

Lecture Notes in Artificial Intelligence
Subseries of Lecture Notes in Computer Science
Edited by J. Siekmann

Lecture Notes in Computer Science
Edited by G. Goos and J. Hartmanis

Editorial

Artificial Intelligence has become a major discipline under the roof of Computer Science. This is also reflected by a growing number of titles devoted to this fast developing field to be published in our Lecture Notes in Computer Science. To make these volumes immediately visible we have decided to distinguish them by a special cover as Lecture Notes in Artificial Intelligence, constituting a subseries of the Lecture Notes in Computer Science. This subseries is edited by an Editorial Board of experts from all areas of AI, chaired by Jörg Siekmann, who are looking forward to consider further AI monographs and proceedings of high scientific quality for publication.

We hope that the constitution of this subseries will be well accepted by the audience of the Lecture Notes in Computer Science, and we feel confident that the subseries will be recognized as an outstanding opportunity for publication by authors and editors of the AI community.

Editors and publisher

Lecture Notes in Artificial Intelligence

Edited by J. Siekmann

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482

Y. Kodratoff (Ed.)

Machine Learning – EWSL-91

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Editor's Foreword

During the last decade numerous learning techniques, such as empirical induction, explanation-based learning, version spaces, etc., have been developed and tested on a variety of applications. It appears that each method leads to interesting results, but that real applications require a combination of the various methods in order to solve practical problems. This is why Part 1 of this book is concerned with a topic which has been emerging during the very last few years in Machine Learning (ML), **multi-strategy learning**, also called **constructive learning**. This part of the book starts with a kind of discussion between a theoretical approach as given by Giordana et al., and Tecuci's more intuitive approach. Part 1 goes on with several instances of a multi-strategic approach to ML, and ends up with a discussion on representation changes steered by F. Bergadano. The topic called **discovery** can be said to be an application of multi-strategy learning, since it tends to use a combination of inductive and deductive techniques in order to discover functional relationships among sets of numeric data. This topic has been already extensively dealt with in statistics. The point of view of ML in that matter, as shown by papers of Part 2, brings to the fore the importance of using the symbolic information implicitly contained in the data, rather than the raw data alone.

Part 3 deals with the **numeric and statistical approaches**, including techniques using information compression as the key to learning, also often called **inductive construction of decision trees** by ML specialists. The last paper in this part is the only representative of **genetic algorithms** that passed the criticism of our referees.

Part 4 brings us back to purely symbolic techniques stemming from **theorem proving** techniques, including **explanation-based learning**, which have become so important since the middle of the last decade. Part 5 deals with **inversion of resolution**, which is of course an inductive technique, but the origin of which is so much embedded within logic programming that it counts as the very first inductive technique to be as well formalized as the deductive ones.

In Part 6, **analogy and case-based reasoning**, we come back to more intuitive learning methods that have been undergoing a continuous progress during this last decade. Part 7, **multi-agents**, contains two papers describing how agents may interact in order to improve their learning. This last topic has received very little attention up to now. Together with multi-strategy approaches they may well become the great research topics of the 1990s. Last part, **applications**, describes some applications to ML.

The reader may complain about the scarcity of such applications in this volume. This is due to the fact that the content of the book stems from the proceedings of the fifth European Working Session on Learning (EWSL-91, the programme of which is given at the end of this volume) which deals more with recent advances in the field than with applications.

It is my pleasure to acknowledge the help I received from the EWSL programme committee in the selection of the papers accepted for this volume. The choices were made during a vivid discussion conducted almost entirely through electronic mail, which leads to a combination of an informal discussion where quick ideas are put forward, together with a bit more care than in ordinary meetings, since everything leaves a trace and is communicated to everyone else. If our European electronic mail could work a little bit better, this would certainly improve the ease with which such discussions take place. Some of our European PC members gathered information through replies from US members, while I was unable to reach them directly! EWSL-91 PC members are Ivan Bratko (Yugoslavia), Pavel Brazdil (Organization chair, Portugal), Peter Clark (UK), Kenneth De Jong (USA), Luc De Raedt (Belgium), Jean-Gabriel Ganascia (France), Yves Kodratoff (Programme chair, France), Nada Lavrac (Yugoslavia), Ramon Lopez de Mantaras (Spain), Katharina Morik (FRG), Igor Mozetic (Austria), Stephen Muggleton (UK), Lorenza Saitta (Italy), Alberto Segre (USA), Jude Shavlik (USA), Derek Sleeman (UK), Gheorghe Tecuci (Rumania and USA), Maarten Van Someren (The Netherlands).

The discussions of the programme committee, hence the composition of this volume, have been strongly inspired by a large selection of the members of the ML community, mainly if not exclusively a European one. I warmly thank all these referees for their careful job. I also take the opportunity of noticing that the number of referees has been larger than the number of papers accepted for publication, allowing each paper to be reported upon four times. This shows well that the European community of ML is growing at a steady rate, that the field is now quite mature, and ready to start working on large applications. Here is a list of the people who acted as referees for EWSL-91:

J. Aguilar, A. Arigoni, M. Bain, Jerzy Bala, Francesco Bergadano, R. Bisio, Gilles Bisson, Marko Bohanec, Damjan Bojadziev, Pierre Bonelli, Robin A. Boswell, Ivan Bratko, Pavel Brazdil, Maurice Bruynooghe, Cao Feng, Claudio Carpineto, Bojan Cestnik, Peter Clark, Helen G. Cobb, William Cohen, Antoine Cornuejols, Susan Craw, Kenneth De Jong, Luc De Raedt, Danny De Schreye, L. Di Pace, Bojan Dolsak, Kejitan Dontas, Saso Dzeroski, Peter Edwards, Werner Emde, F. Esposito, F. Fabrocini, Bogdan Filipic, Doug Fisher, Marta Franova, Jean-Gabriel Ganascia, R. Gemello, A. Giordana, Diana Gordon, Nicolas Graner, Haym Hirsh, Simon Holland, Dimitar Hristovski, Aram Karalic, Joerg-Uwe Kietz, Kenneth Kaufman, Saliha Khoulas, Yves Kodratoff, Igor Kononenko, Matevz Kovacic, Nada Lavrac, Ramon Lopez de Mantaras, F. Malerba, F. Mana, P. Meseguer, Simos Metaxas, J. Millan, Ray Mooney, Eduardo Morales, Katharina Morik, Marjorie Moulet, Igor Mozetic, Stephen Muggleton, Yves Niquil, M. Nunez, Rudiger Oehlmann, Peter W. Pachowicz, Jan Paredis, Alexandre Parodi, Bernhard Pfahringer, Enric Plaza, Jean-Francois Puget, Connie Ramsey, Michael Rissakis, Celine Rouveirol, Gunther Sablon, Lorenza Saitta, Alan C. Schultz, Alberto Segre, V. Semeraro, Sunil Sharma, Jude Shavlik, Derek Sleeman, William N. Spears, Martin Stacey, Jan Talmon, Michael Tanner, Gheorghe Tecuci, P. P. Terpstra, Luis Torgo, C. Torras, Tanja Urbancic, Bozo Urh, Bradley W. Utz, Walter Van de Velde, Maarten W. Van Someren, Alen Varsek, Harry Vassilev, Gilles Venturini, Christel Vrain, Gerhard Widmer, Bob J. Wielinga, Janusz Wnek, Stefan Wrobel, Jianping Zhang, Renata Zupanc.

Contents

Foreword.....	V
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Part 1: Constructive Induction and Multi-strategy Approaches

A. Giordana, D. Roverso, and L. Saitta	
Abstracting Background Knowledge for Concept Learning.....	1
G. Tecuci	
A Multistrategy Learning Approach to Domain Modeling and Knowledge Acquisition.....	14
G. Widmer	
Using Plausible Explanations to Bias Empirical Generalizations in Weak Theory Domains.....	33
D. Yang, G. Blix, and L. A. Rendell	
The Replication Problem: A Constructive Induction Approach.....	44
F. Zerr and J.G. Ganascia	
Integrating an Explanation-Based Learning Mechanism into a General Problem-Solver.....	62
C. Carpineto	
Analytical Negative Generalization and Empirical Negative Generalization are not Cumulative: A Case Study.....	81
F. Bergadano, F. Esposito, C. Rouveirol, and S. Wrobel	
Panel: Evaluating and Changing Representation in Concept Acquisition.....	89

Part 2: Discovery

J. M. Zytchow and J. Zhu	
Panel: Application of Empirical Discovery in Knowledge Acquisition.....	101

M. Moulet	
Using Accuracy in Scientific Discovery.....	118

G. Bisson	
KBG: A Generator of Knowledge Bases.....	137

Part 3: Numeric and Statistical Approaches

B. Cestnik and I. Bratko	
On Estimating Probabilities in Tree Pruning.....	138

P. Clark and R. Boswell	
Rule Induction with CN2: Some Recent Improvements.....	151

J. Catlett	
On Changing Continuous Attributes into Ordered Discrete Attributes.....	164

F. Verdenius	
A Method for Inductive Cost Optimization.....	179

C. Schaffer	
When Does Overfitting Decrease Prediction Accuracy in Induced Decision Trees and Rule Sets?.....	192

I. Kononenko	
Semi-Naive Bayesian Classifier.....	206

C. Decaestecker	
Description Contrasting in Incremental Concept Formation.....	220

M. Kubat and J. Pavlickova	
The System FLORA: Learning from Time-Varying Training Sets.....	234

M. Dorigo	
Message-Based Bucket Brigade: An Algorithm for the Apportionment of Credit Problem.....	235

Part 4: Theorem Proving and EBL

L. De Raedt, J. Feyaerts, and M. Bruynooghe Acquiring Object-Knowledge for Learning Systems.....	245
N. Lavrac, S. Dzeroski, and M. Grobelnik Learning Nonrecursive Definitions of Relations with LINUS.....	265
I. Mozetic and C. Holzbaur Extending Explanation-Based Generalization by Abstraction Operators.....	282
C. Belleannee and J. Nicolas Static Learning for an Adaptative Theorem Prover.....	298
K. Zercher Explanation-Based Generalization and Constraint Propagation with Interval Labels.....	312
P. Urbano Learning by Explanation of Failures.....	327
L. De Raedt Panel: Logic and Learnability.....	344
L. Saitta Panel: Causality and Learning.....	345
J. Nicolas Seed Space and Version Space: Generalizing from Approximations.....	346
S. Delisle, S. Matwin, and L. Zupan Integrating EBL with Automatic Text Analysis.....	347

Part 5: Inversion of Resolution

B. Duval Abduction and Induction for Explanation-Based Learning.....	348
S. H. Nienhuys-Cheng and P. A. Flach Consistent Term Mappings, Term Partitions and Inverse Resolution.....	361

Part 6: Analogy and Case-Based Learning

M.M. Veloso and J. G. Carbonell

Learning by Analogical Replay in PRODIGY: First Results.....375

B. Tausend and S. Bell

Analogical Reasoning for Logic Programming.....391

B. Lopez and E. Plaza

Case-Based Learning of Strategic Knowledge.....398

Part 7: Multi-agents

P. Brazdil, M. Gams, S. Sian, L. Torgo, and W. Van de Velde

Panel: Learning in Distributed Systems and Multi-Agent Environments.....412

P. Brazdil and S. Muggleton

Learning to Relate Terms in a Multiple Agent Environment.....424

S. S. Sian

Extending Learning to Multiple Agents: Issues and a Model for Multi-Agent

Machine Learning (MA-ML).....440

Part 8: Applications

P. Clark, B. Cestik, C. Sammut, and J. Stender

Panel: Applications of Machine Learning: Notes from the Panel Members.....457

H. Lounis and G.M. Bisson

Evaluation of Learning Systems: An Artificial Data-Based Approach.....463

L. Di Pace, F. Fabrocini, and G. Bolis

Shift of Bias in learning from Drug Compounds: The Fleming Project.....482

E. Morales

Learning Features by Experimentation in Chess.....494

F. Courtot	
Representation and Induction of Musical Structures for Computer Assisted Composition.....	512
S. Schulze-Kremer and R. D. King	
IPSA: Inductive Protein Structure Analysis.....	513
T. R. Addis, Y. Kodratoff, R. Lopez de Mantaras, K. Morik, and E. Plaza	
Panel: Four Stances on Knowledge Acquisition and Machine Learning.....	514
Programme of EWSL-91.....	534