

Thesis review

Author: Ruslan Jumurov

Name: Meta-optimization of a master key system solver

Review by the supervisor: Radomír Černoch, MSc.

The thesis deals with improving an existing solver for an NP-hard problem by automatically tuning its parameters. Machine-learning techniques are used to extract the relationship between problem instances and suitable choices of heuristic parameters.

The strongest point is the technical result. The proposed method was evaluated on a commercial, already-tuned solver and the hardest existing dataset (to the best of my knowledge). Achieving a performance improvement in a similarly difficult environment is exceptional for a master's thesis. The chosen method is straightforward yet robust and there is no apparent obstacle to transferring it into a different domain and solver. The student has shown a good knowledge of programming, machine-learning and optimization.

The weakest point of the thesis is the presentation. Chapter 7 on experimental evaluation, clearly the most important part of a practical thesis, is tangled. Two experiments are described, but it remains unclear which datasets were used for training. The cross-validation schema is mentioned very briefly. Furthermore some of the information is scattered throughout chapter 6, which deals with implementation details. A large overlap between the abstract and the introduction reveals a hasty writing process.

Because of the high difficulty of the task and good technical results, I assess the submitted thesis by grade B–very good.

In Prague on 25th May, 2015

Radomír Černoch, MSc.