

AND/OR Search Strategies for Multi-Objective Combinatorial Optimization in Graphical Models

Project Description

Multi-objective constraint optimization is the process of simultaneously optimizing two or more conflicting objectives subject to certain constraints. Maximizing profit and minimizing the cost of a product, maximizing performance and minimizing fuel consumption of a vehicle and minimizing weight while maximizing the strength of a particular component are examples of multi-objective optimization problems.

In this project we will develop novel systematic search algorithms for multi-objective constraint optimization problems in graphical models. In order to significantly improve the capabilities of current search based algorithms that explore a regular OR space we plan to extend our recent results on AND/OR search for single objective optimization to the multi-objective case. These new algorithms will exploit efficiently the problem structure during search and use caching of partial results effectively. A second line of research is focused on compilation schemes for post-optimality analysis. Our goal is to extend the current search based compilation scheme for AND/OR Multi-Valued Decision Diagrams (AOMDD) to represent the necessary set of optimal and near-optimal solutions.

Project Coordinators

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