

# Lecture Notes in Artificial Intelligence 4827

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Alexander Gelbukh  
Ángel Fernando Kuri Morales (Eds.)

# MICAI 2007: Advances in Artificial Intelligence

6th Mexican International Conference  
on Artificial Intelligence  
Aguascalientes, Mexico, November 4-10, 2007  
Proceedings

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# Preface

Artificial Intelligence is a branch of computer science that studies heuristic methods of solving complex problems. Historically the first such tasks modeled human intellectual activity: reasoning, learning, seeing and speaking. Later similar methods were extended to super-complex optimization problems that appear in science, social life and industry. Many methods of Artificial Intelligence are borrowed from nature, where there occur similar super-complex problems such as those related to survival, development, and behavior of living organisms.

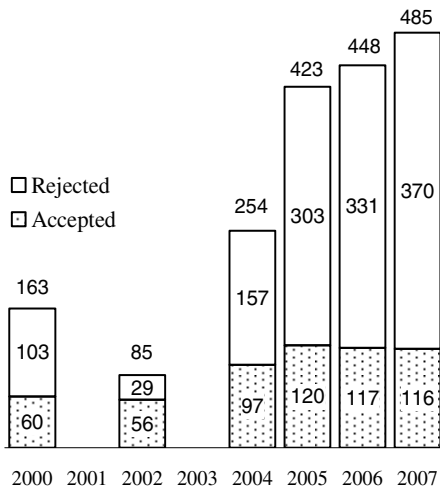
The Mexican International Conference on Artificial Intelligence (MICA), a yearly international conference series organized by the Mexican Society for Artificial Intelligence (SMIA), is a major international AI forum and the main event in the academic life of the country's growing AI community. The proceedings of the previous MICA events were published by Springer in its Lecture Notes in Artificial Intelligence (LNAI) series, vol. 1793, 2313, 2972, 3789, and 4293. Since its foundation in 2000, the conference has shown a stable growth in popularity (see Figures 1 and 3) and improvement in quality (see Fig. 2). The 25% acceptance rate milestone was passed for the first time this year.

This volume contains the papers presented at the oral session of the 6<sup>th</sup> Mexican International Conference on Artificial Intelligence, MICA 2007, held on November 4–10, 2007, in Aguascalientes, Mexico. The conference received for evaluation 485 submissions by 1014 authors from 43 different countries, see Tables 1 and 2. This book contains the revised versions of 115 papers from 31 countries selected for oral presentation according to the results of the international reviewing process. Thus the acceptance rate was 23.9%. The book has been structured into 12 thematic fields representative of the main current areas of interest for the AI community:

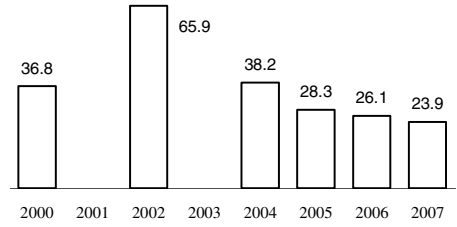
- Computational Intelligence,
- Neural Networks,
- Knowledge Representation and Reasoning,
- Agents and Multiagent Systems,
- Machine Learning and Data Mining,
- Image Processing, Computer Vision, and Robotics,
- Natural Language Processing,
- Speech Processing and Human-Computer Interfaces,
- Planning and Scheduling,
- Bioinformatics and Medical Applications,
- Industrial Applications, and
- Intelligent Tutoring Systems.

The conference featured excellent keynote lectures by leading AI experts:

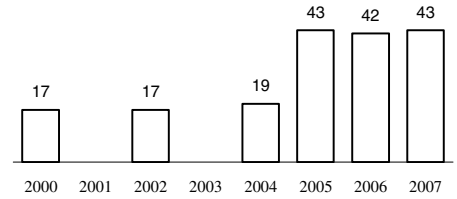
- Fernando De Arriaga-Gómez of the Polytechnic University of Madrid, Spain, who spoke about intelligent e-learning systems;



**Fig. 1.** Number of received, rejected, and accepted papers



**Fig.2.** Acceptance rate.



**Fig. 3.** Number of countries from which submissions were received

- Francisco Escolano, Director of the Robot Vision Group of the University of Alicante, Spain, who spoke about computer vision for autonomous robots and visually impaired people;
- Simon Haykin, Director of the Adaptive Systems Laboratory of the McMaster University, Canada, who spoke about neural networks, their theoretical foundations and applications;
- Pablo Noriega of the Institute for Artificial Intelligence Research of the Superior Council of Scientific Research, Spain, who spoke about regulated agent systems and automated negotiation;
- Paolo Petta of the Institute for Medical Cybernetics and Artificial Intelligence of the Centre for Brain Research of the Medical University of Vienna and Austrian Research Institute for Artificial Intelligence, Austria, who spoke about intelligent interface agents with emotions; and
- Boris Stilman of the University of Colorado at Denver, Chairman & CEO of Stilman Advanced Strategies, USA, who spoke about industrial and military applications of linguistic geometry.

In addition to the oral technical session and the keynote lectures, the conference program included tutorials (some of them given by the keynote speakers in their respective areas of expertise), workshops, and poster sessions, which were published in separate proceedings volumes and special issues of journals.

The following papers received the Best Paper Award and the Best Student Paper Award, correspondingly (the best student paper was selected out of papers whose first author was a full-time student):

1<sup>st</sup> place: *Scaling Kernels: A New Least Squares Support Vector Machine Kernel for Approximation*, by Mu Xiangyang, Zhang Taiyi and Zhou Yatong (China);

**Table 1.** Statistics of submissions and accepted papers by country / region

Country / Region	Authors		Papers	
	Submitted	Accepted	Rate	
Algeria	3	2.33	1	0.43
Argentina	32	12.42	2.42	0.19
Australia	4	2	0	0
Austria	3	1.5	0.5	0.33
Belgium	3	1.17	0.5	0.43
Brazil	37	20	6.67	0.33
Canada	5	1.5	0	0
Chile	20	15.67	1.5	0.1
China	124	53.17	7.75	0.15
Colombia	21	8.47	1.67	0.2
Cuba	22	9.75	2.5	0.26
Czech Rep.	8	2.67	1.67	0.62
Egypt	1	1	0	0
Finland	2	1	0	0
France	35	15.89	6.31	0.4
Germany	10	6.86	4.86	0.71
Greece	4	2	0	0
Hong Kong	1	0.25	0.25	1
India	3	1	0	0
Iran	21	17	3	0.18
Israel	1	0.25	0.25	1
Italy	7	3.25	1	0.31

Country / Region	Authors		Papers	
	Submitted	Accepted	Rate	
Japan	12	5.75	3	0.52
Korea, South	30	16.33	1.5	0.09
Macau	1	0.5	0	0
Macedonia	1	0.5	0	0
Mexico	409	194.2	42.67	0.22
Pakistan	6	3	0	0
Peru	1	0.5	0	0
Poland	4	3	2	0.67
Portugal	13	4.5	0.5	0.11
Romania	2	1	0	0
Russia	8	3.08	0.33	0.11
Spain	75	28.67	10.83	0.38
Sweden	3	2	1	0.50
Switzerland	5	2.58	2.33	0.90
Taiwan	19	12	1	0.08
Thailand	2	1	1	1
Tunisia	5	1.75	0.75	0.43
Turkey	16	8	1	0.13
UAE	1	1	0	0
UK	8	4.33	2	0.46
USA	26	12.17	4.25	0.35
Total:	1014	485	116	

<sup>1</sup> Counted by authors: e.g., for a paper by 2 authors from UK and 1 from USA, we added  $\frac{2}{3}$  to UK and  $\frac{1}{3}$  to USA.

2<sup>nd</sup> place: *On-line Rectification of Sport Sequences with Moving Cameras*, by Jean-Bernard Hayet and Justus Piater (Mexico / Belgium);

3<sup>rd</sup> place: *SELDI-TOF-MS Pattern Analysis for Cancer Detection as a Base for Diagnostic Software*, by Marcin Radlak and Ryszard Klempous (UK / Poland);

Student: *3D Object Recognition Based on Low Frequency Response and Random Feature Selection*, by Roberto A. Vázquez, Humberto Sossa and Beatriz A. Garro (Mexico).

We want to thank all those involved in the organization of this conference. In the first place, these are the authors of the papers constituting this book: it is the excellence of their research work that gives value to the book and sense to the work of all of the other people involved. We thank the members of the Program Committee and additional reviewers for their great and very professional work on reviewing and selecting the papers for the conference. Our very special thanks go to the members of the Board of Directors of SMIA, especially to José Galaviz Casas, Sulema Torres, Yulia Ledeneva, and Alejandro Peña of the CIC-IPN and Oscar Celma of the Music Technology Group of the Pompeu Fabra University devoted great effort to the preparation of the conference. Mikhail Alexandrov, Hiram Calvo, Denis Filatov,

**Table 2.** Statistics of submissions and accepted papers by topic<sup>2</sup>

Accepted	Submitted	Rate	Topic
32	96	0.33	Machine Learning
21	72	0.29	Neural Networks
19	97	0.20	Other
19	67	0.28	Natural Language Processing and Understanding
19	55	0.35	Computer Vision
14	52	0.27	Knowledge Representation
14	35	0.40	Hybrid Intelligent Systems
13	50	0.26	Data Mining
13	49	0.27	Genetic Algorithms
11	40	0.28	Planning and Scheduling
10	51	0.20	Fuzzy Logic
8	29	0.28	Knowledge Management
7	40	0.17	Robotics
7	27	0.26	Uncertainty and Probabilistic Reasoning
7	26	0.27	Knowledge Acquisition
7	20	0.35	Constraint Programming
7	16	0.44	Logic Programming
6	26	0.23	Bioinformatics
6	21	0.29	Intelligent Interfaces: Multimedia; Virtual Reality
5	28	0.18	Expert Systems and Knowledge-Based Systems
5	17	0.29	Computational Creativity
4	32	0.12	Multiagent systems and Distributed AI
4	10	0.40	Model-Based Reasoning
4	8	0.50	Belief Revision
3	13	0.23	Navigation
3	10	0.30	Nonmonotonic Reasoning
3	9	0.33	Spatial and Temporal Reasoning
3	7	0.43	Qualitative Reasoning
2	6	0.33	Intelligent Organizations
2	5	0.40	Common Sense Reasoning
1	21	0.05	Ontologies
1	16	0.06	Intelligent Tutoring Systems
1	9	0.11	Case-Based Reasoning
1	5	0.20	Philosophical and Methodological Issues of AI
1	3	0.33	Automated Theorem Proving
0	10	0.00	Knowledge Verification; Sharing; Reuse
0	4	0.00	Assembly

<sup>2</sup> According to the topics indicated by the authors. A paper may have more than one topic.

Oleksiy Pogrebnnyak, Grigory Sidorov, Manuel Vilares were among the most helpful and active PC members.

We would like to express our sincere gratitude to the IEEE Section of Aguascalientes, the Instituto Tecnológico de Aguascalientes, the Universidad Autónoma de Aguascalientes, the Universidad Tecnológica de Aguascalientes, the Tecnológico de Monterrey Campus Aguascalientes, the Universidad Politécnica de Aguascalientes and the Museo Descubre for their warm hospitality and for providing the infrastructure for the tutorials and workshops. Special thanks to the Constitutional

Governor of the State of Aguascalientes, Ing. Luis Armando Reynoso Femat, for his valuable participation and support in the organization of this conference. The opening ceremony and keynote lectures were held in the beautiful Teatro Aguascalientes which would not have been available without his decided support. We also thank the Consejo de Ciencia y Tecnología of the State of Aguascalientes for their partial financial support, and the Secretaría de Desarrollo Económico, Subsecretaría de Gestión e Innovación and Secretaría de Turismo of the State of Aguascalientes for their effort in organizing industrial and tourist visits as well as cultural and amusement activities. We are deeply grateful to the conference staff and to all of the members of the Local Committee headed by José Antonio Calderón Martínez.

The entire submission and reviewing process, as well as the assemblage of the proceedings, was freely supported by the EasyChair system ([www.easychair.org](http://www.easychair.org)); we express our gratitude to its author, Andrei Voronkov, for his constant support and help. Last but not least, we deeply appreciate the patience of the staff at Springer and their help in editing this volume.

September 2007

Alexander Gelbukh  
Angel Kuri



# Organization

MICAI 2007 was organized by the Mexican Society for Artificial Intelligence (SMIA) in collaboration with the IEEE Section of Aguascalientes, the Instituto Tecnológico de Aguascalientes, the Universidad Autónoma de Aguascalientes, the Universidad Tecnológica de Aguascalientes, the Tecnológico de Monterrey Campus Aguascalientes, the Universidad Politécnica de Aguascalientes and the Museo Descubre, as well as the Center for Computing Research of the National Polytechnic Institute (CIC-IPN), the Instituto Tecnológico Autónomo de México (ITAM), the Instituto Nacional de Astrofísica Óptica y Electrónica (INAOE), the Universidad Nacional Autónoma de México (UNAM), the Universidad Autónoma de México (UAM-Azcapotzalco), and the Instituto Tecnológico de Estudios Superiores de Monterrey (ITESM), Mexico.

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