



The 15th International Conference on
Algorithmic Learning Theory
and
The 7th International Conference on
Discovery Science
Padova University, Padova, Italy
October 2 - 5, 2004
ALT '04 / DS '04 – Conference Program

The 15th International Conference on Algorithmic Learning Theory (ALT'04) and the 7th International Conference on Discovery Science will be held at Padova University, Padova, Italy, October 2 - 5, 2004 as part of the Padova Dialogues. The Conferences are sponsored by the Institute for Theoretical Computer Science, University at Lübeck, by the Division of Computer Science, Hokkaido University, Department of Information Engineering of the University of Padova, Yokohama National University, and the Research Institute on High Performance Computing and Networking of the Italian National Research Council (ICAR-CNR)

This ALT conference is the 15th in a series of annual meetings established in 1990. For information concerning previous ALT meetings visit the Archives of ALT conferences at <http://www.tcs.uni-luebeck.de/pages/thomas/>

The ALT series is focusing on all areas related to algorithmic learning theory including (but not limited to): *the design and analysis of learning algorithms, computational models of machine learning (e.g., on-line learning, learning via queries, inductive inference, statistical learning), specific algorithmic approaches (e.g., margin-based algorithms, MDL estimation), learning complex models (e.g., neural networks, Bayesian networks, logical formulae, grammars, instance-based models), machine discovery, and applications of machine learning to other fields (e.g., data mining, web mining, bioinformatics).*

The ALT conference program comprises 29 lectures selected by its program committee from 91 submissions.

This DS conference is the seventh in a series of annual meetings established by the Discovery Science Project of Japan in 1998. The DS conferences provide an open forum for intensive discussions and interchange of new information among researchers working in the area of Discovery Science including (but not limited to) the following topics: *logic for/of knowledge discovery; knowledge discovery*

by inferences; abductive reasoning; heuristic search; constructive programming as discovery; knowledge discovery from texts and the Web; knowledge discovery from unstructured and multimedia data; knowledge discovery in databases; data mining; data and knowledge visualization; active mining; knowledge discovery in network environments; intelligent network agents; machine learning; statistical methods and neural networks for knowledge discovery; Bayesian networks; knowledge discovery and human interaction; human factors in knowledge discovery; philosophy and psychology of discovery; chance discovery; scientific discovery; application of knowledge discovery to natural and social sciences.

The DS conference program comprises 20 long papers and 19 regular papers selected by its program committee from 80 submissions.

Additionally, we are are fortunate to present five invited lectures by:

Nicolò Cesa-Bianchi (Univ. degli Studi di Milano, Italy)

Pedro Domingos (Univ. of Washington, Seattle, USA)

Luc De Raedt (Univ. Freiburg, Freiburg, Germany)

Ayumi Shinohara (Kyushu Univ. Fukuoka, Japan)

Esko Ukkonen (Univ. of Helsinki, Helsinki, Finland)

which are shared by both conferences.

The E.M. Gold Award winner in 2004 is Hubie Chen. Congratulations !!!

For any further information as well as for **registration**, we refer to the following web-pages:

<http://www.tcs.uni-luebeck.de/pages/alt04.html>

<http://www.slab.dnj.ynu.ac.jp/DS04/>

<http://thepadovialogues.dei.unipd.it/>



Saturday, October 2



ALT '04 and DS '04 Joint Program

Saturday, October 2, Morning

REGISTRATION:

from 8.30 to 13.00 and from 18.30 to 20.30 at the Department of Information Engineering of the University of Padova

9.00–9.10: **Opening of Dialogues 2004:** Alberto Apostolico

SESSION 1: Saturday, October 2, Morning

Tutorial on Statistical Bases of Machine Learning

Chair: John Case

9.10–11.10: Bruno Apolloni

Foundations

Short Break

11.20–12.50: Bruno Apolloni and Dario Malchiodi

Machine Learning

Lunch Break (at your own)

SESSION 2: Saturday, October 2, Afternoon

Chair: Einoshin Suzuki

13.50–14.50: **Invited Talk by Pedro Domingos**

Learning, Logic, and Probability: A Unified View

Short Break

SESSION 3: Saturday, October 2, Afternoon

Tutorial on Statistical Mechanical Methods in Learning

Chair: Shai Ben-David

15.00–16.00: Toshiyuki Tanaka

Statistical Learning in Digital Wireless Communications

16.00–17.00: Yoshiyuki Kabashima

A BP-Based Algorithm for Performing Bayesian Inference in Large Networks of Perceptron-Type

Short Break

17.10–18.10: Manfred Opper

Approximate Inference in Probabilistic Models

18.30–20.30: **Reception**



Program

SESSION 1: Sunday, October 3, Morning

Chair: Steffen Lange

9.00–10.00: **Invited Talk by Ayumi Shinohara**

String Pattern Discovery

Coffee Break

SESSION 2: Sunday, October 3, Morning

Inductive Inference I

Chair: Sandra Zilles

10.40–11.05: Sanjay Jain and Efim Kinber

Learning Languages from Positive Data and Negative Counterexamples

11.05–11.30: M. R. K. Krishna Rao

Inductive Inference of Term Rewriting Systems from Positive Data

Short Break

SESSION 3: Sunday, October 3, Morning

Inductive Inference II

Chair: Peter Flach

11.40–12.05: Eric Martin, Arun Sharma, and Frank Stephan

On the Data Consumption Benefits of Accepting Increased Uncertainty

12.05–12.30: Steffen Lange and Sandra Zilles

Comparison of Query Learning and Gold-style Learning in Dependence of the Hypothesis Space

12.30–12.55: Yasuhito Mukouchi and Masako Sato

Learning Languages generated by Elementary Formal Systems and its Application to SH Languages

Lunch Break

SESSION 4: Sunday, October 3, Afternoon

Chair: Arun Sharma

14.30–15.30: **Invited Talk by Nicolás Cesa-Bianchi**

Applications of Regularized Least Squares in Classification Problems

Short Break

SESSION 5: Sunday, October 3, Afternoon

PAC Learning and Boosting I

Chair: Gabor Lugosi

15.40–16.05: Kohei Hatano and Osamu Watanabe

Learning r -of- k Functions by Boosting

16.05–16.30: Eiji Takimoto, Syuhei Koya, and Akira Maruoka

Boosting Based on Divide and Merge

Coffee Break

SESSION 6: Sunday, October 3, Afternoon

Statistical Supervised Learning

Chair: Akira Maruoka

17.10–17.35: Amos Fiat and Dmitry Pechyony

Decision Trees: More Theoretical Justification for Practical Algorithms

17.35–18.00: Daniil Ryabko

Application of Classical Nonparametric Predictors to Learning Conditionally I.I.D. Data

18.00–18.25: Amiran Ambroladze and John Shawe-Taylor
Complexity of Pattern Classes and Lipschitz Property

18.25–18.50: Jan Poland and Marcus Hutter

On the Convergence Speed of MDL Predictions for Bernoulli Sequences

SESSION 7: Monday, October 4, Morning

Statistical Analysis of Unlabeled Data I

Chair: Rocco Servedio

9.00–9.25: Maria-Florina Balcan, Avrim Blum, and Santosh Vempala

On Kernels, Margins, and Low-dimensional Mappings

9.25–9.50: Kazuho Watanabe and Sumio Watanabe

Estimation of the Data Region Using Extreme-value Distributions

Coffee Break

SESSION 8: Monday, October 4, Morning

Statistical Analysis of Unlabeled Data II

Chair: Eiji Takimoto

10.30–10.55: Victor Maslov and Vladimir V'yugin

Maximum Entropy Principle in Non-Ordered Setting

10.55–11.20: Marcus Hutter and Andrej Muchnik

Universal Convergence of Semimeasures on Individual Random Sequences

Short Break

SESSION 9: Monday, October 4, Morning

Online Sequence Prediction

Chair: Nicolò Cesa-Bianchi

11.30–11.55: Yuri Kalnishkan, Vladimir Vovk, and Michael V. Vyugin

A Criterion for the Existence of Predictive Complexity for Binary Games

11.55–12.20: Chamy Allenberg-Neeman and Benny Neeman

Full Information Game with Gains and Losses

12.20–12.45: Marcus Hutter and Jan Poland

Prediction with Expert Advice by Following the Perturbed Leader for General Weights

13.00–14.00: **ALT & DS Business Meeting (during Lunch)**

SESSION 10: Monday, October 4, Afternoon

Chair: Hiroshi Motoda

14.15–15.15: **Invited Talk by Luc De Raedt**

Probabilistic Inductive Logic Programming

Short Break

SESSION 11: Monday, October 4, Afternoon

Approximate Optimization Algorithms I

Chair: Susumu Hayashi

15.25–15.50: Mark Herbster

Relative Loss Bounds and Polynomial-time Predictions for the K-LMS-NET Algorithm

15.50–16.15: Hans Ulrich Simon

On the Complexity of Working Set Selection

Coffee Break

SESSION 12: Monday, October 4, Afternoon

Approximate Optimization Algorithms II

Chair: Setsuo Arikawa

16.55–17.20: Nikolas List

Convergence of a Generalized Gradient Selection Approach for the Decomposition Method

17.20–17.45: Keisuke Yamazaki and Sumio Watanabe

Newton Diagram and Stochastic Complexity in Mixture of Binomial Distributions

Short Break

SESSION 13: Monday, October 4, Afternoon

Logic Based Learning I

Chair: Peter Flach

17.55–18.20: Andrei Bulatov, Hubie Chen, and Víctor Dalmau

Learnability of Relatively Quantified Generalized Formulas

18.20–18.45: Judy Goldsmith, Robert H. Sloan, Balázs Szörényi, and György Turán

New Revision Algorithms

Conference Dinner from 20.00 on

SESSION 14: Tuesday, October 5, Morning

Query and Reinforcement Learning

Chair: Rüdiger Reischuk

9.00–9.25: Satoshi Matsumoto and Takayoshi Shoudai

Learning of Ordered Tree Languages with Height-Bounded Variables using Queries

9.25–9.50: Jérôme Besombes and Jean-Yves Marion

Learning Tree Languages from Positive Examples and Membership Queries

9.50–10.15: Ana Iglesias, Paloma Martínez, Ricardo Aler, and Fernando Fernández

Learning Content Sequencing in an Educational Environment According to Student Needs

Coffee Break

SESSION 15: Tuesday, October 5, Morning

Learning and Logic

Chair: Hans Ulrich Simon

10.55–11.20: Marta Arias and Roni Khardon

The Subsumption Lattice and Query Learning

11.20–11.45: Akinobu Miyata, Jun Tarui, Etsuji Tomita
Learning Boolean Functions in AC^0 on Attribute and Classification Noise

Short Break

SESSION 16: Tuesday, October 5, Morning

Chair: Thomas Zeugmann

11.55–12.55: **Invited Talk by Esko Ukkonen**

Hidden Markov Modelling Techniques for Haplotype Analysis

Adjourn



PROGRAM

SESSION 1: Sunday, October 3, Morning

Chair: Steffen Lange

9.00–10.00: **Invited Talk by Ayumi Shinohara**

String Pattern Discovery

Coffee Break

SESSION 2: Sunday, October 3, Morning

Discovery Science in Reality I

Chair: Luc De Raedt

10.40–11.05: Taneli Mielikäinen

Privacy Problems with Anonymized Transaction Databases

11.05–11.30: Ruggero G. Pensa, Jérémy Besson, and Jean-François Boulicaut

A Methodology for Biologically Relevant Pattern Discovery from Gene Expression Data

Short Break

SESSION 3: Sunday, October 3, Morning

Classification

Chair: Sanjay Jain

11.40–12.05: Fang Chu, Yizhou Wang, and Carlo Zaniolo
Mining Noisy Data Streams via a Discriminative Model

12.05–12.30: Albrecht Zimmermann and Luc De Raedt
CorClass: Correlated Association Rule Mining for Classification

12.30–12.55: Jesús Cerquides and Ramon Lòpez de Màntaras

Maximum a Posteriori Tree Augmented Naive Bayes Classifiers

Lunch Break

SESSION 4: Sunday, October 3, Afternoon

Chair: Arun Sharma

14.30–15.30: **Invited Talk by Nicolás Cesa-Bianchi**

Applications of Regularized Least Squares in Classification Problems

Short Break

SESSION 5: Sunday, October 3, Afternoon

Clustering

Chair: Carlo Zaniolo

15.40–16.05: Hisashi Koga, Tetsuo Ishibashi, and Toshi-nori Watanabe

Fast Hierarchical Clustering Algorithm using Locality-Sensitive Hashing

16.05–16.30: SiQuang Le and TuBao Ho

Measuring the Similarity for Heterogenous Data: An Ordered Probability-Based Approach

Coffee Break

SESSION 6: Sunday, October 3, Afternoon

Knowledge Acquisition

Chair: Ramon Lòpez de Màntaras

17.10–17.35: Son Bao Pham and Achim Hoffmann

Extracting Positive Attributions from Scientific Papers

17.35–18.00: Thanh-Nghi Do and François Poulet

Enhancing SVM with Visualization

18.00–18.25: Mina Akaishi, Ken Satoh, and Yuzuru Tanaka

An Associative Information Retrieval based on the Dependency of Term Co-occurrence

18.25–18.50: Tri M. Cao, Eric Martin, and Paul Compton
On the Convergence of Incremental Knowledge Base Construction

SESSION 7: Monday, October 4, Morning

Introductory Presentations of Regular Papers on Pattern Mining and Machine Learning Algorithms

Chair: Einoshin Suzuki

9.00–9.05: Alberto Apostolico, Cinzia Pizzi, and Giorgio Satta

Optimal Discovery of Subword Associations in Strings (Extended abstract)

9.05–9.10: Floris Geerts, Bart Goethals, and Taneli Mielikäinen

Tiling Databases

9.10–9.15: Benoît Vaillant, Philippe Lenca, and Stéphane Lallich

A Clustering of Interestingness Measures

9.15–9.20: Yoshikazu Shima, Shinji Mitsuishi, Kouichi Hirata, and Masateru Harao

Extracting Minimal and Closed Monotone DNF Formulas

9.20–9.25: José Luis Balcázar and Jaume Baixeries
Characterizations of Multivalued Dependencies and Related Expressions (Extended Abstract)

9.25–9.30: Fabrice Muhlenbach, Stéphane Lallich, and Djamel A. Zighed

Outlier Handling in the Neighbourhood-based Learning of a Continuous Class

9.30–9.35: Minho Kim and R.S. Ramakrishna

A New Clustering Algorithm based on Cluster Validity Indices

9.35–9.40: Songbo Tan and Jun Gu

An Efficient Rules Induction Algorithm for Rough Set Classification

9.40–9.45: Ricardo Blanco-Vega, José Hernández-Orallo, and María José Ramírez-Quintana

Analysing the Trade-off between Comprehensibility and Accuracy in Mimetic Models

9.45–9.50: Jinu Joo, Jun Zhang, Jihoon Yang, and Vasant Honavar

Generating AVTs Using GA for Learning Decision Tree Classifiers with Missing Data

Coffee Break

SESSION 8: Monday, October 4, Morning

Introductory Presentations of Regular Papers on

Web Mining, Applications of Predictive Methods, and Interdisciplinary Approaches

Chair: Einoshin Suzuki

10.30–10.35: Masayuki Hirose and Einoshin Suzuki

Using WWW-Distribution of Words in Detecting Peculiar Web Pages

10.35–10.40: Shoujian Yu, Jianwei Liu, and Jiajin Le

DHT Facilitated Web Service Discovery Incorporating Semantic Annotation

10.40–10.45: Ryutaro Ichise, Masahiro Hamasaki, and Hideaki Takeda

Discovering Relationships among Catalogs

10.45–10.50: Chiara Cumbo, Salvatore Iiritano, and Pasquale Rullo

Reasoning-based Knowledge Extraction for Text Classification

10.50–10.55: Ye Du, Huiqiang Wang, and Yonggang Pang
*A Useful System Prototype for Intrusion Detection - Architecture and Experiments **

10.55–11.00: Sanghack Lee, Jihoon Yang, and Sung-Yong Park

Discovery of Hidden Similarity on Collaborative Filtering to Overcome Sparsity Problem

11.00–11.05: Marcelo A. T. Aragão and Alvaro A. A. Fernandes

Seamlessly Supporting Combined Knowledge Discovery and Query Answering: A Case Study

11.05–11.10: Charles-David Wajnberg, Vincent Corruble, Jean-Gabriel Ganascia, and C. Ulises Moulines

A Structuralist Approach towards Computational Scientific Discovery

11.10–11.15: Radoslaw Piotr Katarzyniak

Extracting Modal Implications and Equivalences from Cognitive Minds

Short Break

SESSION 9: Monday, October 4, Morning

Pattern Mining

Chair: Esko Ukkonen

11.30–11.55: Andreas Karwath and Luc De Raedt

Predictive Graph Mining

11.55–12.20: Takeaki Uno, Tatsuya Asai, Yuzo Uchida, and Hiroki Arimura

An Efficient Algorithm for Enumerating Closed Patterns in Transaction Databases

12.20–12.45: Shunsuke Inenaga, Hideo Bannai, Heikki Hyyrö, Ayumi Shinohara, Masayuki Takeda, Kenta Nakai, and Satoru Miyano

Finding Optimal Pairs of Cooperative and Competing Patterns with Bounded Distance

13.00–14.00: **ALT & DS Business Meeting (during Lunch)**

SESSION 10: Monday, October 4, Afternoon

Chair: Hiroshi Motoda

14.15–15.15: **Invited Talk by Luc De Raedt**

Probabilistic Inductive Logic Programming

Short Break

SESSION 11: Monday, October 4, Afternoon

Feature Construction and Generation

Chair: Akihiro Yamamoto

15.25–15.50: Kouzou Ohara, Yukio Onishi, Noboru Babaguchi, and Hiroshi Motoda

Constructive Inductive Learning based on Meta-Attributes

15.50–16.15: Gexiang Zhang, Laizhao Hu, and Weidong Jin

*Resemblance Coefficient and a Quantum Genetic Algorithm for Feature Selection **

Coffee Break

SESSION 12 & 13: Monday, October 4, Afternoon

16.55–18.45: **Poster Presentations of Regular Papers**

Conference Dinner from 20.00 on

SESSION 14: Tuesday, October 5, Morning

Outlier Detection

Chair: Hiroki Arimura

9.25–9.50: Fabrizio Angiulli, Stefano Basta, and Clara Pizzuti

Improving Prediction of Distance-Based Outliers

9.50–10.15: Fabrizio Angiulli, Gianluigi Greco, and Luigi Palopoli

Detecting Outliers via Logical Theories and its Data Complexity

Coffee Break

SESSION 15: Tuesday, October 5, Morning

Discovery Science in Reality II

Chair: Achim Hoffmann

10.55–11.20: Gilles Caporossi, Denis Alamargot, and David Chesnet

Using the Computer to Study the Dynamics of the Handwriting Processes

11.20–11.45: Przemysław Kazienko

Product Recommendation in E-Commerce Using Direct and Indirect Confidence for Historical User Sessions

Short Break

SESSION 16: Tuesday, October 5, Morning

Chair: Thomas Zeugmann

11.55–12.55: **Invited Talk by Esko Ukkonen**

Hidden Markov Modelling Techniques for Haplotype Analysis

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Acknowledgments

Conference Chair ALT 2004:

Akira Marouka, Tohoku University, Sendai, Japan

Conference Chair DS 2004:

Setsuo Arikawa, Kyushu University, Fukuoka, Japan

Local Arrangement Chair:

Massimo Melucci, University of Padova, Italy
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We look forward to seeing you in Padova.