META-LEARNING AND ALGORITHM SELECTION WORKSHOP AT ECAI 2014

MetaSel 2014

August 19, 2014

Prague, Czech Republic

Edited by

Joaquin Vanschoren, Pavel Brazdil, Carlos Soares and Lars Kotthoff

Preface

Algorithm Selection and configuration are increasingly relevant today. Researchers and practitioners from all branches of science and technology face a large choice of parameterized machine learning algorithms, with little guidance as to which techniques to use. Moreover, data mining challenges frequently remind us that algorithm selection and configuration are crucial in order to achieve the best performance, and drive industrial applications.

Meta-learning leverages knowledge of past algorithm applications to select the best techniques for future applications, and offers effective techniques that are superior to humans both in terms of the end result and especially in the time required to achieve it. In this workshop we will discuss different ways of exploiting meta-learning techniques to identify the potentially best algorithm(s) for a new task, based on meta-level information and prior experiments. We also discuss the prerequisites for effective meta-learning systems such as recent infrastructure such as OpenML.org.

Many problems of today require that solutions be elaborated in the form of complex systems or workflows which include many different processes or operations. Constructing such complex systems or workflows requires extensive expertise, and could be greatly facilitated by leveraging planning, meta-learning and intelligent system design. This task is inherently interdisciplinary, as it builds on expertise in various areas of AI.

This ECAI-2014 workshop will provide a platform for researchers and research students interested to exchange their knowledge about:

- Problems and solutions of algorithm selection and algorithm configuration
- How to use software and platforms to select algorithms in practice
- How to provide advice to end users about which algorithms to select in diverse domains, including optimization, SAT etc. and incorporate this knowledge in new platforms.

These proceedings include 14 contributions discussing the nature of algorithm selection which arises in many diverse domains, such as machine learning, data mining, optimization and satisfiability solving, among many others. We thank everybody for their sincere interest and their contributions, our programme committee for reviewing all submissions, and especially our invited speakers:

- Lars Kotthoff: Towards an Algorithm Selection Standard: Data Format and Tools.
- Frank Hutter: Bayesian Optimization for More Automatic Machine Learning.

We hope you will find it an interesting and inspiring workshop, leading to great new collaborations.

Eindhoven, July 2014

Joaquin Vanschoren
Pavel Brazdil
Carlos Soares
Lars Kotthoff

Main areas covered by the workshop

Of particular interest are methods and proposals that address the following issues:

- Algorithm Selection and Configuration
- Planning to learn and construct workflows
- Applications of workflow planning
- Meta-learning and exploitation of meta-knowledge
- Exploitation of ontologies of tasks and methods
- Exploitation of benchmarks and experimentation
- Representation of learning goals and states in learning
- Control and coordination of learning processes
- Meta-reasoning
- Experimentation and evaluation of learning processes
- Layered learning
- Multi-task and transfer learning
- Learning to learn
- Intelligent design
- Performance modeling
- Process mining

Program Committee

- Pavel Brazdil, LIAAD-INESC Porto L.A. / FEP, University of Porto, Portugal
- André C. P. Carvalho, USP, Brasil
- Claudia Diamantini, UniversitĂ Politecnica delle Marche, Italy
- Johannes Fuernkranz, TU Darmstadt, Germany
- Christophe Giraud-Carrier, Brigham Young Univ., USA
- Krzysztof Grabczewski, Nicolaus Copernicus University, Poland
- Melanie Hilario, Switzerland
- Frank Hutter, University of Freiburg, Germany
- Christopher Jefferson, University of St Andrews, UK
- Alexandros Kalousis, U Geneva, Switzerland
- Jörg-Uwe Kietz, U.Zurich, Switzerland
- Lars Kotthoff, University College Cork, Ireland
- Yuri Malitsky, University College Cork, Ireland
- Bernhard Pfahringer, U Waikato, New Zealand
- Vid Podpecan, Jozef Stefan Institute, Slovenia
- Ricardo Prudêncio, Univ. Federal de Pernambuco Recife (PE), Brasil
- Carlos Soares, FEP, University of Porto, Portugal
- Guido Tack, Monash University, Australia
- Joaquin Vanschoren, Eindhoven University of Technology
- Ricardo Vilalta, University of Houston, USA
- Filip Zelezný, CVUT, Prague, R.Checa