

CompSci 275 Winter 2016, Constraint Networks


Project Information

1. Example Projects from Fall 2010:

- Petke, J. and Jeavons, P. Local Consistency and SAT-Solvers. CP 2010. [report](#) | [slides](#)
- Mateescu, R., and Dechter, R. Compiling Constraint Networks into AND/OR Multi-valued Decision Diagrams (AOMDDs). CP 2006. [report](#) | [slides](#)
- Schreiber, Y. Value-Ordering Heuristics: Search Performance vs. Solution Diversity. CP 2010. [report](#) | [slides](#)

2. Possible projects:

Focus on counting and weighted counting queries, as well as parallel processing

- [Kuldeep S. Meel](#), Moshe Y. Vardi, [Supratik Chakraborty](#), [Daniel J. Fremont](#), [Sanjit A. Seshia](#), [Dror Fried](#), [Alexander Ivrii](#), [Sharad Malik](#):
Constrained Sampling and Counting: Universal Hashing Meets SAT Solving. [CoRR abs/1512.06633](#) (2015)
- [Supratik Chakraborty](#), [Dror Fried](#), [Kuldeep S. Meel](#), Moshe Y. Vardi:
From Weighted to Unweighted Model Counting. [IJCAI 2015](#): 689-695
- On computing Minimal Independent Support and its applications to sampling and counting
Alexander Ivrii, Sharad Malik, Kuldeep S. Meel and Moshe Vardi.
Constraints Journal fast track: <http://dx.doi.org/10.1007/s10601-015-9204->
- Ermon's group: <http://cs.stanford.edu/~ermon/#pub>
- Stefano Ermon, Carla Gomes, Ashish Sabharwal, and Bart Selman.
Optimization With Parity Constraints: From Binary Codes to Discrete Integration. [[PDF](#)]
[[Slides](#)] [[Poster](#)] [[Code](#)]
UAI-13. In Proc. 29th Conference on Uncertainty in Artificial Intelligence, July 2013.
- Fahiem Bacchus, [Shannon Dalmao](#), [Toniann Pitassi](#):
Solving #SAT and Bayesian Inference with Backtracking
Search. [CoRR abs/1401.3458](#) (2014) 
- [Erin Delisle](#), Fahiem Bacchus:
Solving Weighted CSPs by Successive Relaxations. [CP 2013](#): 273-281
- Regin's paper on Embarrassly Parallel search <http://cp2013.a4cp.org/slides/45.pdf>
- Milchgrub and Dechter: Cutset-driven local search for MPE, SOCS 2014
- <http://www.aaai.org/ocs/index.php/SOCS/SOCS14/paper/viewFile/8925/8901>
- Thesis: <http://www.ics.uci.edu/~dechter/publications/r217.pdf>

3. Conference link: CP 2015

<http://booleconferences.ucc.ie/cp2015papers>

<http://link.springer.com/book/10.1007%2F978-3-319-23219-5>

3.1. Recommendations from CP2015:

- On computing Minimal Independent Support and its applications to sampling and counting
Alexander Ivrii, Sharad Malik, Kuldeep S. Meel and Moshe Vardi.
Constraints Journal fast track: <http://dx.doi.org/10.1007/s10601-015-9204-z>
- Anytime Hybrid Best-First Search with Tree Decomposition for Weighted CSP
David Allouche, Simon de Givry, George Katsirelos, Thomas Schiex and Matthias Zytnicki.
- Restricted Path Consistency Revisited
Kostas Stergiou.
- Broken Triangles Revisited
Martin Cooper, Aymeric Duchein and Guillaume Escamocher.
- On Tree-Preserving Constraints
Shufeng Kong, Sanjiang Li, Yongming Li and Zhiguo Long.

3.2. The full list of CP2015 Papers (watch ***)

- Projection, Consistency, and George Boole
John Hooker.
Constraints Journal fast track: <http://dx.doi.org/10.1007/s10601-015-9201-2>
- Exact Sampling for Regular and Markov constraints with Belief Propagation
Alexandre Papadopoulos, Francois Pachet, Pierre Roy and Jason Sakellariou.
- General bounding mechanism for Constraint Programs
Minh Hoàng Hà, Claude-Guy Quimper and Louis-Martin Rousseau.
- Fleet design optimisation from historical data using constraint programming and large neighbourhood search
Tommaso Urli and Philip Kilby.
Constraints Journal fast track: <http://dx.doi.org/10.1007/s10601-015-9203-0>
- Smaller Selection Networks for Cardinality Constraints Encoding
Michał Karpiński and Marek Piotrów.
- ***Restricted Path Consistency Revisited
Kostas Stergiou.
- Constructing Sailing Match Race Schedules: Round-Robin Pairing Lists
Craig Macdonald, Ciaran McCreesh, Alice Miller and Patrick Prosser.
- ****A Parallel, Backjumping Subgraph Isomorphism Algorithm using Supplemental Graphs
Ciaran McCreesh and Patrick Prosser.
- Broken Triangles Revisited
Martin Cooper, Aymeric Duchein and Guillaume Escamocher.
- Hybridization of Interval CP and Evolutionary Algorithms for Optimizing Difficult Problems

- Charlie Vanaret, Jean-Baptiste Gotteland, Nicolas Durand and Jean-Marc Alliot.
- MiniSearch: a solver-independent meta-search language for MiniZinc
Andrea Rendl, Tias Guns, Peter J. Stuckey and Guido Tack.
 - Using Finite Transducers for Describing and Synthesising Structural Time-Series Constraints
Nicolas Beldiceanu, Mats Carlsson, Remi Douence and Helmut Simonis.
Constraints Journal fast track: <http://dx.doi.org/10.1007/s10601-015-9200-3>
 - Joint Vehicle and Crew Routing and Scheduling
Edward Lam, Pascal Van Hentenryck and Philip Kilby.
 - Pseudopolynomial simulation of DNNF by a Non-deterministic read-once branching program
Igor Razgon.
 - The Unary Resource with Transition Times
Cyrille Dejemeppe, Sascha Van Cauwelaert and Pierre Schaus.
 - Upper and Lower Bounds on the Time Complexity of Infinite-domain CSPs
Peter Jonsson and Victor Lagerkvist.
 - Open Packing for Facade-Layout Synthesis Under a General Purpose Solver
Andrés Felipe Barco Santa, Jean-Guillaume Fages, Elise Vareilles, Michel Aldanondo and Paul Gaborit.
 - Simple and Scalable time-table filtering for the Cumulative Constraint
Steven Gay, Renaud Hartert and Pierre Schaus.
 - Design and Evaluation of a Constraint-based Energy Saving and Scheduling Recommender System
Seán Óg Murphy, Oscar Manzano and Ken Brown.
 - General Game Playing with Stochastic CSP
Frédéric Koriche, Sylvain Lagrue, Eric Piette and Sébastien Tabary.
Constraints Journal fast track: <http://dx.doi.org/10.1007/s10601-015-9199-5>
 - ***Machine learning of Bayesian networks using constraint programming
Peter van Beek and Hella-Franziska Hoffmann.
 - PREFIX-PROJECTION Global Constraint for Sequential Pattern Mining
Amina Kemmar, Samir Loudni, Lebbah Yahia, Patrice Boizumault and Thierry Charnois.
 - Strengthening Convex Relaxations with Bound Tightening for Power Network Optimization
Carleton Coffrin, Hassan Hijazi and Pascal Van Hentenryck.
 - Visual Search Tree Profiling
Maxim Shishmarev, Christopher Mears, Guido Tack and Maria Garcia De La Banda.
Constraints Journal fast track: <http://dx.doi.org/10.1007/s10601-015-9202-1>
 - Scheduling Running Modes of Satellite Instruments Using Constraint-Based Local Search
Cédric Pralet, Solange Lemai-Chenevier and Jean Jaubert.
 - Modeling Universal Instruction Selection
Gabriel Hjort Blindell, Roberto Castañeda Lozano, Mats Carlsson and Christian Schulte.
 - Combined Translations of Linear Constraints to CNF
Ignasi Abío, Valentin Mayer-Eichberger and Peter J. Stuckey.
 - Modeling and Solving Project Scheduling with Calendars
Stefan Kreter, Andreas Schutt and Peter Stuckey.

- Automated Auxiliary Variable Elimination through On-the-Fly Propagator Generation
Jean-Noël Monette, Pierre Flener and Justin Pearson.
- A Constraint Programming Approach for Non-Preemptive Evacuation Scheduling
Caroline Even, Andreas Schutt and Pascal Van Hentenryck.
- On Tree-Preserving Constraints
Shufeng Kong, Sanjiang Li, Yongming Li and Zhiguo Long.
- A General Framework for Reordering Agents Asynchronously in Distributed CSP
Mohamed Wahbi, Younes Mechqrane, Christian Bessiere and Ken Brown.
- Randomness as a Constraint
Steven Prestwich, Roberto Rossi and Armagan Tarim.
- ***A Microstructure-based Family of Tractable Classes for CSPs
Martin Cooper, Philippe Jégou and Cyril Terrioux.
- On computing Minimal Independent Support and its applications to sampling and counting
Alexander Ivrii, Sharad Malik, Kuldeep S. Meel and Moshe Vardi.
Constraints Journal fast track: <http://dx.doi.org/10.1007/s10601-015-9204-z>
- Two Clause Learning Approaches for Disjunctive Scheduling
Mohamed Siala, Christian Artigues and Emmanuel Hebrard.
- Constrained Minimum Sum of Squares Clustering by Constraint Programming
Thi-Bich-Hanh Dao, Khanh-Chuong Duong and Christel Vrain.
- Anytime Hybrid Best-First Search with Tree Decomposition for Weighted CSP
David Allouche, Simon de Givry, George Katsirelos, Thomas Schiex and Matthias Zytnicki.
- Power Capping in High Performance Computing systems
Andrea Borghesi, Michele Lombardi, Michela Milano and Luca Benini.
- ***Automatically Improving SAT Encoding of Constraint Problems through Common
Subexpression Elimination in Savile Row
Peter Nightingale, Patrick Spracklen and Ian Miguel.
- Conflict-Ordering Search
Steven Gay, Renaud Hartert, Christophe Lecoutre and Pierre Schaus.
- Automatically Generating Streamlined Constraint Models with Essence and Conjure
James Wetter, Ozgur Akgun and Ian Miguel.
- Solving Segment Routing Problems with Constraint Programming Techniques
Renaud Hartert, Pierre Schaus, Stefano Vissicchio and Olivier Bonaventure.
- A Constraint-Based Approach for the Differential Harvest Problem
Nicolas Briot, Christian Bessiere and Philippe Vismara.
- A Global Constraint for a Tractable Class of Temporal Optimization Problems
Alban Derrien, Jean-Guillaume Fages, Thierry Petit and Charles Prud'Homme.
- Constraint-based Local Search for Finding Node Disjoint Paths in Optical Access Networks
Alejandro Arbelaez, Deepak Mehta and Barry O'Sullivan.
- Smallest MUS Extraction with Minimal Hitting Set Dualization
Alexey Ignatiev, Alessandro Previti, Mark Liffiton and Joao Marques-Silva.
- Find Your Way Back: Mobility Profile Mining with Constraints
Lars Kotthoff, Mirco Nanni, Riccardo Guidotti and Barry O'Sullivan.

- Exploiting GPUs in Solving (Distributed) Constraint Optimization Problems with Dynamic Programming
Ferdinando Fioretto, Tiep Le, Enrico Pontelli, William Yeoh and Tran Cao Son.
- Generalized Totalizer Encoding for Pseudo-Boolean Constraints
Saurabh Joshi, Ruben Martins and Vasco Manquinho.
- Optimizing the Cloud Service Experience using Constraint Programming
Serdar Kadioglu, Michael Colena, Steven Huberman and Claire Bagley.
- Bounding an Optimal Search Path with a Game of Cop and Robber on graphs
Frédéric Simard, Michael Morin, Claude-Guy Quimper, François Laviolette and José Desharnais.
- Deterministic estimation of the expected makespan of a POS under duration uncertainty
Michele Lombardi, Alessio Bonfietti and Michela Milano.
- Improved Constraint Propagation via Lagrangian Decomposition
David Bergman, Andre Cire and Willem-Jan Van Hoeve.

3.3. Journal Presentation Papers

- MDD Propagation for Sequence Constraints
David Bergman, Andre Cire and Willem-Jan Van Hoeve.
JAIR, Volume 50, pages 697-722, 2014. <http://www.jair.org/media/4199/live-4199-8076-jair.pdf>
- Constraint programming for LNG ship scheduling and inventory management
Willem-Jan Van Hoeve.
European Journal of Operational Research 241(3): 662-673, 2015. http://www.optimization-online.org/DB_FILE/2014/01/4211.pdf
- Achieving Domain Consistency and Counting Solutions for Dispersion Constraints
Gilles Pesant.
INFORMS Journal on Computing,
forthcoming. <https://www.cirrelt.ca/DocumentsTravail/CIRRELT-2015-08.pdf>
- A Quadratic Extended Edge-Finding Filtering Algorithm for Cumulative Resource Constraints
Roger Kameugne, Laure Pauline Fotso and Joseph D. Scott.
International Journal of Planning and Scheduling 1(4):264-284,
2013. <https://www.it.uu.se/research/group/astra/publications/IJPS13.pdf>
- meSAT: Multiple Encodings of CSP to SAT
Mirko Stojadinović and Filip Marić.
Constraints, 19(4):380-403,
2014. <http://jason.matf.bg.ac.rs/~mirkos/Downloads/meSAT/meSAT.pdf>
- Representing and Solving Finite-Domain Constraint Problems using Systems of Polynomials
Christopher Jefferson, Peter Jeavons, Martin Green and Marc van Dongen.
Annals of Mathematics and Artificial Intelligence, 67(3-4):359-382,
2013. <http://www.cs.ox.ac.uk/peter.jeavons/CP2015:groebnerabstract.pdf>

- On the Reification of Global Constraints
Nicolas Beldiceanu, Mats Carlsson, Pierre Flener and Justin Pearson.
Constraints 18(1), 2013. <http://www.it.uu.se/research/group/astra/publications/Constraints13-Reify.pdf>
- A Hybrid Approach Combining Local Search and Constraint Programming for a Large Scale Energy Management Problem
Haris Gavranovic and Mirsad Buljubasic.
RAIRO - Operations Research 47(4):481-500, 2013. <http://dx.doi.org/10.1051/ro/2013053>
- Discrete Optimization with Decision Diagrams
David Bergman, Andre Augusto Cire, Willem-Jan Van Hoeve and John Hooker.
INFORMS Journal on Computing, forthcoming
2015. <http://web.tepper.cmu.edu/jnh/BDDBBpost.pdf>
- Revisiting the Limits of MAP Inference by MWSS on Perfect Graphs
Adrian Weller.
JMLR, Volume 38, pages 1061-1069,
2015. http://mlg.eng.cam.ac.uk/adrian/Weller15_revisit_fixed.pdf

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