

**Proceedings of the Eighth International Joint
Conference on Artificial Intelligence**

8-12 August 1983, Karlsruhe, West Germany

Volume 1

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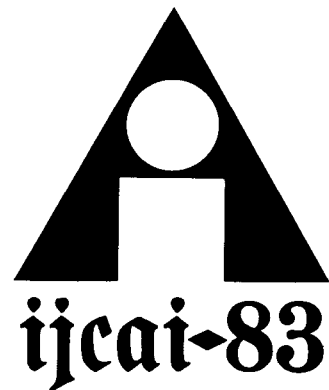
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on Artificial Intelligence**

8-12 August 1983, Karlsruhe, West Germany

Volume 1

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Foreword

These volumes are the proceedings of the Eighth International Joint Conference on Artificial Intelligence. They represent the best current research in AI from all over the world, and appear at a time of unparalleled interest in AI. This interest has been triggered by the development of commercial applications of AI, especially expert systems and robotics. There are now major government and industrial initiatives on AI in many countries, one of which, the Japanese "Fifth Generation" project, is discussed explicitly in these volumes.

Given this interest, it is especially important that basic research is not neglected and that the standards expected of AI research are high, clear and widely agreed upon. The programme committee has done its best to encourage such standards, and in particular has introduced various reforms in the procedures for IJCAI conferences, which we hope will become the norm.

We have made clear the different standards expected from long and short papers, and have done our best to ensure that accepted papers meet these standards. In many cases this has meant accepting only as short papers ones submitted in the long category; in fact, more long papers have suffered this fate than were accepted in the long category. This has placed a heavy burden on those authors who have had to reduce drastically the length of their papers, but as the standards expected of long papers become generally accepted we hope that this kind of transfer will become rarely necessary. As a result the programme committee hopes that the 49 long papers represent the highest quality, finished AI research, and that the 196 short papers provide a directory of the best ongoing work in each subfield of AI. All the papers demonstrate that AI is a field which is capable of producing both useful applications and exciting intellectual challenges.

The quality of accepted papers is crucially dependent on the quality of refereeing. Each IJCAI-83 referee was handpicked by a member of the programme committee on the basis of his/her known excellence in a particular subfield. Each paper was refereed by two such referees, who then conferred in order to resolve their differences. The final decision was taken by the member of the programme committee responsible for that subfield, with borderline cases being decided by me. I would like to take this opportunity to thank the members of the programme committee and all the referees for their sterling work, under great pressure. It is for you, the readers, to judge whether we succeeded.

Readers of these volumes should find their task of deciding what to read a little easier. The long papers, together with the invited talks, the Computers and Thought lecture, the Distinguished Service Award lecture and the general panels, form a "mainstream" of interest to all readers. The short papers, the keynote addresses and the specialist panels are aimed at the specialist in the relevant subfield.

Being programme chairman has been much harder work than I imagined. It would not have been possible without the support of my assistant, Helen Pain, and the members of the programme committee, or without the helpful advice of my fellow members of the organising committee: Saul Amarel, Don Walker, Joerg Siekmann and Graham Wrightson. Thank you all. The conference benefited by the close cooperation and interaction of the organizers, which was facilitated enormously by the extensive use of computer networks, especially the ARPAnet. This facilitation was emphasized by the frustration I felt, on the not infrequent occasions, when my link to the ARPAnet broke down.

Alan Bundy
Programme Chairman, IJCAI-83

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Tom Mitchell

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Art Samuel

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David Barstow, Schlumberger-Doll Research
Stan Rosenschein, Hebrew University/SRI International
Alan Mackworth, University of British Columbia

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Expert Systems: John McDermott, Carnegie-Mellon University
Learning and Knowledge Acquisition: Doug Lenat, Stanford University
Logic Programming: Alain Colmerauer, Universite Luminy
Natural Language: Gerald Gazdar, University of Sussex
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Robotics: Marc Raibert, Carnegie-Mellon University
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Panel on the Fifth Generation Project

Organiser: Robert Kowalski, Imperial College
Panelists: Herve Gallaire, Lab de Marcoussis
Toshio Yokoi, ICOT
Robert Dewar, New York University

Artificial Intelligence: Its Impact on Human Occupations and Distribution of Income

Organisers: Nils J. Nilsson, SRI International
Sandra B. Cook, SRI International
Panelists: Alan C. Kay, Atari Inc.
Faye Duchin, New York University
Margaret A. Boden, University of Sussex
Dennis Chamot, AFL-CIO

A Panel on AI and Databases

Organiser: Ray Reiter, University of British Columbia/Rutgers University
Panelists: Herve Gallaire, Lab de Marcoussis
Jonathan J. King, Symantec
John Mylopoulos, University of Toronto
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Industrial Strength Knowledge Bases: Issues and Experiences

Organiser: Thomas P. Kehler, IntelliGenetics
Panelists: Steve Rosenberg, Hewlett-Packard Labs
Rene Reboh, SRI International
Peter Friedland, Stanford University

Under What Conditions Can a Machine Attribute Meaning to Symbols

Organiser: Aaron Sloman, University of Sussex
Panelists: Brian Smith, Xerox Corporation
Bill Woods, Bolt, Beranek & Newman Inc.
Pat Hayes, University of Rochester
Drew McDermott, Yale University

IJCAI-83 Conference Schedule

Monday, August 8, 1983

Evening

8:00

INTRODUCTORY SESSION

Distinguished Service Award: Art Samuel

Tuesday, August 9, 1983

Morning

9:00-10:00

INVITED TALK: John Seely Brown and Johan de Kleer
The Origin, Form, and Logic of Qualitative Physical Laws

10:30-12:00

LONG PAPER SESSIONS

Expert Systems 1: Commercial applications

Vision 1: Motion and correspondence

SHORT PAPER SESSIONS

Natural Language 1: Keynote Addresses by Gerald
Gazdar and Scott Weinstein

Cognitive Modelling 1

Planning and Search 1

Logic Programming 1

Afternoon

1:30-3:00

PANEL

Panel on the Fifth Generation Project

LONG PAPER SESSION

Cognitive Modelling 2

SHORT PAPER SESSIONS

Natural Language 2: Generation-theoretical, including
semantics

Vision 2: Perceptual organization

Expert Systems/Automatic Programming/Knowledge
Representation: Applications

Knowledge Representation 1: Frames and semantic
networks

3:30-5:00

LONG PAPER SESSIONS

Expert Systems 2: Plausible inference

Vision 3: Surfaces and shape

SHORT PAPER SESSIONS

Natural Language 3: Generation-theoretical, including
semantics

Knowledge Representation 2: Uncertainty, non-
monotonic logic, and timespace

Cognitive Modelling 3

Robotics 1 (Includes Keynote Address by Marc Raibert)

Theorem Proving 1

Wednesday, August 10, 1983

Morning

9:00-10:00

INVITED TALK: David Barstow
A Perspective on Automatic Programming

10:30-12:00

PANEL

*Under What Conditions Can a Machine Attribute
Meaning to Symbols?*

LONG PAPER SESSIONS

Vision 4: Object models and recognition

Logic Programming 2: Theoretical

SHORT PAPER SESSIONS

Natural Language 4: Speech related areas

Expert Systems 3 (Includes Keynote Address by John
McDermott)

Knowledge Representation 3: Knowledge and belief

Planning and Search 2

Thursday, August 11, 1983

Morning

9:00-10:00

INVITED TALK: Stan Rosenschein
*Natural-Language Processing: Crucible for
Computational Theories of Cognition*

10:30-12:00

LONG PAPER SESSIONS

Expert Systems 4: Applications

Knowledge Representation 4: Exotic logics

SHORT PAPER SESSIONS

Natural Language 5: Interfaces and applications

Vision 5: Motion perception

Learning and Knowledge Acquisition 1

Automatic Programming 1 (Includes Keynote Address
by Gérard Guiho)

Afternoon

1:30-3:00

PANEL

*Artificial Intelligence: Its Impact on Human
Occupations and Distribution of Income*

LONG PAPER SESSION

Theorem Proving 2

SHORT PAPER SESSIONS

Natural Language 6: Interfaces and applications

Vision 6: Shape from stereo, shading and contour

Expert Systems 5

Learning and Knowledge Acquisition 2

3:30-5:00

PANEL

*Industrial Strength Knowledge Bases: Issues and
Experiences*

LONG PAPER SESSIONS

Knowledge Representation 5: Time and space

Robotics 2: Motion planning and tracking

SHORT PAPER SESSIONS

Natural Language 7: Parsing, grammar implementation
and morphology

Vision 7: Integration of information

Automatic Programming 2

Learning and Knowledge Acquisition 3 (Includes
Keynote Address by Doug Lenat)

Evening

8:00

Computers and Thought Lecture: Tom Mitchell
Learning and Problem Solving

Friday, August 12, 1983

Morning

9:00-10:00

INVITED TALK: Alan Mackworth
On Seeing Things, Again

10:30-12:00

LONG PAPER SESSIONS

Natural Language 8

Theorem Proving/Automatic Programming

SHORT PAPER SESSIONS

Vision 8: Object modelling

Expert Systems 6: Plausible reasoning

Knowledge Representation 6

Logic Programming 3 (Includes Keynote Address by
Alain Colmerauer)

Systems Support

Afternoon

1:30-3:00

PANEL

AI and Databases

LONG PAPER SESSION

Robotics/Vision: Robot programming

SHORT PAPER SESSIONS

Natural Language 9: Parsing, grammar implementation,
and morphological analysis

Expert Systems 7: Languages and structures, especially
for Time Dependent Reasoning

Learning and Knowledge Acquisition 4

Theorem Proving 3 (Includes Keynote Address by
L. Wos)

3:30-5:00

LONG PAPER SESSIONS

Knowledge Representation/Logic Programming/
Learning and Knowledge Acquisition

Planning and Search 3

SHORT PAPER SESSIONS

Natural Language 10: Discourse, dialogue, etc.

Vision 9: Systems and applications

Expert Systems 8: Applications

Robotics 3: Mobile robots and programming

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