Lecture Notes in Artificial Intelligence 5632

Edited by R. Goebel, J. Siekmann, and W. Wahlster

Subseries of Lecture Notes in Computer Science

Petra Perner (Ed.)

Machine Learning and Data Mining in Pattern Recognition

6th International Conference, MLDM 2009
Leipzig, Germany, July 23-25, 2009
Proceedings

Springer

Volume Editor

Petra Perner
Institute of Computer Vision and Applied Computer Sciences (IBal)
Kohlenstr. 2, 04107 Leipzig, Germany
E-mail: pperner@ibai-institut.de

Library of Congress Control Number: 2009930146

CR Subject Classification (1998): I.2, F.4, I.4, I.5, H.3

LNCS Sublibrary: SL 7 – Artificial Intelligence

ISSN 0302-9743
ISBN-10 3-642-03069-6 Springer Berlin Heidelberg New York
ISBN-13 978-3-642-03069-7 Springer Berlin Heidelberg New York

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India
Printed on acid-free paper SPIN: 12714995 06/3180 5 4 3 2 1 0

Preface

There is no royal road to science,
and only those who do not dread the fatiguing climb of its steep paths have a chance of gaining its luminous summits.

Karl Marx
A Universial Genius of the 19th Century

Many scientists from all over the world during the past two years since the MLDM 2007 have come along on the stony way to the sunny summit of science and have worked hard on new ideas and applications in the area of data mining in pattern recognition. Our thanks go to all those who took part in this year's MLDM. We appreciate their submissions and the ideas shared with the Program Committee. We received over 205 submissions from all over the world to the International Conference on Machine Learning and Data Mining, MLDM 2009. The Program Committee carefully selected the best papers for this year's program and gave detailed comments on each submitted paper. There were 63 papers selected for oral presentation and 17 papers for poster presentation.

The topics range from theoretical topics for classification, clustering, association rule and pattern mining to specific data-mining methods for the different multimedia data types such as image mining, text mining, video mining and Web mining. Among these topics this year were special contributions to subtopics such as attribute discretization and data preparation, novelty and outlier detection, and distances and similarities. The section "Aspects of Data Mining" presented work that considers automating the whole data mining process. The sections also cover data mining in medicine.

Four papers were selected for the Best Paper Award. The final decision on the Best Paper was made during the conference and was based on the review results, the presentation style and the discussion. Please check www.mldm.de for information about the nominated papers and the final decision.

We thank all members of the Institute of Applied Computer Sciences, Leipzig, Germany (www.ibai-institut.de) who handled the conference as secretariat. We appreciate the help and understanding of the editorial staff at Springer, and in particular Alfred Hofmann, who supported the publication of these proceedings in the LNAI series.

Last, but not least, we wish to thank all the speakers and participants who contributed to the success of the conference. We would also like to encourage those who could not get their paper accepted to MLDM 2009 to work out the comments of the reviewers and resubmit their paper to our next conference. See you at MLDM 2011 (www.mldm.de).

July 2009 Petra Perner

International Conference on Machine Learning and Data Mining in Pattern Recognition MLDM 2009

Chair

Petra Perner	Institute of Computer Vision and Applied Computer Sciences IBaI Leipzig, Germany

Program Committee

Agnar Aamodt	NTNU, Norway
Jacky Baltes	University of Manitob, Canada
Max Bramer	University of Portsmouth, UK
Horst Bunke	University of Bern, Switzerland
Krzysztof Cios	University of Colorado, USA
Christoph F. Eick	University of Houston, USA
Ana Fred	Technical University of Lisbon, Portugal
Giorgio Giacinto	University of Cagliari, Italy
Makato Haraguchi	Hokkaido University Sapporo, Japan
Robert J. Hilderman	University of Regina, Canada
Tin Kam Ho	Bell Laboratories, USA
Atsushi Imiya	Chiba University, Japan
Horace Ip	City University, Hong Kong
Abraham Kandel	University of South Florida , USA
Dimitrios A. Karras	Chalkis Institute of Technology, Greece
Adam Krzyzak	Concordia University, Montreal, Canada
Longin Jan Latecki	Temple University Philadelphia, USA
Tao Li	Florida International University, USA
Brian Lovell	University of Queensland, Australia
Mariofanna Milanova	University of Arkansas at Little Rock, USA
Thang V. Pham	University of Amsterdam, The Netherlands
Maria da Graca Pimentel	Universidade de São Paulo, Brazil
Petia Radeva	Universitat Autonoma de Barcelona, Spain
Michael Richter	University of Calgary, Canada
Fabio Roli	University of Cagliari, Italy
Linda Shapiro	University of Washington, USA
Sameer Singh	Loughborough University, UK

David Steinberg	Tel Aviv University, Israel
Francesco Tortorella	Universita' degli Studi di Cassino, Italy
Patrick Wang	Northeastern University, USA

Additional Reviewers

Indriyati Atmosukarto	University of Washington, USA
Jiun-Hung Chen	University of Washington, USA
Natalia Larios	University of Washington, USA
Dingding Liu	University of Washington, USA
Marta Penas Centeno	University of Washington, USA
Jia Wu	University of Washington, USA
Sara Rolfe	University of Washington, USA
Shulin Yang	University of Washington, USA
Mabel Raza	University of Washington, USA
Rosalia Tungaraza	University of Washington, USA
Katarzyna Wilamowska	University of Washington, USA
Tore Amble	NTNU, Norway
Richard Blake	NTNU, Norway
Tore Bruland	NTNU, Norway
Tor Gunnar Houeland	NTNU, Norway
Dung Manh Chu	University of Amsterdam, The Netherlands
Francesco Fontanella	Universita' degli Studi di Cassino, Italy
Claudio Marrocco	Universita' degli Studi di Cassino, Italy
Mario Molinara	Universita' degli Studi di Cassino, Italy
Maria Teresa Ricamato	Universita' degli Studi di Cassino, Italy
Alessandra Scotto di Freca	Universita' degli Studi di Cassino, Italy
Paolo Simeone	Universita' degli Studi di Cassino, Italy
Davide Ariu	University of Cagliari, Italy
Battista Biggio	University of Cagliari, Italy
Luca Didaci	University of Cagliari, Italy
Giorgio Fumera	University of Cagliari, Italy
Gian Luca Marcialis	University of Cagliari, Italy
Daniele Muntoni	University of Cagliari, Italy
Ignazio Pillai	University of Cagliari, Italy
Luca Piras	University of Cagliari, Italy
Ajita Rattani	University of Cagliari, Italy
Roberto Tronci	University of Cagliari, Italy

Table of Contents

Attribute Discretization and Data Preparation

Classification

Ensemble Classifier Learning

Association Rules and Pattern Mining

Support Vector Machines

Clustering

Novelty and Outlier Detection

Learning

Data Mining on Multimedia Data

Text Mining

Aspects of Data Mining

Data Mining in Medicine