Ilkka Niemelä

Answer set programming

Tuesday afternoon, 17th August, 2010, Room 6.2.53

Answer set programming (ASP) is a novel declarative programming paradigm where the basic idea is similar to, for example, SAT-based planning or constraint programming: an application problem is solved by encoding it using logic program type rules so that the solutions to the problem are captured by the stable models of the rules. Then an ASP solver capable of computing stable models can provide solutions to the original problem. What makes the approach particularly interesting is that, on one hand, ASP provides a powerful knowledge representation language for effective problem encoding and, on the other hand, a number of efficient ASP systems have already been developed. This has led to applications in areas such as planning, decision support, product configuration, computer aided verification, VLSI routing, network management, security protocol analysis, linguistics, and diagnosis.

The tutorial explains the theoretical foundations of ASP, introduces the ASP programming paradigm, outlines computational techniques used in current ASP solvers, and discusses some interesting applications of the approach..
Short bio

Ilkka Niemelä is Professor of Computer Science at Aalto University School of Science and Technology where he is the Chair of the Degree Program of Computer Science and Engineering. Dr. Niemelä received his doctoral degree in computer science in 1993 from Helsinki University of Technology and has worked in 1993 as an International Fellow at SRI International, in 1995-1996 as a research scientist and acting professor in the Department of Computer Science of the University of Koblenz-Landau, Germany and in 1998-2000 as a senior research fellow of the Academy of Finland.

Dr. Niemelä's current research interests include automated reasoning, knowledge representation, computational complexity, computer aided verification, automated testing and product configuration. At Aalto University he leads the computational logic group which has developed a number of the state-of-the-art software tools for automated reasoning, such as the Smodels system for answer set programming and BCSat for Boolean circuit satisfiability checking, leading to applications in areas like automated planning, product configuration, and bounded model checking. Dr. Niemelä is an author of more than 150 papers, has been a member of the program committee for over 50 international conferences, has given several invited talks and tutorials and is serving as the Editor-in-Chief of Theory and Practice of Logic Programming.