

Silvia Miksch
Jim Hunter
Elpida Keravnou (Eds.)

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Artificial Intelligence in Medicine

10th Conference on Artificial Intelligence
in Medicine, AIME 2005
Aberdeen, UK, July 2005, Proceedings

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Artificial Intelligence in Medicine

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Lecture Notes in Artificial Intelligence 3581

Edited by J. G. Carbonell and J. Siekmann

Subseries of Lecture Notes in Computer Science

Preface

The European Society for Artificial Intelligence in Medicine (AIME) was established in 1986 with two main goals: 1) to foster fundamental and applied research in the application of Artificial Intelligence (AI) techniques to medical care and medical research, and 2) to provide a forum at biennial conferences for reporting significant results achieved. Additionally, AIME assists medical industrialists to identify new AI techniques with high potential for integration into new products. A major activity of this society has been a series of international conferences held biennially over the last 18 years: Marseilles, France (1987), London, UK (1989), Maastricht, Netherlands (1991), Munich, Germany (1993), Pavia, Italy (1995), Grenoble, France (1997), Aalborg, Denmark (1999), Cascais, Portugal (2001), Protaras, Cyprus (2003).

The AIME conference provides a unique opportunity to present and improve the international state of the art of AI in medicine from both a research and an applications perspective. For this purpose, the AIME conference includes invited lectures, contributed papers, system demonstrations, a doctoral consortium, tutorials, and workshops. The present volume contains the proceedings of AIME 2005, the 10th conference on Artificial Intelligence in Medicine, held in Aberdeen, Scotland, July 23-27, 2005.

In the AIME 2005 conference announcement, we encouraged authors to submit original contributions to the development of theory, techniques, and applications of AI in medicine, including the evaluation of health care programs. Theoretical papers were to include presentation or analysis of the properties of novel AI methodologies potentially useful to solving medical problems. Technical papers were to describe the novelty of the proposed approach, its assumptions, benefits, and limitations compared with other alternative techniques. Application papers were to present sufficient information to allow the evaluation of the practical benefits of the proposed system or methodology.

This year we received an all-time high number of very well-elaborated scientific paper submissions (148 paper submissions, 128% more than for AIME 2003). All papers were carefully evaluated by at least two independent reviewers from the program committee with support from additional reviewers. Submissions came from 32 different countries including 13 outside Europe. This emphasizes the international interest for an AI in medicine conference. The reviewers judged the originality, the quality, and the significance of the proposed research, as well as its presentation and its relevance to the AIME conference. All submissions were ranked on four aspects: the overall recommendation of each reviewer, the reviewer's confidence in the subject area of the paper, the quantitative scores obtained from all aspects of the detailed review, and the reviewer's detailed comments.

A small selection committee was established consisting of the AIME 2003 Program Chair Michel Dojat, the AIME 2003 Organizing Chair Elpida Keravnou, the AIME 2005 Program Chair Silvia Miksch, and the AIME 2005 Organizing Chair Jim Hunter. In the middle of April 2005 this committee met in Vienna to make the final decisions on the AIME 2005 program (scientific papers, doctoral consortium, tutorials, and workshops).

As a result we accepted 35 full papers (a 23.6% acceptance rate) for oral presentation. Each of them received a high overall ranking and two positive recommendations, of which at least one was highly positive. Ten pages were allocated to each full paper in this volume and 25 minutes of oral presentation during the conference. In addition, we accepted 34 short papers for poster presentation (a 23.0% acceptance rate). Each of them also received two positive recommendations. Five pages have been allocated to each short paper in this volume. The poster presenters had 5 minutes to present their papers, and their posters were shown throughout the main AIME 2005 conference to allow for fruitful discussions with the audience.

The papers and the sessions were organized according to the following themes: (1) Temporal Representation and Reasoning, (2) Decision Support Systems, (3) Clinical Guidelines and Protocols, (4) Ontology and Terminology, (5) Case-Based Reasoning, Signal Interpretation, Visual Mining, (6) Computer Vision and Imaging, (7) Knowledge Management, and (8) Machine Learning, Knowledge Discovery and Data Mining. These themes reflect the current interests of researchers in AI in medicine. The high quality of the papers selected in this volume demonstrates the vitality and diversity of research in Artificial Intelligence in Medicine.

Two invited speakers gave talks on two challenging topics in AIME. Frank van Harmelen (Vrije Universiteit Amsterdam, The Netherlands) spoke on ontology mapping and presented different approaches to ontology-mapping, covering linguistic, statistical and logical methods. Paul Lukowicz (University for Health Sciences, Medical Informatics and Technology, Hall in Tirol, Austria) introduced the topic of context-aware wearable systems with the focus on human computer interaction, and illustrated different ways forward within that research area. Two extended abstracts of these invited lectures are included in this volume.

An important new feature of the AIME conferences is the Doctoral Consortium (organized by Elpida Keravnou) held for the first time in the context of AIME. We would like to thank the eight students who presented their research work during the consortium and the participating faculty (Ameen Abu-Hanna, Riccardo Bellazzi, Carlo Combi, Michel Dojat, Peter Lucas, Silvana Quaglini, and Yuval Shahar) for their fruitful and constructive discussions and comments with the students.

AIME 2005 hosted two workshops: the Tenth IDAMAP Workshop on Intelligent Data Analysis in Medicine and Pharmacology and the Workshop on Biomedical Ontology Engineering. Four half-day tutorials were also offered: Evaluation of Prognostic Models; Evolutionary Computation Approaches to Mining Biomedical Data; Causal Discovery from Biomedical Data; and Applied Data Mining in Clinical Research.

We mourn the death of one of the members of the Program Committee – Barbara Heller died after a long illness during the reviewing process.

We would like to thank all the people and institutions who contributed to the success of the AIME 2005 conference: the authors, the members of the program committee as well as additional reviewers, all the members of the organizing committee, and the invited speakers Frank van Harmelen and Paul Lukowicz. Moreover, we would like to thank the organizers of the two workshops, John Holmes, Niels Peek, Jeremy Rogers, Alan Rector, and Robert Stevens and the presenters of the tutorials, Ameen Abu-Hanna, John Holmes, Subramani Mani, and Niels Peek. Finally, we would like to thank the University of Aberdeen for sponsoring and hosting the conference.

May 2005

Silvia Miksch
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Workshops

IDAMAP-2005: Intelligent Data Analysis in Medicine and Pharmacology

Co-chairs: John Holmes, School of Medicine, University of Pennsylvania, USA
Niels Peek, Academic Medical Center, University of Amsterdam, The Netherlands

Biomedical Ontology Engineering

Co-chairs: Jeremy Rogers, University of Manchester, United Kingdom
Alan Rector, University of Manchester, United Kingdom
Robert Stevens, University of Manchester, United Kingdom

Tutorials

Evaluation of Prognostic Models

Ameen Abu-Hanna and Niels Peek, Academic Medical Center, University of Amsterdam, The Netherlands

Evolutionary Computation Approaches to Mining Biomedical Data

John Holmes, School of Medicine, University of Pennsylvania, USA

Causal Discovery from Biomedical Data

Subramani Mani, Department of Electrical Engineering and Computer Science, University of Wisconsin-Milwaukee, USA

Applied Data Mining in Clinical Research

John Holmes, School of Medicine, University of Pennsylvania, USA

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Table of Contents

Invited Talks

Ontology Mapping: A Way Out of the Medical Tower of Babel? <i>Frank van Harmelen</i>	3
Human Computer Interaction in Context Aware Wearable Systems <i>Paul Lukowicz</i>	7

Temporal Representation and Reasoning

A New Approach to the Abstraction of Monitoring Data in Intensive Care <i>Samir Sharshar, Laurent Allart, Marie-Christine Chambrin</i>	13
Learning Rules with Complex Temporal Patterns in Biomedical Domains <i>Lucia Sacchi, Riccardo Bellazzi, Cristiana Larizza, Riccardo Porreca, Paolo Magni</i>	23
Discriminating Exanthematic Diseases from Temporal Patterns of Patient Symptoms <i>Silvana Badaloni, Marco Falda</i>	33
Probabilistic Abstraction of Multiple Longitudinal Electronic Medical Records <i>Michael Ramati, Yuval Shahar</i>	43
Using a Bayesian-Network Model for the Analysis of Clinical Time-Series Data <i>Stefan Visscher, Peter Lucas, Karin Schurink, Marc Bonten</i>	48
Data-Driven Analysis of Blood Glucose Management Effectiveness <i>Barry Nannings, Ameen Abu-Hanna, Robert-Jan Bosman</i>	53
Extending Temporal Databases to Deal with Telic/Atelic Medical Data <i>Paolo Terenziani, Richard Snodgrass, Alessio Bottrighi, Mauro Torchio, Gianpaolo Molino</i>	58
Dichotomization of ICU Length of Stay Based on Model Calibration <i>Marion Verduijn, Niels Peek, Frans Voorbraak, Evert de Jonge, Bas de Mol</i>	67

Decision Support Systems

AtherEx: An Expert System for Atherosclerosis Risk Assessment <i>Petr Berka, Vladimír Laš, Marie Tomečková</i>	79
Smooth Integration of Decision Support into an Existing Electronic Patient Record <i>Silvana Quaglini, Silvia Panzarasa, Anna Cavallini, Giuseppe Micieli, Corrado Pernice, Mario Stefanelli</i>	89
REPS: A Rehabilitation Expert System for Post-stroke Patients <i>Douglas D. Dankel II, María Ósk Kristmundsdóttir</i>	94

Clinical Guidelines and Protocols

Testing Asbru Guidelines and Protocols for Neonatal Intensive Care <i>Christian Fuchsberger, Jim Hunter, Paul McCue</i>	101
EORCA: A Collaborative Activities Representation for Building Guidelines from Field Observations <i>Liliane Pellegrin, Nathalie Bonnardel, François Antonini, Jacques Albanèse, Claude Martin, Hervé Chaudet</i>	111
Design Patterns for Modelling Medical Guidelines <i>Radu Serban, Annette ten Teije, Mar Marcos, Cristina Polo-Conde, Kitty Rosenbrand, Jolanda Wittenberg, Joyce van Croonenborg</i>	121
Improving Clinical Guideline Implementation Through Prototypical Design Patterns <i>Monika Moser, Silvia Miksch</i>	126
Automatic Derivation of a Decision Tree to Represent Guideline-Based Therapeutic Strategies for the Management of Chronic Diseases <i>Brigitte Séroussi, Jacques Bouaud, Jean-Jacques Vieillot</i>	131
Exploiting Decision Theory for Supporting Therapy Selection in Computerized Clinical Guidelines <i>Stefania Montani, Paolo Terenziani, Alessio Bottrighi</i>	136
Helping Physicians to Organize Guidelines Within Conceptual Hierarchies <i>Diego Sona, Paolo Avesani, Robert Moskovitch</i>	141

MHB – A Many-Headed Bridge Between Informal and Formal Guideline Representations <i>Andreas Seyfang, Silvia Miksch, Cristina Polo-Conde, Jolanda Wittenberg, Mar Marcos, Kitty Rosenbrand</i>	146
Clinical Guidelines Adaptation: Managing Authoring and Versioning Issues <i>Paolo Terenziani, Stefania Montani, Alessio Bottrighi, Gianpaolo Molino, Mauro Torchio</i>	151
Open-Source Publishing of Medical Knowledge for Creation of Computer-Interpretable Guidelines <i>Mor Peleg, Rory Steele, Richard Thomson, Vivek Patkar, Tony Rose, John Fox</i>	156
A History-Based Algebra for Quality-Checking Medical Guidelines <i>Arjen Hommersom, Peter Lucas, Patrick van Bommel, Theo van der Weide</i>	161
The Spock System: Developing a Runtime Application Engine for Hybrid-Asbru Guidelines <i>Ohad Young, Yuval Shahar</i>	166
AI Planning Technology as a Component of Computerised Clinical Practice Guidelines <i>Kirsty Bradbrook, Graham Winstanley, David Glasspool, John Fox, Richard Griffiths</i>	171
Gaining Process Information from Clinical Practice Guidelines Using Information Extraction <i>Katharina Kaiser, Cem Akkaya, Silvia Miksch</i>	181
Ontology-Driven Extraction of Linguistic Patterns for Modelling Clinical Guidelines <i>Radu Serban, Annette ten Teije, Frank van Harmelen, Mar Marcos, Cristina Polo-Conde</i>	191
Formalising Medical Quality Indicators to Improve Guidelines <i>Marjolein van Gendt, Annette ten Teije, Radu Serban, Frank van Harmelen</i>	201
Ontology and Terminology	
Oncology Ontology in the NCI Thesaurus <i>Anand Kumar, Barry Smith</i>	213

Ontology-Mediated Distributed Decision Support for Breast Cancer <i>Srinandan Dasmahapatra, David Dupplaw, Bo Hu, Paul Lewis, Nigel Shadbolt</i>	221
Multimedia Data Management to Assist Tissue Microarrays Design <i>Julie Bourbeillon, Catherine Garbay, Joëlle Simony-Lafontaine, Françoise Giroud</i>	226
Building Medical Ontologies Based on Terminology Extraction from Texts: Methodological Propositions <i>Audrey Baneyx, Jean Charlet, Marie-Christine Jaulent</i>	231
Translating Biomedical Terms by Inferring Transducers <i>Vincent Claveau, Pierre Zweigenbaum</i>	236
Using Lexical and Logical Methods for the Alignment of Medical Terminologies <i>Michel Klein, Zharko Aleksovski</i>	241
Latent Argumentative Pruning for Compact MEDLINE Indexing <i>Patrick Ruch, Robert Baud, Johann Marty, Antoine Geissbühler, Imad Tbahriti, Anne-Lise Veuthey</i>	246
A Benchmark Evaluation of the French MeSH Indexers <i>Aurélie Névéol, Vincent Mary, Arnaud Gaudinat, Célia Boyer, Alexandrina Rogozan, Stéfan J. Darmoni</i>	251
Populating an Allergens Ontology Using Natural Language Processing and Machine Learning Techniques <i>Alexandros G. Valarakos, Vangelis Karkaletsis, Dimitra Alexopoulou, Elsa Papadimitriou, Constantine D. Spyropoulos</i>	256
Ontology of Time and Situoids in Medical Conceptual Modeling <i>Heinrich Herre, Barbara Heller</i>	266
The Use of Verbal Classification in Determining the Course of Medical Treatment by Medicinal Herbs <i>Leonas Ustinovichius, Robert Balceвич, Dmitry Kochin, Ieva Shlesoraityte</i>	276
Case-Based Reasoning, Signal Interpretation, Visual Mining	
Interactive Knowledge Validation in CBR for Decision Support in Medicine <i>Monica Ou, Geoff A.W. West, Mihai Lazarescu, Chris Clay</i>	289

Adaptation and Medical Case-Based Reasoning, Focusing on Endocrine Therapy Support <i>Rainer Schmidt, Olga Vorobieva</i>	300
Transcranial Magnetic Stimulation (TMS) to Evaluate and Classify Mental Diseases Using Neural Networks <i>Alberto Faro, Daniela Giordano, Manuela Pennisi, Giacomo Scarciofalo, Concetto Spampinato, Francesco Tramontana</i>	310
Towards Information Visualization and Clustering Techniques for MRI Data Sets <i>Umberto Castellani, Carlo Combi, Pasquina Marzola, Vittorio Murino, Andrea Sbarbati, Marco Zampieri</i>	315
Computer Vision and Imaging	
Electrocardiographic Imaging: Towards Automated Interpretation of Activation Maps <i>Liliana Ironi, Stefania Tentoni</i>	323
Automatic Landmarking of Cephalograms by Cellular Neural Networks <i>Daniela Giordano, Rosalia Leonardi, Francesco Maiorana, Gabriele Cristaldi, Maria Luisa Distefano</i>	333
Anatomical Sketch Understanding: Recognizing Explicit and Implicit Structure <i>Peter Haddawy, Matthew Dailey, Ploen Kaewruen, Natapope Sarakhette</i>	343
Morphometry of the Hippocampus Based on a Deformable Model and Support Vector Machines <i>Jeong-Sik Kim, Yong-Guk Kim, Soo-Mi Choi, Myoung-Hee Kim</i>	353
Automatic Segmentation of Whole-Body Bone Scintigrams as a Preprocessing Step for Computer Assisted Diagnostics <i>Luka Šajn, Matjaž Kukar, Igor Kononenko, Metka Milčinski</i>	363
Knowledge Management	
Multi-agent Patient Representation in Primary Care <i>Chris Reed, Brian Boswell, Ron Neville</i>	375

Clinical Reasoning Learning with Simulated Patients
Frodoald Kabanza, Guy Bisson 385

Implicit Learning System for Teaching the Art of Acute Cardiac
 Infarction Diagnosis
Dmitry Kochin, Leonas Ustinovichius, Victoria Sliesoraitiene 395

Which Kind of Knowledge Is Suitable for Redesigning Hospital Logistic
 Processes?
Laura Mărușter, René J. Jorna 400

**Machine Learning, Knowledge Discovery and Data
 Mining**

Web Mining Techniques for Automatic Discovery of Medical Knowledge
David Sánchez, Antonio Moreno 409

Resource Modeling and Analysis of Regional Public Health Care Data
 by Means of Knowledge Technologies
*Nada Lavrač, Marko Bohanec, Aleksander Pur, Bojan Cestnik,
 Mitja Jermol, Tanja Urbančič, Marko Debeljak, Branko Kavšek,
 Tadeja Kopač* 414

An Evolutionary Divide and Conquer Method for Long-Term Dietary
 Menu Planning
Balázs Gaál, István Vassányi, György Kozmann 419

Human/Computer Interaction to Learn Scenarios from ICU
 Multivariate Time Series
Thomas Guyet, Catherine Garbay, Michel Dojat 424

Mining Clinical Data: Selecting Decision Support Algorithm for the
 MET-AP System
*Jerzy Blaszczynski, Ken Farion, Wojtek Michalowski, Szymon Wilk,
 Steven Rubin, Dawid Weiss* 429

A Data Pre-processing Method to Increase Efficiency and Accuracy in
 Data Mining
Amir R. Razavi, Hans Gill, Hans Åhlfeldt, Nosrat Shahsavar 434

Rule Discovery in Epidemiologic Surveillance Data Using EpiXCS: An
 Evolutionary Computation Approach
John H. Holmes, Jennifer A. Sager 444