



Fakultät für Ingenieurwissenschaften und Informatik

Informatik-Fachvortrag

Donnerstag, den 17. September 2009, 16 Uhr s.t.
Universität Ulm, Oberer Eselsberg
Gebäude O27, Raum 531

Herr Dr. Marijn Heule

TU Delft, Faculty of Engineering, Mathematics and Computer Science
(EWI), Department of Software Technology

spricht zum Thema

State-of-the-art SAT solving using look-ahead techniques

There has been an enormous progress in solving the Boolean Satisfiability Problem (SAT) over the last decade. SAT is now widely used in applications such as Formal Verification and Equivalence Checking. The conflict-driven SAT solvers are a dominant technique for large industrial applications, while look-ahead SAT solvers are strong on small hard combinatorial problems and random-formulae. The March (look-ahead) SAT solver won several awards at the SAT 2007 and SAT 2009 competitions. We will focus on two of its main features. The performance on satisfiable problems depends heavily on direction heuristics. These heuristics determine in each step of the search which subtree to visit first. The better these heuristics, the more it pays off to traverse the search-tree in a different order than depth-first. This phenomenon is clearly observed on random benchmarks. An alternative traversal, called distribution jumping, can speed-up the performance on these instances by a factor of 10. Moreover, distribution jumping yields even better results on many combinatorial problems. Random SAT problems are widely studied. It is easy to generate many small but very hard random formulae. Although learning is hardly useful on these problems, effective heuristics are crucial for fast performances. The SAT 2009 version of March introduces a new decision heuristic which is quite expensive. However, due to this new heuristic the search tree is reduced in such a way that the solving time is decreased significantly. As with many features of look-ahead SAT solvers this shows that expensive reasoning techniques can be very useful in practice.

Es laden ein die Dozenten der Fakultät für Ingenieurwissenschaften und Informatik.

Ulm, den 20.08.2009

gez. Prof. Dr. U. Schöning