woRKshop (SPARK)

Organizers: Gabriella Cortellessa, Minh Do, Riccardo Rasconi, Neil Yorke-Smith **Date and Location:** June 13, 2011, Hall 101-00-036 Computer Science Campus

Invited Talk

Luis Castillo Vidal Lessons Learned Empowering Smart Applications with Planning Technology

Few people would disagree with the success stories of deploying real world planning applications. In this talk we describe the pitfalls we have found since we founded lActive Intelligent Technologies in 2006. IActive specializes in introducing planning technology into existing applications to give them additional decision support capabilities, with tangible and measurable added value. In this talk we discuss the "good" and "not so good" decisions from IActive's experiences.

Schedule

| 09:00-09:10 | Welcome and Introduction |
|-------------|---|
| | Invited Talk |
| 09:10-10:00 | Lessons Learned Empowering Smart Applications with Planning Technology Luis Castillo Vidal |
| | P&S Under Uncertainty & Execution |
| 10:00-10:15 | Planning and Replanning for a Constellation of Agile Earth Observation Satellites Romain Grasset-Bourdel, Gérard Verfaillie, Antoine Flipo |
| 10:15-10:30 | Opening the PANDORA-BOX: Planning and Executing Timelines in a Training Environment Amedeo Cesta, Gabriella Cortellessa, Riccardo De Benedictis, Keith Strickland |
| | Coffee Break |
| | P&S Under Uncertainty & Execution cont'd |
| 11:00-11:25 | Dynamic Management of Paratransit Vehicle Schedules Zachary Rubinstein, Stephen Smith |
| 11:25-11:50 | The Emergency Landing Planner Experiment Nicolas Meuleau, Christian Neukom, Christian Plaunt, David Smith, Tristan Smith |
| 11:50-12:15 | Scheduling a Dynamic Aircraft Repair Shop Maliheh Aramon Bajestani, J. Christopher Beck |
| 12:15-12:30 | Commentary and Discussion |
| | Lunch Break |

| 14:00-14:25 | Diagnosis As Planning: Two Case Studies Patrik Haslum, Alban Grastien |
|--|--|
| 14:25-14:40 | Computing Genome Edit Distances using Domain-Independent Planning Patrik Haslum |
| 14:40-15:05 | Planning for Human-Robot Teaming Kartik Talamadupula, Subbarao Kambhampati, Paul Schermerhorn, J. Benton, Matthias Scheutz |
| 15:05-15:20 | Temporal Planning for Co-Design of Host Scheduling and Workflow Allocation in Mobile Environments Qiang Lu, Yixin Chen, Mart Haitjema, Catalin Roman, Christopher Gill, Guoliang Chen |
| 15:20-15:30 | Commentary and Discussion |
| | Coffee Break |
| | Emerging Applications for P&S |
| 16:00-16:15 | <i>The MMP: A Mixed-Initiative Mission Planning System for the Multi-Aircraft Domain</i> Ruben Strenzke, Axel Schulte |
| 1015 10 20 | |
| 16:15-16:30 | <i>Temporal Optimization Planning for Fleet Repositioning</i> Kevin Tierney, Rune Møller Jensen |
| 16:30-16:45 | Temporal Optimization Planning for Fleet Repositioning Kevin Tierney, Rune Møller Jensen Knowledge Representations for High-level and Low-level Planning Franziska Zacharias, Christoph Borst |
| 16:15-16:30 16:30-16:45 16:45-17:05 | Temporal Optimization Planning for Fleet Repositioning Kevin Tierney, Rune Møller Jensen <i>Knowledge Representations for High-level and Low-level Planning</i> Franziska Zacharias, Christoph Borst <i>Command and Control Training Centers:</i> <i>Computer Generated Forces Meet Classical Planning</i> Carmel Domshlak, Ziv Even-Zur, Yannai Golany, Erez Karpas, Yevgeni Nus |
| 16:15-16:30 16:30-16:45 16:45-17:05 17:05-17:15 | Temporal Optimization Planning for Fleet Repositioning Kevin Tierney, Rune Møller Jensen <i>Knowledge Representations for High-level and Low-level Planning</i> Franziska Zacharias, Christoph Borst <i>Command and Control Training Centers:</i> <i>Computer Generated Forces Meet Classical Planning</i> Carmel Domshlak, Ziv Even-Zur, Yannai Golany, Erez Karpas, Yevgeni Nus Commentary and Discussion |

Verification and Validation of Planning and Scheduling Systems (VVPS)

Organizers: Saddek Bensalem, Klaus Havelund, Andrea Orlandini **Date and Location:** June 13, 2011, Hall 101-01-009/013 Computer Science Campus

| 09:00-10:00 | Invited Talk: Policy Learning for Autonomous Feature Tracking Maria Fox |
|-------------|--|
| 10:00-10:30 | Directed Search for Generalized Plans Using Classical Planners Siddharth Srivastava, Neil Immerman, Shlomo Zilberstein, Tianjiao Zhang |
| | Coffee Break |
| 11:00-11:30 | Synthesizing and Verifying Plans for Constrained Workflows: Transferring Tools from Formal Methods Jason Crampton, Michael Huth |
| 11:30-12:00 | Generating Controllers for Flexible Plan Execution: a TGA Approach Andrea Orlandini, Alberto Finzi, Amedeo Cesta, Simone Fratini |
| 12:00-12:30 | A Loop Acceleration Technique to Speed Up Verification of Automatically-Generated Plans Robert P. Goldman, Michael Pelican, David Musliner |
| | Lunch Break |
| 14:00-14:30 | Predicting Atomicity Violations in Concurrent Programs via Planning Niloofar Razavi, Azadeh Farzan, Sheila McIlraith |
| 14:30-15:00 | A Critical Overview and Open Questions for Temporal Planning with Uncertainty Rosella Gennari, Anna Roubickova, Marco Roveri |
| 15:00-15:30 | Formally Ensuring Time Constraints in a Development Process Ilias Garnier, Christophe Aussaguès, Vincent David, Guy Vidal-Naquet |
| | Coffee Break |
| 16:00-17:30 | Special Session <i>"Darmstadt, we have a problem" -</i> Open Discussion about a Planning Domain Inspired by an ESA Robotic Mission |

TUTORIALS

Sunday, June 12, 2011

A Survey of Suboptimal Search Algorithms Jordan Thayer, Wheeler Ruml 09:00-10:30, Hall 101-02-016/018

Using Solution Length Estimates in Heuristic Search Jordan Thayer, Wheeler Ruml 11:00-12:30, Hall 101-02-016/018

Decision Diagrams in Automated Planning and Scheduling Scott Sanner 14:00-15:30, Hall 101-02-016/018

Problem Solving with Model Checking Techniques Michael Weber, Jaco van de Pol 16:00-17:30, Hall 101-02-016/018

Monday, June 13, 2011

Translation-based Approaches to Conformant and Contingent Planning Héctor Palacios, Alexandre Albore 09:00–10:30, Hall 101-02-016/018

Petri Nets and their Relation to Planning Blai Bonet, Patrik Haslum 11:00-12:30, Hall 101-02-016/018

Open Source Solutions for Motion Planning Sachin Chitta 14:00-15:30, Hall 101-01-016/018

Introduction to Planning Domain Modeling in RDDL Scott Sanner

16:00-17:30, Hall 101-01-016/018

A Survey of Suboptimal Search Algorithms

Jordan Thayer and Wheeler Ruml (University of New Hampshire, USA) Sunday, June 12, 2011, 09:00-10:30, Hall 101-02-016/018

This tutorial provides a survey of heuristic search algorithms, focusing on algorithms that find suboptimal solutions. We will cover algorithms that provide quality bounds, beam search algorithms, and anytime search algorithms. The commonality between these families of algorithms is that they all sacrifice finding optimal solutions in order to find solutions faster. The goal will be to develop an understanding of when the searches are likely to perform well and when they are likely to perform poorly.

Using Solution Length Estimates in Heuristic Search

Jordan Thayer and Wheeler Ruml (University of New Hampshire, USA) Sunday, June 12, 2011, 11:00-12:30, Hall 101-02-016/018

Handling g-value plateaus is an open and challenging problem for domain independent planning. One promising approach for dealing with these plateaus is to search on multiple objectives, hoping that the guidance of one cost metric will pull the search out of plateaus in another. For cost based planning, plan length is a natural candidate for this additional guidance. This tutorial examines how the field of heuristic search has been tackling the problem of using both solution cost and solution length within a single algorithm, with a special focus on how algorithms can incorporate solution length without abandoning guarantees on solution quality.

Decision Diagrams in Automated Planning and Scheduling

Scott Sanner (NICTA & ANU, Australia) Sunday, June 12, 2011, 14:00-15:30, Hall 101-02-016/018

Decision diagrams have proved to be a useful data structure for model checking, temporal verification, graphical model inference, and factored planning (factored MDPs and POMDPs among many applications). This tutorial will cover the foundations of binary and algebraic decision diagrams (BDDs & ADDs) - their properties, their algorithms, their use in various automated planning settings (including a discussion of when other techniques are preferable to decision diagrams), and tricks of the trade (variable orderings, approximation, and application-specific operations) that help one achieve maximal efficiency in practice. Beyond BDDs and ADDs, the tutorial will also cover a variety of less-used but important decision diagrams and their applications: Zero-suppressed DDs (ZDDs) for set representation, Affine ADDs (AADDs) for arithmetic function representation, recent extensions of decision diagrams to continuous variables, and many others (Factor Edge Value BDDs, Binary Moment Diagrams, etc.) as time permits. While focusing on the theory of decision diagrams, the tutorial will constantly relate the theory to practical applications in automated planning and scheduling.

Problem Solving with Model Checking Techniques

Michael Weber and Jaco van de Pol (University of Twente, Netherlands) Sunday, June 12, 2011, 16:00-17:30, Hall 101-02-016/018

Abstract:

The Model Checking Problem is the question whether a mathematical model (typically of a real-world system) fulfills its specification (often given as a set of logic formulas). Automatic solutions to solve such model checking problems have been researched and refined for close to 30 years now. Since reaching maturity, they have become a standard quality assurance method in, e.g., the semiconductor and aviation industries.

In this tutorial, we aim to connect research on model checking and the plethora of techniques it spawned (or incorporated successfully) to strongly related, and sometimes overlapping fields: graph searching, planning, scheduling, artificial intelligence. Contents:

- Introduction to Model Checking: expressing properties, flavors of models, diagnostics
- Application areas and success stories: hardware, software, scheduling, puzzle solving, ...
- Conquering the search space: enumerative vs. symbolic methods
- Algorithmic techniques: sequential, directed, multi-core, distributed, and I/O-efficient algorithms (and combinations thereof)
- Symbolic methods: state space compression, binary decision diagrams, translations to SAT problems
- State-of-the-art techniques: CEGAR, bounded model checking, SMT solvers
- Engineering challenges: an explosion of modelling languages and exploration techniques

Translation-based Approaches to Conformant and Contingent Planning

Héctor Palacios (Universidad Carlos III de Madrid, Spain) and Alexandre Albore (Universitat Pompeu Fabra, Spain) Monday, June 13, 2011, 09:00-10:30, Hall 101-02-016/018

Conformant planning is the problem of finding a sequence of actions for achieving a goal in the presence of uncertainty in the initial state or in action effects. On the other hand, contingent planning is concerned with the problem of achieving goals in the presence of incomplete information and sensing actions. Both problems have been approached as a path-finding problem in the belief space where good belief representations and heuristics are critical for scaling up. In this tutorial, we present algorithms for both conformant and contingent planning that rely on translations to classical planning problems, solved by an off-the-shelf classical planner.

The first half of this tutorial will be devoted to present translations from conformant planning (i.e., planning with incomplete information and no sensing) into classical planning. Compiled classical problems are solved by a classical planner, taking advantage of heuristics developed for classical planning: as long as heuristics for searching in the belief space have not been as successful so far. On top of such a translation was built the T0 conformant planner, best performer of the conformant track at IPC 2006. These general translation schemes are sound and we establish the conditions under which such translations are also complete. Thus, we present the notion of conformant width, that characterizes the size of classical translations that are guaranteed to be complete.

In the second half of the tutorial, we will focus on how to build efficient action selection mechanisms for planning with sensing (contingent planning) on top of conformant planning translations. In fact, the ability to find conformant plans is needed in contingent settings where conformant situations constitute a special case. Planning with incomplete information and partial observability is the most complex setting for planning. We will show how to obtain a closed-loop algorithm for achieving the goal in planning with sensing, using a conformant translation. Also, we will introduce the notion of contingent width, similar to the former conformant width, to characterize contingent planning problems.

Finally, building on the same translations, we will show how to obtain robust finite-state controllers. Finite-state and memoryless controllers are simple action selection mechanisms widely used in domains such as video games and mobile robotics. We show how to develop a model-based

method for deriving finite-state controllers automatically. In particular, the models represent a class of contingent problems where actions are deterministic and some fluents are observable. The problem of deriving a controller from such models is converted into a conformant planning problem that is solved using classical planners, taking advantage of a complete translation introduced before. All algorithms will be illustrated with examples. We expect the tutorial to be interesting for general AI researchers, as we build on simple ideas that have been successful and that we introduce step by step. We will discuss other similar approaches and their limits, e.g., how a representation affects heuristic search, to put the translations introduced into context.

Petri Nets and their Relation to Planning

Blai Bonet (Universidad Simón Bolívar, Venezuela) and Patrik Haslum (NICTA & ANU, Australia) Monday, June 13, 2011, 11:00-12:30, Hall 101-02-016/018

Petri nets are a formalism for modelling discrete dynamical systems, widely used in automated verification (model checking). There is a wealth of results and algorithmic techniques for Petri nets, often based on principles quite different from those commonly employed in planning. This tutorial aims to present the basics of Petri nets, with focus on their relation to modelling formalisms used in planning and the exchange of algorithmic techniques between the two fields.

Open Source Solutions for Motion Planning

Sachin Chitta (Willow Garage) Monday, June 13, 2011, 14:00-15:30, Hall 101-01-016/018

This tutorial will focus on the application of motion planning for mobile manipulation in unstructured environments. Topics will include the following:

- integrating real time sensing with planning to deal with dynamic environments
- integrating planning and reactive control for mobile manipulation
- dealing with kinematic constraints
- plan monitoring and replanning in dynamic environments
- combining different planning techniques
- application of these techniques to real world problems in object manipulation, door opening, cart pushing

Introduction to Planning Domain Modeling in RDDL

Scott Sanner (NICTA & ANU, Australia) Monday, June 13, 2011, 16:00-17:30, Hall 101-01-016/018

RDDL is the Relational Dynamic Influence Diagram Language, the domain modeling language used in the ICAPS 2011 International Probabilistic Planning Competition. RDDL has been developed to compactly model real-world planning problems that use boolean, multi-valued, integer and continuous variables, unrestricted concurrency, non-fluents, probabilistic independence among complex effects (important for exogenous events), aggregation operators in addition to quantifiers, and partial observability. While RDDL addresses some of the probabilistic modeling limitations of PPDDL, its deterministic subset also addresses some modeling limitations of PDDL (e.g., models needing nonlinear difference equations or unrestricted concurrency). This tutorial provides a general introduction to RDDL, its semantics, and a number of detailed examples like elevator and traffic control to demonstrate its expressive power. It also provides a brief introduction to the rddlsim software that permits the simulation, evaluation, and visualization of planners and planning domains.

MAIN CONFERENCE PROGRAM



Map data © OpenStreetMap contributors, CC-BY-SA; based on a map by Frederik Ramm and Jochen Topf

The main program will be hosted at

Kollegiengebäude I (KG I) Platz der Universität 3 79098 Freiburg



| 08:45-09:00 | Opening Hall | Remarks Aula |
|-------------|---|---|
| 09:00-10:00 | Invited Talk: <i>Spoken Dialog Systems as a</i> Jason D. Hall: Session Chair: <u>5</u> | <i>n Application of Planning under Uncertainty</i> Williams Aula stefan Edelkamp |
| 10:00-10:30 | Coffee | : Break |
| 10:30-12:10 | Ia: Heuristics for Planning Hall: HS 1199 Session Chair: Subbarao Kambhampati | Ib: Markov Decision Processes Hall: Aula Session Chair: Sylvie Thiébaux |
| | Where Ignoring Delete Lists Works, Part II: Causal Graphs Jörg Hoffmann | Heuristic Search for Generalized Stochastic Shortest Path MDPs Andrey Kolobov, Mausam, Daniel S. Weld, Héctor Geffner |
| | When Optimal is Just Not Good Enough: Learning Fast Informative Action Cost Partitionings Erez Karpas, Michael Katz, Shaul Markovitch | Efficient Policy Construction for MDPs Represented in Probabilistic PDDL Boris Lesner, Bruno Zanuttini |
| | Heuristics for Planning with SAT and Expressive Action Definitions Jussi Rintanen | Closing the Gap: Improved Bounds on Optimal POMDP Solutions Pascal Poupart, Kee-Eung Kim, Dongho Kim |
| | LPRPG-P: Relaxed Plan Heuristics for Planning with Preferences Amanda Coles, Andrew Coles | Markov Decision Processes with Ordinal Rewards: Reference Point-Based Preferences Paul Weng |
| 12:10-14:00 | Lunch Break (individual, no | o organized lunch provided) |

Tuesday, June 14, 2011, AM

| IIb: Generalized Planning Hall: Aula Session Chair: Sheila McIlraith | Scaling Up Multiagent Planning: A Best-Response Approach Anders Jonsson, Michael Rovatsos | Planning for Loosely Coupled Agents using Partial Order Forward-Chaining Jonas Kvarnström | Directed Search for Generalized Plans Using Classical Planners Siddharth Srivastava, Neil Immerman, Shlomo Zilberstein, Tianjiao Zhang | An Effective Approach to Realizing Planning Programs Alfonso E. Gerevini, Fabio Patrizi, Alessandro Saetti (short talk) | e Break | Its IPC IS 1199 ngel García Olaya | <i>Competition</i> Sungwook Yoon | c Competition es López, Sergio Jiménez Celorrio | Competition nanda Coles, Andrew Coles | osters & System Demos d Prometheus | uring the posters and system demos session. |
|--|--|---|---|---|-------------|--|-------------------------------------|--|--|--|---|
| Ila: Plan Search Engineering Hall: HS 1199 Session Chair: Patrik Haslum | Dynamic State-Space Partitioning in External-Memory Graph Search Rong Zhou, Eric A. Hansen | Exploiting the Computational Power of the Graphics Card: Optimal State Space Planning on the GPU Damian Sulewski, Stefan Edelkamp, Peter Kissmann | Distributed Control of Situated Assistance in Large Domains with Many Tasks Jesse Hoey, Marek Grzes | Abstraction Heuristics Extended with Counting Abstractions Blai Bonet (short talk) | Coffee | Resul Hall: H Session Chair: Ár | Uncertainty Scott Sanner, 9 | Deterministic Ángel García Olaya, Carlos Linar | <i>Learning C</i> Sergio Jiménez Celorrio, An | Doctoral Consortium Po Hall: Aula and | Light appetizers and drinks will be served du |
| 14:00-15:35 | | | | | 15:35-16:05 | | 16:05-16:30 | 16:30-17:10 | 17:10-17:30 | 17:30–20:00 (open end) | |

Tuesday, June 14, 2011, PM

Searching for Plans with Carefully Designed Probes Alexandre Albore, Miquel Ramírez, Héctor Geffner Learning Inadmissible Heuristics during Search ordan T. Thayer, Austin Dionne, Wheeler Ruml Effective Heuristics and Belief Tracking for Planning with Incomplete Information Ensemble Monte-Carlo Planning: Nir Lipovetzky, Héctor Geffner IIIb: Frontiers in Planning Session Chair: David Smith Alan Fern, Paul Lewis An Empirical Study Hall: Aula Invited Talk: Last-Mile Disaster Preparedness and Recovery Lunch Break (individual, no organized lunch provided) Session Chair: Fahiem Bacchus Pascal Van Hentenryck **Coffee Break** Hall: Aula Amanda Coles, Andrew Coles, Allan Clark, Stephen Gilmore losé E. Flórez, Álvaro Torralba Arias de Reyna, Javier García, Carlos Linares López, Ángel García Olaya, Daniel Borrajo Cost-Sensitive Concurrent Planning under Duration **Online Planning for a Material Control System for** Fumio Hasegawa, Yukihiro Kawano, Koji Tanaka, Planning Multi-Modal Transportation Problems Emili Hernandez, Marc Carreras, Pere Ridao Minh Do, Kazumichi Okajima, Serdar Uckun, **Jncertainty for Service-Level Agreements** Lara Crawford, Ying Zhang, Aki Ohashi Liquid Crystal Display Manufacturing A Path Planning Algorithm for an AUV Guided with Homotopy Classes Session Chair: Scott Sanner IIIa: Applications I Room: HS 1199 10:00-10:30 12:10-14:00 09:00-10:00 10:30-12:10

Wednesday, June 15, 2011, AM

14:00-15:40

Session Chair: Malte Helmert IV: Best Papers Hall: Aula

Automatic Construction of Efficient Multiple Battery Usage Policies Maria Fox, Derek Long, Daniele Magazzeni

(best paper)

Computing All-Pairs Shortest Paths by Leveraging Low Treewidth Léon Planken, Mathijs de Weerdt, Roman van der Krogt (honorable mention for best student paper)

Trade-Offs in Sampling-Based Adversarial Planning Raghuram Ramanujan, Bart Selman

(honorable mention for best student paper)

Planning to Perceive: Exploiting Mobility For Robust Object Detection

Javier Velez, Garrett Hemann, Albert S. Huang, Ingmar Posner, Nicholas Roy (best student paper)

| Coffee Break | Community Meeting (includes Best Dissertation Talk and Awards Ceremony) Hall: Aula |
|--------------|--|
| 15:40-16:10 | 16:10-18:10 |

Session Chair: Shlomo Zilberstein

20:00

Banquet

Wednesday, June 15, 2011, PM

| <i>nalysis and the Behavior of Software Agents</i> P. Wellman : Aula Carmel Domshlak | e Break | Vb: Limits and Possibilities Hall: Aula Session Chair: Jörg Hoffmann | Limits for Compact Representations of Plans Christer Bäckström, Peter Jonsson | Automatic Polytime Reductions of NP Problems into a Fragment of STRIPS Aldo Porco, Alejandro Machado, Blai Bonet | A Complete Algorithm for Generating Landmarks Blai Bonet, Julio Castillo (short talk) | A Polynomial All Outcome Determinization for Probabilistic Planning Thomas Keller, Patrick Eyerich (short talk) | Sample-Based Planning for Continuous Action Markov Decision Processes Chris Mansley, Ari Weinstein, Michael L. Littman (short talk) | o organized lunch provided) |
|---|-------------|---|---|--|--|--|--|-----------------------------|
| Invited Talk: Empirical Game-Theoretic A Michael I Hall Session Chair: (| Coffe | Va: Applications II Hall: HS 1199 Session Chair: Maria Fox | <i>Cross-Domain Action-Model Acquisition for Planning Via Web Search</i> Hankz Hankui Zhuo, Qiang Yang, Rong Pan, Lei Li | Potential Search: A Bounded-Cost Search Algorithm Roni Stern, Rami Puzis, Ariel Felner | Visual Programming of Plan Dynamics Using Constraints and Landmarks Julie Porteous, Jonathan Teutenberg, David Pizzi Marc Cavazza | The Multi-Round Balanced Traveling Tournament Problem Richard Hoshino, Ken-ichi Kawarabayashi | | Lunch Break (individual, n |
| 00:01-00:60 | 10:00-10:30 | 10:30-12:15 | | | | | | 12:15-14:00 |

Thursday, June 16, 2011, AM

| 14:00-15:15 | Vla: Automated Scheduling Hall: HS 1199 Session Chair: Daniel Borrajo | VIb: Incomplete Information Hall: Aula Session Chair: Pascal Poupart |
|-------------|--|--|
| | <i>Scheduling an Aircraft Repair Shop</i> Maliheh Aramon Bajestani, J. Christopher Beck | Planning and Acting in Incomplete Domains Christopher Weber, Daniel Bryce |
| | Scalable Scheduling for Hardware-Accelerated Functional Verification Michael D. Moffitt, Gernot E. Günther | Contingent Planning as AND/OR Forward Search with Disjunctive Representation Son Thanh To, Tran Cao Son, Enrico Pontelli |
| | Theoretical Aspects of Scheduling Coupled-Tasks in the Presence of Compatibility Graph Gilles Simonin, Rodolphe Giroudeau, Jean-Claude König, Benoit Darties | Generalised Domain Model Acquisition from Action Traces Stephen Cresswell, Peter Gregory |
| 15:15-15:45 | Coffee E | Break |
| 15:45-16:25 | Vlla: Real-Time Planning Hall: HS 1199 Session Chair: J. Christopher Beck | VIIb: Applications III Hall: Aula Session Chair: Gabriele Röger |
| | <i>Partial-Order Support-Link Scheduling</i> Debdeep Banerjee, Patrik Haslum (short talk) | The Minimal Seed Set Problem Avitan Gefen, Ronen I. Brafman (short talk) |
| | <i>Fast Subgoaling for Pathfinding Via Real-Time Search</i> Carlos Hernández, Jorge A. Baier (short talk) | <i>Planning Problems for Social Robots</i> Gian Diego Tipaldi, Kai O. Arras (short talk) |
| 16:25-16:30 | Closing R Hall: A | emarks wla |
| | | |

Thursday, June 16, 2011, PM

System Demonstrations

The winner of the **Best System Demo Award** will be determined by a ballot.

Organizers: Piergiorgio Bertoli, Minh Do **Date and Location:** June 14, 2011, Prometheus Hall and Aula

> FlowOpt: A Set of Tools for Modeling, Optimizing, Analyzing, and Visualizing Production Workflows Roman Barták, Martin Cully, Milan Jaška, Ladislav Novák, Vladimír Rovenský, Con Sheahan, Tomáš Skalický, Dang Thanh-Tung

Only Hope remains in the PANDORA's .jar – Pervasive Use of Planning in a Training Environment Giulio Bernardi, Amedeo Cesta, Luca Coraci, Gabriella Cortellessa, Riccardo De Benedictis, Francois Mohier, Jure Polutnik, Miha Vuk

Command and Control Training Centers: Computer Generated Forces Meet Classical Planning Carmel Domshlak, Ziv Even-Zur, Yannai Golany, Erez Karpas

Constraint Priorities – a Way to Get an Optimal Timetable Fully Automatically. Three Steps into the Modern Timetable Scheduler - www.school-timetable.eu Wiesław Dudek

Planning Multi-modal Transportation Problems Jose E. Florez, Alvaro Torralba, Javier García, Carlos Linares López, Ángel García Olaya, Daniel Borrajo

PLANET: a Planning and Replanning Tool for a Constellation of Agile Earth-observing Satellites

Romain Grasset-Bourdel, Gérard Verfaillie, Antoine Flipo

Building a Domain-Independent Architecture for Planning, Learning and Execution (PELEA) Cesar Guzman, Vidal Alcázar, David Prior, Eva Onaindía, Daniel Borrajo, Juan Fdez-Olivares

Dora, a Robot Exploiting Probabilistic Knowledge under Uncertain Sensing for Efficient Object Search Marc Hanheide, Charles Gretton, Moritz Göbelbecker

A Path Planning Algorithm for an AUV Guided with Homotopy Classes Emili Hernandez, Marc Carreras, Pere Ridao

The TorchLight Tool: Analyzing Search Topology Without Running Any Search Jörg Hoffmann

The "DUKC Optimiser" Ship Scheduling System Elena Kelareva

WindMT: An Integrated System for Failure Detection and Maintenance Scheduling at Wind Farms Andras Kovacs, Janos Csempesz, Gabor Erdos, David Karnok, Lorinc Kemeny, Laszlo Monostori, Zsolt Janos Viharos

Demonstration of the Emergency Landing Planner Elif Kurklu, Nicolas Meuleau, Christian Neukom, Christian Plaunt, David E. Smith, Tristan Smith Scheduling and Planning Interface for Exploration (SPIFe) Mike McCurdy, Arash Aghevli, Alfredo Bencomo

A New Approach to Conformant Planning via Classical Planners Khoi Nguyen, Vien Tran, Tran Cao Son, Enrico Pontelli

Automatic Polytime Reductions of NP Problems into a Fragment of STRIPS Aldo Porco, Alejandro Machado, Blai Bonet

A Visual Programming Interface for Specifying Plan Dynamics Julie Porteous, Jonathan Teutenberg, David Pizzi, Fred Charles, Marc Cavazza

Beyond Calendar Mashups: SELFPLANNER 2.0 Ioannis Refanidis, Anastasios Alexiadis, Neil Yorke-Smith

Planning for Agents with Changing Goals Kartik Talamadupula, Paul Schermerhorn, J. Benton, Subbarao Kambhampati, Matthias Scheutz

Scheduling Print Jobs in Lean Document Production (LDP) Toolkit Rong Zhou, Sudhendu Rai, Minh Do

DOCTORAL CONSORTIUM POSTERS

Organizers: Patrik Haslum, Héctor Geffner, Subbarao Kambhampati **Date and Location:** June 14, 2011, Prometheus Hall and Aula

Malileh Aramon Bajestani Combining Stochastic Models of Maintenance with Optimization-based Scheduling Decisions

J. Benton Partial Satisfaction Planning: Representations and Solving Methods

Will Cushing Temporal Planning

Masood Feyzbakhsh-Rankooh Using a Complete Heuristic Search for State-Space Based Temporal Planning

Avitan Gefen Modeling Planning Problems using Hypergraphs

Bharat Ranjan Kavuluri The Invariant Class of Problems

Elena Kelareva Ship Scheduling with Uncertainty

Andrey Kolobov Heuristic Search for Generalized Stochastic Shortest Path MDPs

Fabien Lagriffoul A Framework for Hybrid Planning

Alejandro Machado Translating Decision Problems into Planning Tasks Aldo Porco Automatic Polytime Reductions of NP Problems into a Fragment of STRIPS

Maria Viviane de Menezes Model Update for Automated Planning

Gonzalo Milla Millan Learning HTN Planning Domains from Plan Traces

Daniel Morwood Goal-Directed Knowledge Acquisition

Srinivas Nedunuri Dominance Relations for Better Plans and Planners

Khoi Nguyen Conformant Planning via Classical Planners

Léon Planken Solving and Coordinating the Simple Temporal Problem

Nir Pochter Pruning Techniques in Search and Planning

Ezequiel Quintero Improving Plan Execution on Mobile Robots by Learning Action Durations

Inmaculada Sánchez Garzón A Repair-Replanning Strategy for HTN Planning Frameworks

Joris Scharpff Dynamic Contracting and Road Blocks

Ruben Strenzke Human-Machine Mixed-Initiative Cooperation in Multi-UAV Mission Planning

Kartik Talamadupula Planning for Human-Robot Teaming in Open Worlds

Kevin Tierney Fleet Repositioning with Temporal Optimization Planning

Son To On the Effectiveness of Belief State Representation in Planning under Uncertainty

Mauro Vallati Configuration and Learning Techniques for Efficient Automated Planning Systems

SOCIAL PROGRAM



Map data $\ensuremath{\mathbb{C}}$ OpenStreetMap contributors, CC-BY-SA; based on a map by Frederik Ramm and Jochen Topf

Opening Reception

Mon, June 13, 19:30-22:00

Historisches Kaufhaus Münsterplatz 24 79098 Freiburg

Banquet

Wed, June 15, 20:00

Schlossbergrestaurant Dattler Am Schloßberg 1 79104 Freiburg im Breisgau



Historisches Kaufhaus

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GENERAL INFORMATION

Registration Desk

June 11-13:

The registration desk is located in the foyer of building 101 on the computer science campus. Saturday, June 11: 10:00–15:00 Sunday and Monday, June 12 and 13: 8:00–18:00

June 14-16:

The registration desk is located in the Prometheus hall in front of the Aula in building KG I. Tuesday, June 14: 8:00-20:00 Wednesday, June 15: 8:30-18:00 Thursday, June 16: 8:30-16:45

Lunches

Lunches are included for all conference participants on Sunday and Monday (served in the foyer of building 101 on the computer science campus). For DC participants and mentors, lunch is also included on Saturday (same location). On all other days, lunch is individual (no organized lunch provided) with plenty of options near the conference venue.

Internet Access

Wireless internet access is available near the conference halls.

Participants from eduroam institutions can use their usual authentication process to connect to WLANuni-fr (available all over the campus).

Other participants can use the following authentication: Network: ICAPS Password: omitted in online version

Organization

ICAPS 2011 has been organized by the University of Freiburg in cooperation with kongress & kommunikation gGmbH.

We wish to thank the following for their contribution to the success of this conference:



European Office of Aerospace Research and Development, Air Force Office of Scientific Research, United States Air Force Research Laboratory (http://www.london.af.mil).

ICAPS 2011 SATELLITE EVENTS AT A GLANCE

Saturday, June 11

Doctoral Consortium

Sunday, June 12

| AM 1 | HDIP 101-00-026 | KEPS 101-00-036 | MCTS 101-00-010/014 | GAPRec 101-01-009/013 | Tutorial 1 101-02-016/018 |
|------|--------------------|---------------------------|------------------------|--------------------------|-------------------------------------|
| | | | Coffee Break | | |
| AM 2 | HDIP 101-00-026 | KEPS 101-00-036 | MCTS 101-00-010/014 | GAPRec 101-01-009/013 | Tutorial 2 101-02-016/018 |
| | | | Lunch Break | | |
| PM 1 | HDIP 101-00-026 | KEPS 101-00-036 | MCTS 101-00-010/014 | | Tutorial 3 101-02-016/018 |
| | | | Coffee Break | | |
| PM 2 | HDIP 101-00-026 | KEPS 101-00-036 | MCTS 101-00-010/014 | | Tutorial 4 101-02-016/018 |

Tutorial 1:A Survey of Suboptimal Search Algorithms (Jordan Thayer and Wheeler Ruml)Tutorial 2:Using Solution Length Estimates in Heuristic Search (Jordan Thayer and Wheeler Ruml)Tutorial 3:Decision Diagrams in Automated Planning and Scheduling (Scott Sanner)Tutorial 4:Decision Diagrams in Automated Planning and Scheduling (Scott Sanner)

Tutorial 4: Problem Solving with Model Checking Techniques (Michael Weber and Jaco van de Pol)

Monday, June 13

| AM 1 | PAL 101-00-026 | SPARK 101-00-036 | COPLAS 101-00-010/014 | VVPS 101-01-009/013 | Tutorial 5 101-02-016/018 |
|----------------------------------|---|--|--|--|-------------------------------------|
| | | | Coffee Break | | |
| AM 2 | PAL 101-00-026 | SPARK 101-00-036 | COPLAS 101-00-010/014 | VVPS 101-01-009/013 | Tutorial 6 101-02-016/018 |
| | | | Lunch Break | | |
| PM 1 | PAL 101-00-026 | SPARK 101-00-036 | COPLAS 101-00-010/014 | VVPS 101-01-009/013 | Tutorial 7 101-01-016/018 |
| | | | Coffee Break | | |
| PM 2 | | SPARK 101-00-036 | | VVPS 101-01-009/013 | Tutorial 8 101-01-016/018 |
| Tutorial Tutorial Tutorial | 5: Translation- (Héctor Palaci 6: Petri Nets an 7: Open Source | based Approaches os and Alexandre Al nd their Relation t Solutions for Mo | a to Conformant and bore) to Planning (Blai Bone tion Planning (Sachir | Contingent Planni et and Patrik Haslum) Chitta) | ng |

Tutorial 8: Introduction to Planning Domain Modeling in RDDL (Scott Sanner)

| Malcoma R | acantion is on | | 13 from 10 | -30-22-00 at the Histori | schae Kaufhaus | (navt to tha | Mincter) |
|---------------------------|---|--|-------------|--|----------------------|--|--|
| | | r Moriday, Jurie | | | | י נוובאר נט נווב | |
| Fuesday , | June 14 | | Wednesda | ay, June 15 | Thursday, | June 16 | |
| 08:45-09:00 | Opening Hall: | Remarks Aula | | | | | |
| 09:00-10:00 | Invited Talk: Ja Hall: | son D. Williams Aula | 09:00-10:00 | Invited Talk: Pascal Van Hentenryck Hall: Aula | 09:00-10:00 | Invited Talk: Mi Hall: | ichael P. Wellman Aula |
| 10:00-10:30 | Coffee | Break | 10:00-10:30 | Coffee Break | 10:00-10:30 | Coffee | : Break |
| 10:30-12:10 | la: Heuristics for Planning Hall: HS 1199 | lb: Markov Decision Processes Hall: Aula | 10:30-12:10 | IIIa: IIIb: Frontier Applications I in Planning Hall: HS 1199 Hall: Aula | s 10:30-12:15 | Va: Applications II Hall: HS 1199 | Vb: Limits and Possibilities Hall: Aula |
| 12:10-14:00 | Lunch | Break | 12:10-14:00 | Lunch Break | 12:15-14:00 | Lunch | Break |
| 14:00-15:35 | lla: Plan Search Engineering Hall: HS 1199 | IIb: Generalized Planning Hall: Aula | 14:00-15:40 | IV: Best Papers Hall: Aula | 14:00-15:15 | Vla: Automated Scheduling Hall: HS 1199 | VIb: Incomplete Information Hall: Aula |
| 15:35-16:05 | Coffee | Break | 15:40-16:10 | Coffee Break | 15:15-15:45 | Coffee | : Break |
| 16:05-17:30 | Result Hall: H5 | ts IPC 5 1199 | 16:10-18:10 | Community Meeting (includes Best Dissertation Talk | 15:45-16:25 | VIIa: Real- Time Planning | VIIb: Applications III |
| 17:30-20:00 (open end) | DC Posters & S Hall: Aula and | System Demos I Prometheus | | and Awards Ceremony) Hall: Aula | | Hall: HS 1199 | Hall: Aula |
| | | | | | 16:25-16:30 | Closing l Hall: | Remarks Aula |
| | | | 20:00 | Banquet | | | |

ICAPS 2011 Main Conference at a Glance