

ECAI 2000

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including
Prestigious Applications of Intelligent Systems (PAIS-2000)

Proceedings

Edited by

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Contents

| | | | |
|---|-----|---|-----|
| ECCAI Member Societies | v | Multi-Agent Systems | 331 |
| Programme Committee | vi | Natural Language Processing | 399 |
| Reviewers | vii | Nonmonotonic Reasoning | 457 |
| Programme Chairpersons's Foreword | ix | Planning | 489 |
| Prestigious Applications of Intelligent Systems (PAIS, Foreword and Programme Committee) | xi | Reasoning about Actions and Change | 541 |
| Index of Papers | xii | Reasoning under Uncertainty | 569 |
| | | Search | 597 |
| | | User Interfaces, User Models, AI and Music | 619 |
| | | Vision and Robotics | 641 |
| Belief Revision | 1 | | |
| Case-based Reasoning | 43 | Prestigious Applications of Intelligent Systems | 679 |
| Constraint Reasoning | 71 | | |
| Diagnosis and Model-based Reasoning | 129 | Invited Speakers | 737 |
| Knowledge Representation, Automated Reasoning | 197 | | |
| Machine Learning | 249 | Author Index | 777 |

ECCAI Member Societies

| | |
|-------------------------------------|--|
| ACIA (Spain) | Catalan Association for Artificial Intelligence (Associació Catalana d'Intelligència Artificial) |
| ADUIS (Ukraine) | Association of Developers and Users of Intelligent Systems |
| AEPIA (Spain) | Spanish Association for Artificial Intelligence (Asociación Española para la Inteligencia Artificial) |
| AFIA (France) | French Association for Artificial Intelligence (Association Française pour l'Intelligence Artificielle) |
| AIIA (Italy) | Italian Association for Artificial Intelligence (Associazione Italiana per l'Intelligenza Artificiale) |
| APPIA (Portugal) | Portuguese Association for Artificial Intelligence (Associação Portuguesa para a Inteligência Artificial) |
| BAIA (Bulgaria) | Bulgarian Artificial Intelligence Association |
| BCS-SGES (UK) | British Computer Society Specialist Group on Expert Systems |
| BNVKI (Belgium, The Netherlands) | Belgian-Dutch Association for Artificial Intelligence (Belgisch-Nederlandse Vereniging voor Kunstmatige Intelligentie) |
| ČSKI (Czech Republic) | Czech Society for Cybernetics and Informatics (Česká společnost pro kybernetiku a informatiku) |
| DAIS (Denmark) | Danish Artificial Intelligence Society |
| EETN (Greece) | Hellenic Artificial Intelligence Association |
| FAIS (Finland) | Finnish Artificial Intelligence Society (Suomen Tekoälyseura) |
| GI/KI (Germany) | German Informatics Association (Gesellschaft für Informatik; Sektion KI e.V.) |
| IAAI (Israel) | Israeli Association for Artificial Intelligence |
| LANO (Latvia) | Latvian National Organisation of Automatics (Latvijas Automatikas Nacionāla Organizācija) |
| LIKS-AIS (Lithuania) | Lithuanian Computer Society–Artificial Intelligence Section (Lietuvos Kompiuterininku Sąjunga) |
| NAIS (Norway) | Norwegian Artificial Intelligence Society |
| NJSZT (Hungary) | John von Neumann Society for Computing Sciences (Neumann János Számítógéptudományi Társaság) |
| ÖGAI (Austria) | Austrian Association for Artificial Intelligence (Österreichische Gesellschaft für Artificial Intelligence) |
| RAAI (Russia) | Russian Association for Artificial Intelligence |
| SAIS (Sweden) | Swedish Artificial Intelligence Society |
| SGAICO (Switzerland) | Swiss Group for Artificial Intelligence and Cognitive Science (Schweizer Informatiker Gesellschaft) |
| SLAIS (Slovenia) | Slovenian Artificial Intelligence Society (Slovensko društvo za umetno inteligenco) |
| SSAISB (UK) | Society for the Study of Artificial Intelligence and Simulation of Behaviour |
| SSKI SAV (Slovak Republic) | Slovak Society for Cybernetics and Informatics at Slovak Academy of Sciences (Slovenská spoločnosť pre kybernetiku a informatiku pri Slovenskej akadémii vied) |

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Programme Chairperson's Foreword

ECAI 2000 is the 14th European Conference on Artificial Intelligence. The current volume of the proceedings contains 145 papers which represent the high-quality status of artificial intelligence research. ECAI has now a well-established tradition of being the premier biennial European event for covering all aspects of AI. As such it stands in one line with other global AI conferences like IJCAI, AAAI, and PRICAI.

ECAI tries to maintain its width of scope in areas. Most natural all of ECAI's major subareas have achieved a mature status after dozens of years of research and development. Many of these subareas organize major conferences presenting an in-depth coverage of recent progress in its area. ECAI has the advantage to bring together all these areas again. It heads for providing cross-fertilization and for area-spanning discussion. As a consequence ECAI's papers should serve both as a source for most recent and most important contributions in each of its subareas and as a reference point for researchers and developers in all fields of AI.

After half a century of high-quality research it is fair to show (in Europe too) that AI is good for making money. In the year 2000 ECAI has established a subconference dedicated to the successful applications of AI technology. The "Prestigious Applications of Intelligent Systems (PAIS)" subconference presents such deployed applications. A set of selected application papers is included in this volume. I am grateful to Rob Milne for chairing the PAIS programme committee. His practical knowledge about fruitful work in industry gives him the ability to judge the aspects essential for success of an intelligent system. He was accompanied by the PAIS programme committee I would like to express my in-depth thanks for their reviewing work. We have seen many papers presenting AI applications most prestigious. However the strict limitations of ECAI forced us to select only a few of them for inclusion in this volume. There is really a lot of excellent work on intelligent systems in progress. We are happy to see these success stories.

Most important, ECAI reports about recent progress in its technical areas. This proceedings volume contains 139 papers (including 11 PAIS papers) which have been selected carefully from the 443 submissions. 412 papers have been submitted to the ECAI technical conference and 31 papers to PAIS. The overall acceptance rate is 31%. In addition the volume includes six papers that accompany invited talks. The 145 papers are organized into 17 sections:

| Area | Number of Papers |
|---|------------------|
| Belief Revision | 8 |
| Case-based Reasoning | 5 |
| Constraint Reasoning | 11 |
| Diagnosis and Model-based Reasoning | 13 |
| Knowledge Representation, Automated Reasoning | 10 |
| Machine Learning | 17 |
| Multi-Agent Systems | 13 |
| Natural Language Processing | 11 |
| Nonmonotonic Reasoning | 6 |
| Planning | 10 |
| Reasoning about Actions and Change | 5 |
| Reasoning under Uncertainty | 5 |
| Search | 4 |
| User Interfaces, User Models, AI and Music | 4 |
| Vision and Robotics | 7 |
| Prestigious Applications of Intelligent Systems | 11 |
| Invited Speakers | 6 |

Submissions were received from 42 countries. Although the majority of papers comes from Europe, there is a significant number of papers from Australia, Asia, and North-America. Each paper was sent to two members of the

programme committee, each of whom was responsible for obtaining one review. In case of contradictory reviews the reviewers were encouraged to communicate their position. In conflicting cases a third review was obtained. In total, 953 reviews have been written by 474 reviewers. All papers which remained controversial were discussed at the two-day programme committee meeting on April 7–8, 2000 in Vienna.

I would like to thank everybody who helped and contributed to the richness and high standards of the ECAI 2000 programme. I thank all the authors of submitted papers for having chosen ECAI as a forum to communicate their research results and application systems. Special thanks are due to my distinguished colleagues Piero Bonissone, Patrick Doherty, Daniele Nardi, Bernhard Nebel, Luc Steels and Mark Wallace for accepting the invitation by the programme committee to present their most recent research results in plenary talks. Papers summarizing these results are included in this proceedings volume. I am indebted to the 52 members of the ECAI programme committee, the 21 members of the PAIS programme committee, and all the reviewers for their intensive work to provide accurate reviews in the limited amount of time available for reviewing. Extraordinary thanks are due to the 13 area chairs for spending that much time and effort to ensure quality and attractiveness of the programme.

Special thanks are devoted to Marie-Odile Cordier for organizing the 34 ECAI workshops and to Hans-Jürgen Bürckert for selecting and organizing the 10 tutorials. I am grateful to the organizing team of ECAI 2000 for the ease of cooperation, in particular Kurt Sundermeyer, Hans-Dieter Burkhard, Stefan Drooff, Markus Hannebauer and Joscha Bach. Many thanks to the experienced advice from Wolfgang Wahlster, the chair of the Board of the European Coordinating Committee for Artificial Intelligence (ECCAI). The cooperative work of Ron Jansen from IOS Press during preparation of the proceedings is gratefully acknowledged. Finally, I would like to express my special thanks to all members of the Austrian Research Institute for Artificial Intelligence (ÖFAI) who helped me in one way or another during the preparation of the ECAI programme. Inge Hauer, Pia Trost and Christian Holzbaur deserve special mention for the excellent support they provided.

Vienna, June 2000

Werner Horn
ECAI 2000 Programme Chairperson

Prestigious Applications of Intelligent Systems (PAIS subconference)

PAIS Programme Chairperson's Foreword

The real success of Artificial Intelligence is measured by the applications that use the technology rather than the technology itself. PAIS-2000 is the first major European showcase of beneficial solutions for industry and commerce based on AI technologies. The applications cover a wide range of areas from industrial systems to business support to web based personal assistance. They illustrate not only the range of technologies being used in applications, but also the wide range of areas in which AI can produce real benefits. This collection of papers also provides a snapshot of leading edge applications of today as well as the first deployment of the possible killer applications of tomorrow.

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