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Artificial Intelligence in Medicine

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Proceedings

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Preface

The European Society for Artificial Intelligence in Medicine (AIME) was established in 1986 following a very successful workshop held in Pavia, Italy, the year before. The principal aims of AIME are to foster fundamental and applied research in the application of artificial intelligence (AI) techniques to medical care and medical research, and to provide a forum at biennial conferences for discussing any progress made. For this reason the main activity of the Society was the organization of a series of biennial conferences, held in Marseilles, France (1987), London, UK (1989), Maastricht, The Netherlands (1991), Munich, Germany (1993), Pavia, Italy (1995), Grenoble, France (1997), Aalborg, Denmark (1999), Cascais, Portugal (2001), Protaras, Cyprus (2003), and Aberdeen, UK (2005).

This volume contains the proceedings of AIME 2007, the 11th Conference on Artificial Intelligence in Medicine, held in Amsterdam, The Netherlands, July 7-11, 2007. The AIME 2007 goals were to present and consolidate the international state of the art of AI in biomedical research from the perspectives of methodology and application. The conference included invited lectures, a panel discussion, full and short papers, tutorials, workshops, and a doctoral consortium. In the conference announcement, authors were solicited to submit original contributions on the development of theory, systems, and applications of AI in medicine, including the exploitation of AI approaches to molecular medicine and biomedical informatics. Authors of papers addressing theory were requested to describe the development or the extension of AI methods and to discuss the novelty to the state of the art. Authors of papers addressing systems were asked to describe the requirements, design and implementation of new AI-inspired tools and systems, and discuss their applicability in the medical field. Finally, application papers were required to describe the implementation of AI systems in solving significant medical problems, and to present sufficient information to allow an evaluation of the practical benefits of such systems.

AIME 2007 received the second highest number of submissions ever (137). Submissions came from 31 different countries, including 12 outside Europe. All papers were carefully peer-reviewed by at least two experts from the Program Committee with the support of additional reviewers. The reviewers judged the quality and originality of the submitted papers, together with their relevance to the AIME conference. Four criteria were taken into consideration in judging submissions: the overall reviewers' recommendation, the suitability of the paper for an oral or poster presentation, the reviewers' detailed comments and the reviewers' confidence about the subject area. In a meeting held in Amsterdam during March, 24-25 a small committee consisting of the AIME 2007 Organizing Committee Chair, Ameen Abu-Hanna, the AIME President, Jim Hunter, and the AIME 2007 Program Chair, Riccardo Bellazzi, took the final decisions on the

AIME 2007 scientific program. As a result, 28 long papers (with an acceptance rate of about 20%) and 38 short papers were accepted. Each long paper was presented as an oral presentation, and was allocated a time of 25 minutes during the conference. Each short paper was presented as a poster. One of the novelties of AIME 2007 was a separate evening session combining poster presentations and dinner. Each poster was discussed with the help of two Poster Session Chairs.

The papers were organized according to their topics in eight main themes: 1) Agent-based systems; 2) Temporal data mining; 3) Machine learning and knowledge discovery; 4) Text mining, natural language processing and generation; 5) Ontologies; 6) Decision support systems; 7) Applications of AI-based image processing techniques; 8) Protocols and guidelines and 9) Workflow systems.

As another novelty, AIME 2007 had the privilege of hosting a panel discussion on “The Coming of Age of AI in Medicine,” organized and moderated by Vimla Patel (Arizona State University, USA). The distinguished panellists were Edward Shortliffe (University of Arizona College of Medicine, USA), Mario Stefanelli (University of Pavia, Italy), Peter Szolovits (Massachusetts Institute of Technology, Cambridge, MA, USA) and Michael Berthold (University of Konstanz, Konstanz, Germany). Peter Szolovits and Michael Berthold were also the invited speakers at AIME 2007. Peter Szolovits gave a talk on “Rationalism and Empiricism in Medical AI” and Michael Berthold on “The Fog of Data: Data Exploration in the Life Sciences.” The choice of these topics was partly related to the recent broadening of the field of AI in medicine and biomedical informatics, which now spans themes from clinical decision support to supporting research in genomics, proteomics and computational biology as applied to medicine and health care.

Following its first appearance at AIME 2005, a doctoral consortium, organized on this occasion by Jim Hunter, was held again this year. A scientific panel consisting of Carlo Combi, Michel Dojat, Frank van Harmelen, Elpidia Keravnou, Peter Lucas, Silvia Miksch, Silvana Quaglini, and Yuval Shahar supported the selection of PhD student contributions and discussed the contents of the students’ doctoral theses.

As at previous AIME meetings, two full-day workshops were organized prior to the AIME 2007 conference: a workshop entitled “From Knowledge to Global Care,” organized by David Riaño, Rovira i Virgili University, Spain and Fabio Campana, CAD RMB, Rome, Italy, and the 12th workshop on Intelligent Data Analysis in bioMedicine and Pharmacology (IDAMAP 2007), organized by Allan Tucker, Brunel University, UK, and Carlo Combi, University of Verona, Italy, and sponsored by the IMIA working group on Intelligent Data Analysis and Data Mining.

Two half-day tutorials were given by John H. Holmes, University of Pennsylvania, USA: Introduction to Applied Clinical Data Mining and Advanced Applied Clinical Data Mining.

We would like to thank everyone who contributed to AIME 2007. First of all we would like to thank the authors of the papers submitted and the members of the Program Committee together with the additional reviewers. Thanks

are also due to the invited speakers, panellists, and the organizers of the workshops, tutorials and doctoral consortium. We would like to thank the Department of Medical Informatics at the Academic Medical Centre of the University of Amsterdam, which hosted and sponsored the conference. Finally, we thank the Netherlands Organization for Scientific Research (NWO), Medecs Decision Support Systems, and the BAZIS foundation for their sponsorship of the conference and the European Coordinating Committee for Artificial Intelligence (ECCAI) and the International Medical Informatics Association (IMIA) for their support.

May 2007

Riccardo Bellazzi
Ameen Abu-Hanna
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Panel

The Coming of Age of AI in Medicine

Organizer: Vimla L. Patel, Arizona State University, USA

Workshops

From Knowledge to Global Health Care

Co-chairs: David Riaño, Rovira i Virgili University, Spain, Fabio Campana, CAD RMB, Italy

IDAMAP 2007: Intelligent Data Analysis in bioMedicine and Pharmacology

Co-chairs: Carlo Combi, University of Verona, Italy, Allan Tucker, Brunel University, UK

Tutorial

Introduction to Applied Clinical Data Mining

John H. Holmes, University of Pennsylvania, USA

Advanced Applied Clinical Data Mining

John H. Holmes, University of Pennsylvania, USA

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