

The 17th International Conference on Algorithmic Learning Theory

and

The 9th International Conference on



Discovery Science

Casa de Convalescència, Barcelona Spain, October 7 - 10, 2006

ALT '06 / DS '06 - Conference Program

The 17th International Conference on Algorithmic Learning Theory (ALT '06) and the 9th International Conference on Discovery Science (DS '06) will be held at the Casa de Convalescència in Barcelona, Spain, during October 7–10, 2006 as part of the PASCAL Dialogues 2006. The Conferences are sponsored by the Spanish Ministry of Education and Science, the Generalitat de Catalunya, the PASCAL network of excellence, Idescat, Statistical Institute of Catalonia, the Universitat Politécnica de Catalunya, and Google financing the E. M. Gold Award as well as Yahoo! Research financing the C. Smith Award. Further support has been provided by the Division of Computer Science of Hokkaido University and the Institute for TCS of the University at Lübeck.

This ALT conference is the 17th in a series of annual meetings established in 1990. For information concerning previous ALT meetings visit the Archives of ALT conferences at http://www-alg.ist.hokudai.ac.jp/~thomas/

The ALT series is focusing on all areas related to algorithmic learning theory including (but not limited to): Comparison of the strength of learning models and the design and evaluation of novel algorithms for learning problems in established learning-theoretic settings such as inductive inference, the PAC model, on-line learning, query models. Analysis of the theoretical properties of existing algorithms, where families of algorithms could include: boosting, kernel-based methods, Bayesian networks, methods for reinforcement learning or learning in repeated games, graph- and/or manifold-based methods, methods for latent-variable estimation and/or clustering, methods based on Dirichlet processes, MDL, decision tree methods, information-based methods. Analyses could include generalization, convergence or computational efficiency.

Elucidation of new theoretical principles to guide the design of learning algorithms, possibly including new measures of algorithm quality, general algorithm-design techniques, hypothesis classes, inductive biases.

Definition and analysis of new learning models. Models might identify and formalize classes of learning problems inadequately addressed by existing theory or capture salient properties of important concrete applications. The use of theory to improve the efficiency with which existing principles, such as Bayesian ideas, can be exploited.

The ALT conference program comprises 24 lectures selected by its program committee from 53 submissions.

This DS conference is the ninth 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 and philosophy of scientific discovery; knowledge discovery, machine learning and statistical methods; active knowledge discovery; text and web mining; information extraction from scientific literature; knowledge discovery from text and the web; knowledge discovery from unstructured and multimedia data; knowledge disvovery in network and link data; knowledge discovery in social networks; data and knowledge visualization; humanmachine interaction for knowledge discovery and management; biomedical knowledge discovery, analysis of microarray and gene deletion data; applications of the above techniques to natural or social sciences.

The DS conference program comprises 23 long papers and 18 regular papers selected by its program committee from 98 submissions.

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

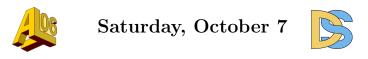
Andrew Ng, Stanford University, USA
Carole Goble, University of Manchester, UK
Padhraic Smyth, University of California, Irvine, USA
Gunnar Rätsch, Max Planck Society, Germany
Hans Ulrich Simon, Ruhr-University Bochum, Germany

which are shared by both conferences.

The E.M. Gold Award winner in 2006 is Alp Atıcı and the C.H. Smith Award winner is Rita Ribeiro. Congratulations!!!

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

 $http://www-alg.ist.hokudai.ac.jp/{\sim}thomas/ALT06/alt06.jhtml\\ http://www-ai.ijs.si/{\sim}ds06$



ALT '06 and DS '06 Joint Tutorials

organized by DS

and with the support of **lidescat**

Idescat, the Statistical Institute of Catalonia.

Saturday, October 7, Morning

REGISTRATION:

from 9.30 to 13.30 and from 15.00 to 18.30 at the Casa de Convalescència

Tutorial SESSION 1: Saturday, October 7, Morning

Chair: Nada Lavrac

10.00-13.30: Tutorial 1: Geographic and Spatial Data Mining

Presenter: Michael May, Fraunhofer Institute for Autonomous Intelligent Systems, Germany

13.30-15.00: Lunch

Tutorial SESSION 2: Saturday, October 7, Afternoon

Chair: Ljupco Todorovski

15.00–18.30: Tutorial 2: Using R for Data Mining and Scientific Discovery

Presenter: Luís Torgo, University of Porto, Portugal

18.30–20.00: Steering Committee Meeting (ALT and DS)

19.30–21.30: Welcome reception (Casa de Convalescència)



PROGRAM

Sunday, October 8, Morning

9.50-10.00: Opening of ALT and DS 2006:

José L. Balcázar and Klaus Peter Jantke

SESSION 1: Sunday, October 8, Morning

Chair: Phil Long

10.00–11.00: Invited talk by Andrew Ng

Reinforcement Learning and Apprenticeship Learning for

Robotic Control

11.00-11.30: Coffee Break

SESSION 2: Sunday, October 8, Morning

Query Learning

Chair: Henning Fernau

11.30–11.55: Nader H. Bshouty and Ehab Wattad

On Exact Learning Halfspaces with Random Consistent

Hypothesis Oracle

Gold Award Winner's talk

11.55-12.20: Alp Atıcı and Rocco A. Servedio

Learning Unions of $\omega(1)$ -Dimensional Rectangles

12.20-12.30: Short Break

SESSION 3: Sunday, October 8, Morning

Applications of Query Learning

Chair: Efim Kinber

12.30-12.55: Matti Kääriäinen

Active Learning in the Non-realizable Case

12.55-13.20: Jorge Castro

How Many Query Superpositions Are Needed to Learn?

13.30-15.00: Lunch

SESSION 4: Sunday, October 8, Afternoon

Chair: Nada Lavrac

15.00-16.00: Invited talk by Carole Goble

Putting Semantics into e-Science and the Grid

16.00-16.10: Short Break

SESSION 5: Sunday, October 8, Afternoon

Complexity of Learning

Chair: Sandra Zilles

16.10-16.35: Frank J. Balbach and Thomas Zeugmann

 $Teaching\ Memoryless\ Randomized\ Learners\ without\ Feed-$

back

16.35–17.00: Stephen Fenner and William Gasarch

The Complexity of Learning SUBSEQ(A)

17.00–17.25: Matthew de Brecht and Akihiro Yamamoto

Mind Change Complexity of Inferring Unbounded Unions

of Pattern Languages From Positive Data

17.25-17.55: Coffee Break

SESSION 6: Sunday, October 8, Afternoon

Inductive Inference

Chair: Nader Bshouty

17.55–18.20: Sanjay Jain and Efim Kinber

Learning and Extending Sublanguages

18.20-18.45: Sanjay Jain and Efim Kinber

Iterative Learning from Positive Data and Negative Coun-

terexamples

18.45–19.10: Sanjay Jain, Steffen Lange and Sandra Zilles

Towards a Better Understanding of Incremental Learning

19.30-20.30: Business Meeting

SESSION 7: Monday, October 9, Morning

Chair: Frank Stephan

10.00-11.00: Invited talk by Hans Ulrich Simon

The Usage of the Spectral Norm in Learning Theory:

Some Selected Topics

11.00-11.30: Coffee Break

SESSION 8: Monday, October 9, Morning

Online Learning

Chair: Hans-Ulrich Simon

11.30-11.55: Nader H. Bshouty and Iddo Bentov

On Exact Learning from Random Walk

11.55–12.20: Eyal Even-Dar, Michael Kearns and Jennifer

Wortman

Risk-Sensitive Online Learning

12.20-12.30: Short Break

SESSION 9: Monday, October 9, Morning

Predicting with Experts

Chair: Marcus Hutter

12.30-12.55: Vladimir Vovk

Leading Strategies in Competitive On-Line Learning

12.55–13.20: Chamy Allenberg, Peter Auer, László Györfi

and György Ottucsák

Hannan Consistency in On-Line Learning in Case of Un-

bounded Losses under Partial Monitoring

13.30-15.00: Lunch Break

SESSION 10: Monday, October 9, Afternoon

Chair: Ljupco Todorovski

15.00-16.00: Invited talk by Padhraic Smyth

Data-Driven Discovery using Probabilistic Hidden Vari-

able Models

16.00-16.10: Short Break

SESSION 11: Monday, October 9, Afternoon

Algorithmic Forecasting

Chair: Steffen Lange

16.10-16.35: Marcus Hutter

General Discounting versus Average Reward

16.35-17.00: Jan Poland

 $The\ Missing\ Consistency\ Theorem\ for\ Bayesian\ Learning:$

Stochastic Model Selection

17.00–17.25: Shane Legg

Is there an Elegant Universal Theory of Prediction?

17.25-17.55: Coffee Break

SESSION 12: Monday, October 9, Afternoon

Boosting, Support Vector Machines and Kernel Methods

Chair: Olivier Bousquet

17.55-18.20: Leonid Kontorovich, Corinna Cortes,

Mehryar Mohri

Learning Linearly Separable Languages

18.20-18.45: Kohei Hatano

Smooth Boosting Using an Information-Based Criterion

18.45-19.10: Hsuan-Tien Lin and Ling Li

Large-Margin Thresholded Ensembles for Ordinal Regres-

sion: Theory and Practice

20.30-: **Banquet**

SESSION 13: Tuesday, October 10, Morning

Chair: José L. Balcázar

10.00-11.00: Invited talk by Gunnar Rätsch

The Solution of Semi-Infinite Linear Programs using

Boosting-like Methods

11.00-11.30: Coffee Break

SESSION 14: Tuesday, October 10, Morning

Reinforcement Learning

Chair: Vladimir Vovk

11.30–11.55: Daniil Ryabko and Marcus Hutter

Asymptotic Learnability of Reinforcement Problems with

Arbitrary Dependence

 $11.55{-}12.20{\colon}$ Takeshi Shibata, Ryo Yoshinaka and Takashi

Chikayama

Probabilistic Generalization of Simple Grammars and Its

Application to Reinforcement Learning

12.20-12.30: Short Break

SESSION 15: Tuesday, October 10, Morning

Statistical Learning

Chair: Rocco Servedio

12.30-12.55: Andreas Maurer

Unsupervised Slow Subspace-Learning from Stationary

Processes

12.55-13.20: Atsuyoshi Nakamura

Learning-Related Complexity of Linear Ranking Functions

13.30-15.00: Lunch

Adjorn



PROGRAM

Sunday, October 8, Morning

9.50-10.00: Opening of ALT and DS 2006:

José L. Balcázar and Klaus Peter Jantke

SESSION 1: Sunday, October 8, Morning

Chair: Phil Long

10.00-11.00: Invited talk by Andrew Ng

Reinforcement Learning and Apprenticeship Learning for

Robotic Control

11.00-11.30: Coffee Break

SESSION 2: Sunday, October 8, Morning

Regression

Chair:

Smith Award Winner's Talk

11.30-11.55: Rita Ribeiro and Luís Torgo

Rule-based Prediction of Rare Extreme Values

11.55-12.20: Marc Boullé and Carine Hue

Optimal Bayesian 2D-discretization for Variable Ranking in Regression

12.20-12.30: Short Break

SESSION 3: Sunday, October 8, Morning

Data Streams

Chair:

12.30-12.55: Albert Bifet and Ricard Gavaldà

Kalman Filters and Adaptive Windows for Learning in Data Streams

12.55-13.20: Milton Severo and João Gama

Change detection with Kalman Filter and CUSUM

13.30-15.00: Lunch

SESSION 4: Sunday, October 8, Afternoon

Chair: Nada Lavrac

15.00-16.00: Invited talk by Carole Goble

Putting Semantics into e-Science and the Grid

16.00-16.10: Short Break

SESSION 5: Sunday, October 8, Afternoon

Brief Poster Presentations

Chair:

16.10-16.15: Hanene Borchani, Nahla Ben Amor and Khaled Mellouli

Learning Bayesian Network Equivalence Classes from Incomplete Data

16.15-16.20: Laurent Brisson

 $Interesting\ Patterns\ Extraction\ Using\ Prior\ Knowledge$

16.20–16.25: Alípio M. Jorge, Fernando Pereira and Paulo J. Azevedo

Visual Interactive Subgroup Discovery with Numerical Properties of Interest

16.25–16.30: Lobna Karoui, Nacéra Bennacer and Marie-Aude Aufaure

Contextual Ontological Concepts Extraction

16.30–16.35: Fabio B. Losa, Pau Origoni and Gilbert Ritschard

 $\label{lem:experiences} Experiences\ from\ a\ Socio-Economic\ Application\ of\ Induction\ Trees$

16.35–16.40: Ricardo Martinez, Nicolas Pasquier, Claude Pasquier and Lucero Lopez-Perez

Interpreting Microarray Experiments Via Co-expressed Gene Groups Analysis (CGGA)

16.40-16.45: Shin-ichi Minato

Symmetric Item Set Mining Based on Zero-suppressed BDDs

16.45–16.50: Mizuho Mishima and Makoto Kikuchi

Mathematical Models of Category-Based Induction

16.50–16.55: Makoto Miwa, Daisaku Yokoyama and Takashi Chikayama

Automatic Construction of Static Evaluation Functions for Computer Game Players

16.55–17.00: Isabel Nepomuceno Chamorro, Juan Antonio Nepomuceno Chamorro, Roberto Ruiz and Jesùs S. Aguilar-Ruiz

Databases Reduction simultaneously by Ordered Projection

17.00–17.05: Mihaela Oprea

Mapping Ontologies in an Air Pollution Monitoring and Control Agent-based System

17.05–17.10: Aritz Pérez, Pedro Larrañaga and Iñaki Inza Information Theory and Classification Error in Probabilistic Classifiers

 $17.10\text{--}17.15\colon \text{Joe Phillips},$ Ronald Edwards and Raghuveer Kumarakrishnan

Checking Scientific Assumptions by Modeling

17.15–17.20: Gonzalo Ramos-Jiménez, José del Campo-Ávila and Rafael Morales-Bueno

Incremental Algorithm Driven by Error Margins

 $17.20{\text -}17.25{\text :}$ Nazha Selmaoui, Claire Leschi and Dominique Gay

Feature Construction and delta-Free Sets in 0/1 Samples

17.25–17.30: Roberto Therón

 $\label{local-condition} Visual\ Knowledge\ Discovery\ in\ Paleoclimatology\ with\ Parallel\ Coordinates$

 $17.30\text{--}17.35\colon$ Hye Sung Yoon, Sang Ho Lee, Sung Bum Cho and Ju Han Kim

 $A\ Novel\ Framework\ for\ Discovering\ Robust\ Cluster\ Results$

17.35–17.40: Li Juan Zhang and Zhou Jun Li

Gene Selection for Classifying Microarray Data Using Grey Relation Analysis

17.40-17.55: Coffee Break

SESSION 6: Sunday, October 8, Afternoon

Poster Session

17.55–19.00: See the list of papers above

19.30-20.30: Business Meeting

SESSION 7: Monday, October 9, Morning

Chair: Frank Stephan

10.00-11.00: Invited talk by Hans Ulrich Simon

The Usage of the Spectral Norm in Learning Theory:

Some Selected Topics

11.00-11.30: Coffee Break

SESSION 8: Monday, October 9, Morning

Scientific Discovery

Chair:

11.30-11.55: Catherine Blake and Meredith Rendall

Scientific Discovery: A View from the Trenches

11.55-12.20: Jean Sallantin and Christopher Dartnell

A Pragmatic Logic of Scientific Discovery

12.20-12.30: Short Break

SESSION 9: Monday, October 9, Morning

Data and Knowledge Visualisation

Chair:

12.30–12.55: Yukihiro Nakamura, Shin Ando, Kenji Aoki, Hiroyuki Mano and Einoshin Suzuki

Strategy Diagram for Identifying Play Strategies in Multiview Soccer Video Data

12.55–13.20: Antti Rasinen, Jaakko Hollmén and Heikki Mannila

Analysis of Linux Evolution Using Aligned Source Code Segments

13.30-15.00: Lunch

SESSION 10: Monday, October 9, Afternoon

Chair

15.00–16.00: Invited talk by Padhraic Smyth

Data-Driven Discovery using Probabilistic Hidden Variable Models

16.00-16.10: Short Break

SESSION 11: Monday, October 9, Afternoon

Remote Sensing and High Dimensional Data

Chair:

 $16.10\text{--}16.35\colon$ Armando Fernandes and Susana Nascimento

Automatic Water Eddy Detection in SST Maps Using Random Ellipse Fitting and Vectorial Fields for Image Segmentation

 $16.35\text{--}17.00\colon$ Ata Kabán, Jianyong Sun, Somak Raychaudhury and Louisa Nolan

On Class Visualisation for High Dimensional Data: Exploring Scientific Data Sets

17.00–17.25: Tomasz Stepinski, Soumya Ghosh and Ricardo Vilalta

Automatic Recognition of Landforms on Mars Using Terrain Segmentation and Classification

17.25-17.55: Coffee Break

SESSION 12: Monday, October 9, Afternoon

Clustering

Chair:

17.55–18.20: Heidi Koivistoinen, Minna Ruuska and Tapio Elomaa

A Voronoi Diagram Approach to Autonomous Clustering

 $18.20\text{--}18.45\colon$ Jae-Seong Ahn, Yang-Won Lee and Key-Ho Park

Clusterized Classification of Changing Regions Based on Temporal Context of Local Spatial Association

18.45–19.10: Jan Poland and Thomas Zeugmann

Clustering Pairwise Distances with Missing Data: Maximum Cuts versus Normalized Cuts

20.30: Banquet

SESSION 13: Tuesday, October 10, Morning

Chair: José L. Balcázar

10.00-11.00: Invited talk by Gunnar Rätsch

 $\begin{tabular}{ll} The Solution of Semi-Infinite Linear Programs using \\ Boosting-like Methods \end{tabular}$

11.00-11.30: Coffee Break

SESSION 14: Tuesday, October 10, Morning

Chair:

Document Clustering and Classification

11.30–11.55: Krzysztof Ciesielski and Mieczysław Kłopotek

Text Data Clustering by Contextual Graphs

11.55–12.20: Yaakov HaCohen-Kerner, Hananya Beck, Elchai Yehudai and Dror Mughaz

Identifying Historical Period and Ethnic Origin of Documents Using Stylistic Feature Sets

12.20-12.30: Short Break

SESSION 15: Tuesday, October 10, Morning

Text Mining

Chair:

12.30–12.55: György Szarvas, Richárd Farkas, András Kocsor

A Multilingual Named Entity Recognition System Using Boosting and C4.5 Decision Tree Learning Algorithms

12.55–13.20: Xin Wang and Ata Kabán

Model-based Estimation of Word Saliency in Text

13.30-15.00: Lunch

SESSION 16: Tuesday, October 10, Afternoon

Itemset and Sequence Mining

15.00–15.25: Yasuto Higa, Shunsuke Inenaga, Hideo Bannai and Masayuki Takeda

A New Family of String Classifiers Based on Local Relatedness

 $15.25{\text --}15.50$: Takashi Katoh, Kouichi Hirata and Masateru Harao

Mining Sectorial Episodes from Event Sequences

15.50–16.15: Taneli Mielikäinen, Panče Panov, Sašo Džeroski

Itemset Support Queries using Frequent Itemsets and Their Condensed Representations 16:15-16:30: Short Break

SESSION 17: Tuesday, October 10, Afternoon

Applications in Bioinformatics

16.30–16.55: Pedro Ferreira, Paulo J. Azevedo, Rui Brito and Cândida G. Silva

Mining Approximate Motifs in Time Series

16.55-17.20: ThanhPhuong Nguyen and Tu Bao Ho

Prediction of domain-domain interactions using inductive logic programming from multiple genome databases

Adjorn

Acknowledgments

Conference Chair ALT 2006:

José L. Balcázar, Universitat Politècnica de Catalunya

Conference Chair DS 2006:

Klaus P. Jantke, FIT Leipzig, Germany

Local Arrangement Chair:

Ricard Gavaldà, Universitat Politècnica de Catalunya altds06@lsi.upc.edu

Tutorial Chair

Johannes Fürnkranz, TU Darmstadt, Germany

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Osamu Watanabe (Tokyo Institute of Technology, Japan) and the current PC Chairs, who are one-year members of

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Einoshin Suzuki (Yokohama National Univ., Japan) Thomas Zeugmann (Hokkaido Univ., Japan)



We look forward to seeing you in Barcelona.

Conference Information

The conferences, including the reception and tutorial sessions, will be held at the Casa de Convalescència, hosted by the Casa de Convalescència (Institute for Catalan Studies).

Institut d'Estudis Catalans Casa de Convalescència Carrer del Carme, 47 (=Carme street, 47) Phone: +34 932 701 620

Please note that this phone is not the conference organization phone. It should be used only during the duration of the conferences as a quick way to contact conference participants.



The Casa de Convalescència, is a beautiful, 17th century building initially designed as a hospital. It is centrally located in downtown Barcelona, within walking distance of many of the major attractions and cultural centers.

How to get there? Generally speaking, you want to get to La Rambla street (also written Las Ramblas or Les Rambles). This is the main the main artery in Barcelona's old town, leading from the central Catalunya Square to the Old Port. If you are taking the metro to get there, take Line 3 (the green line) and exit at either the Plaça Catalunya or Liceu stops.

Carme Street goes west from La Rambla. You can identify it by the baroque church on the corner. Walk for 5 minutes: the Casa de Convalescència is on the left, immediately after a small square on your left.

From the Catalonia Duques de Bergara hotel, exit to Catalunya Square, find Las Ramblas on your right and follow the instructions above. From the Residencia de Investigadores: The Residencia is on the corner of Hospital Street and Egipciaques Street. Just follow Egipciaques Street to the next corner, which is Carme Street, and go right. The entrance to the conference venue is a few meters away.

Travel Information:

El Prat is Barcelona's international airport. It is located about 15 km south of Barcelona. You can get to the city by bus, train or taxi. If you are staying in the recommended accommodation, your general destination is Plaza Catalunya (Catalunya square).

- By taxi: There is a taxi stop in front of each of the terminals. The expected time to Plaza Catalunya is 20-25 minutes, but depends largely on traffic conditions. At the end of the trip, the driver will add a few euros over what the meter indicates, as airport fare. The total should be in the 20-25 € range.
- By bus ("Aerobus"): It runs every 12 minutes from 6 am to at least midnight. It stops in front of each of the terminals and takes you right to Plaza Catalunya in about 30 minutes. Buy the ticket on the bus; 3,75 € one way, 6,45 € roundtrip. Better option than train if you are staying in the recommended accommodation.
- By train: Line C10 runs every 30 minutes, starts at the airport and takes you to Sants and Passeig de Gracia train stations. Passeig de Gracia station is a 10-minute walk away from Plaza Catalunya. From Sants station you can change to other train lines going to Plaza Catalunya train station. Price is about 2.60 €.

Weather: The weather is still warm during October. The average maximum temperature is 23 degrees Celcius and the average minimum temperature is 15 degrees Celcius.

Conference City: Barcelona is the second largest city in Spain, and the capital of Catalonia. Its cultural richness, its location next to the Mediterranean coast, and its closeness to the French border has made it one of the most visited cities in the world, with over 4 million visitors per year.

Barcelona is best known for its architectural treasures. It features many unique buildings from the "Modernist" period (late 19th-early 20th centuries), seven of which have declared World Heritage Sites by UNESCO. Furthermore, in the last two decades, Barcelona has been an experimentation ground for the most innovative architectural concepts.

For more information see http://www.lsi.upc.edu/~altds06/