Lecture Notes in Computer Science 2189
Edited by G. Goos, J. Hartmanis, and J. van Leeuwen

Springer
Berlin
Heidelberg
New York
Barcelona
Hong Kong
London
Milan
Paris
Tokyo

Frank Hoffmann David J. Hand Niall Adams
Douglas Fisher Gabriela Guimaraes (Eds.)

Advances in Intelligent Data Analysis

4th International Conference, IDA 2001
Cascais, Portugal, September 13-15, 2001
Proceedings

Springer

Volume Editors

Frank Hoffmann
Royal Institute of Technology, Centre for Autonomous Systems
10044 Stockholm, Sweden
E-mail: hoffmann@nada.kth.se

David J. Hand
Niall Adams
Imperial College, Huxley Building
180 Queen's Gate, London SW7 2BZ, UK
E-mail: {d.j.hand,n.adams}@ic.ac.uk

Douglas Fisher
Vanderbilt University, Department of Computer Science
Box 1679, Station B, Nashville, TN 37235, USA
E-mail: dfisher@vuse.vanderbilt.edu

Gabriela Guimaraes
New University of Lisbon, Department of Computer Science
2825-114 Caparica, Portugal
E-mail: gg@di.fct.unl.pt

Cataloging-in-Publication Data applied for

Die Deutsche Bibliothek - CIP-Einheitsaufnahme

Advances in intelligent data analysis : 4th international conference ;
proceedings / IDA 2001, Cascais, Portugal, September 13 - 15, 2001. Frank
Hoffmann ... (ed.). - Berlin ; Heidelberg ; New York ; Barcelona ; Hong Kong ;
London ; Milan ; Paris ; Tokyo : Springer, 2001
(Lecture notes in computer science ; Vol. 2189)
ISBN 3-540-42581-0

CR Subject Classification (1998): H.3, I.2, G.3, I.5.1, I.4.5, J.2, J.1, J.3

ISSN 0302-9743
ISBN 3-540-42581-0 Springer-Verlag Berlin Heidelberg New York

Springer-Verlag Berlin Heidelberg New York
a member of BertelsmannSpringer Science+Business Media GmbH

http://www.springer.de

Printed in Germany

Typesetting: Camera-ready by author, data conversion by Boller Mediendesign
Printed on acid-free paper SPIN: 10840583 06/3142 5 4 3 2 1 0

Preface

These are the proceedings of the fourth biennial conference in the *Intelligent Data Analysis* series. The conference took place in Cascais, Portugal, 13–15 September 2001. The theme of this conference series is the use of computers in intelligent ways in data analysis, including the exploration of intelligent programs for data analysis. Data analytic tools continue to develop, driven by the computer revolution. Methods which would have required unimaginable amounts of computing power, and which would have taken years to reach a conclusion, can now be applied with ease and virtually instantly. Such methods are being developed by a variety of intellectual communities, including statistics, artificial intelligence, neural networks, machine learning, data mining, and interactive dynamic data visualization. This conference series seeks to bring together researchers studying the use of intelligent data analysis in these various disciplines, to stimulate interaction so that each discipline may learn from the others. So as to encourage such interaction, we deliberately kept the conference to a single track meeting. This meant that, of the almost 150 submissions we received, we were able to select only 23 for oral presentation and 16 for poster presentation. In addition to these contributed papers, there was a keynote address from Daryl Pregibon, invited presentations from Katharina Morik, Rolf Backhofen, and Sunil Rao, and a special 'data challenge' session, where researchers described their attempts to analyse a challenging data set provided by Paul Cohen. This acceptance rate enabled us to ensure a high quality conference, while also permitting us to provide good coverage of the various topics subsumed within the general heading of intelligent data analysis.

We would like to express our thanks and appreciation to everyone involved in the organization of the meeting and the selection of the papers. It is the behind-the-scenes efforts which ensure the smooth running and success of any conference. We would also like to express our gratitude to the sponsors: Fundação para a Ciência e a Tecnologia, Ministério da Ciência e da Tecnologia, Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa, Fundação Calouste Gulbenkian and IPE Investimentos e Participações Empresariais, S.A.

September 2001

Frank Hoffmann
David J. Hand
Niall Adams
Gabriela Guimaraes
Doug Fisher

Organization

IDA 2001 was organized by the department of Computer Science, New University of Lisbon.

Conference Committee

General Chair:	Douglas Fisher (Vanderbilt University, USA)
Program Chairs:	David J. Hand (Imperial College, UK)
	Niall Adams (Imperial College, UK)
Conference Chair:	Gabriela Guimaraes (New University of Lisbon, Portugal)
Publicity Chair:	Frank Höppner (Univ. of Appl. Sciences Emden, Germany)
Publication Chair:	Frank Hoffmann (Royal Institute of Technology, Sweden)
Local Chair:	Fernando Moura-Pires (University of Evora, Portugal)
Area Chairs:	Roberta Siciliano (University of Naples, Italy)
	Arno Siebes (CWI, The Netherlands)
	Pavel Brazdil (University of Porto, Portugal)

Program Committee

Niall Adams (Imperial College, UK)
Pieter Adriaans (Syllogic, The Netherlands)
Russell Almond (Educational Testing Service, USA)
Thomas Bäck (Informatik Centrum Dortmund, Germany)
Riccardo Bellazzi (University of Pavia, Italy)
Michael Berthold (Tripos, USA)
Liu Bing (National University of Singapore)
Paul Cohen (University of Massachusetts, USA)
Paul Darius (Leuven University, Belgium)
Fazel Famili (National Research Council, Canada)
Douglas Fisher (Vanderbilt University, USA)
Karl Froeschl (University of Vienna, Austria)
Alex Gammerman (Royal Holloway, UK)
Adolf Grauel (University of Paderborn, Germany)
Gabriela Guimaraes (New University of Lisbon, Portugal)
Lawrence O. Hall (University of South Florida, USA)
Frank Hoffmann (Royal Institute of Technology, Sweden)
Adele Howe (Colorado State University, USA)
Klaus-Peter Huber (SAS Institute, Germany)
David Jensen (University of Massachusetts, USA)
Joost Kok (Leiden University, The Netherlands)
Rudolf Kruse (University of Magdeburg, Germany)
Frank Klawonn (University of Applied Sciences Emden, Germany)

Hans Lenz (Free University of Berlin, Germany)
David Madigan (Soliloquy, USA)
Rainer Malaka (European Media Laboratory, Germany)
Heikki Mannila (Nokia, Finland)
Fernando Moura Pires (University of Evora, Portugal)
Susana Nascimento (University of Lisbon, Portugal)
Wayne Oldford (University of Waterloo, Canada)
Albert Prat (Technical University of Catalunya, Spain)
Peter Protzel (Technical University Chemnitz, Germany)
Giacomo della Riccia (University of Udine, Italy)
Rosanna Schiavo (University of Venice, Italy)
Kaisa Sere (Abo Akademi University, Finland)
Roberta Siciliano (University of Naples, Italy)
Rosaria Silipo (Nuance, USA)
Floor Verdenius (ATO-DLO, The Netherlands)
Stefan Wrobel (University of Magdeburg, Germany)
Hui XiaoLiu (Brunel University, UK)
Nevin Zhang (Hong Kong University of Science and Technology, Hong Kong)

Sponsoring Institutions

Fundação para a Ciência e a Tecnologia, Ministério da Ciência e da Tecnologia
Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa
Fundação Calouste Gulbenkian
IPE Investimentos e Participações Empresariais, S.A.

Table of Contents

The Fourth International Symposium on Intelligent Data Analysis