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Alexander Gelbukh
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Preface

Artificial Intelligence embraces heuristic methods of solving complex problems for which exact algorithmic solutions are not known. Among them are, on the one hand, tasks related to modeling of human intellectual activity such as thinking, learning, seeing, and speaking, and on the other hand, super-complex optimization problems appearing in science, social life, and industry. Many methods of Artificial Intelligence are borrowed from nature where similar super-complex problems occur.

This year is special for the Artificial Intelligence community. This year we celebrate the 50th anniversary of the very term "Artificial Intelligence", which was first coined in 1956. This year is also very special for the Artificial Intelligence community in Mexico: it is the 20th anniversary of the Mexican Society for Artificial Intelligence, SMIA, which organizes the MICAI conference series. The series itself also celebrates its own round figure: the fifth event. We can now see that MICAI has reached its maturity, having grown dramatically in size and quality, see Figs. 1 to 3.

The proceedings of the previous MICAI events were also published in Springer's Lecture Notes in Artificial Intelligence (LNAI) series, in volumes 1793, 2313, 2972, and 3789.

This volume contains the papers presented during the oral session of the 5th Mexican International Conference on Artificial Intelligence, held on November 13–17, 2006, at the Technologic Institute of Apizaco, Mexico. The conference received for evaluation 448 submissions by 1207 authors from 42 different countries, see Tables 1 and 2. Each submission was reviewed by three independent Program Committee members. This book contains revised versions of 117 papers by 334 authors from 28 countries selected for oral presentation. Thus the acceptance rate was 26.1%. The book is structured into 17 thematic fields representative of the main current areas of interest of the AI community:

- Knowledge Representation and Reasoning
- Fuzzy Logic and Fuzzy Control
- Uncertainty and Qualitative Reasoning
- Evolutionary Algorithms and Swarm Intelligence
- Neural Networks
- Optimization and Scheduling
- Machine Learning and Feature Selection
- Classification
- Knowledge Discovery
- Computer Vision
- Image Processing and Image Retrieval
- Natural Language Processing
- Information Retrieval and Text Classification
- Speech Processing
- Multiagent Systems
- Robotics
- Bioinformatics and Medical Applications

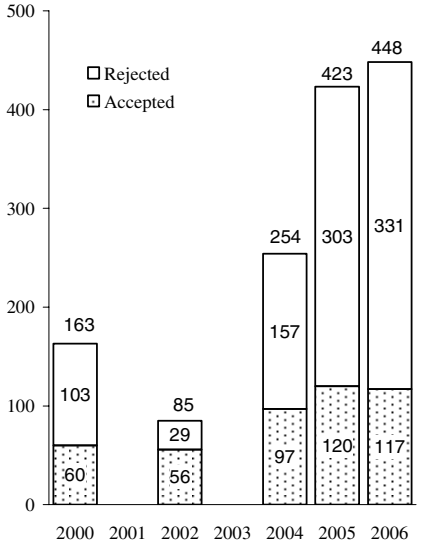

Fig. 1. Number of received, rejected, and accepted papers

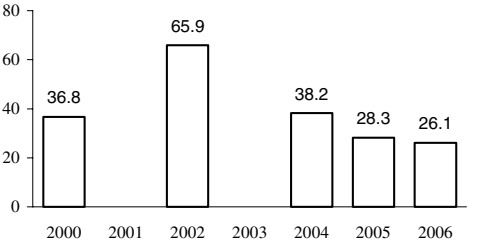

Fig. 2. Acceptance rate

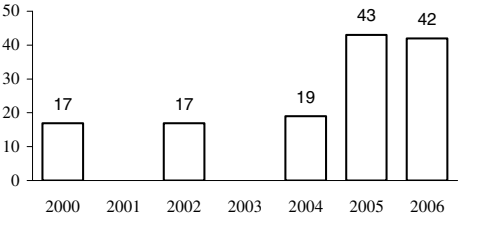

Fig. 3. Number of countries from which submissions were received

The conference featured excellent keynote lectures by the leading experts in Artificial Intelligence: *Advances in Natural Language Processing* by Jaime Carbonell of Carnegie Mellon University, USA; *Evolutionary Multi-objective Optimization: Past, Present and Future* by Carlos A. Coello Coello of the Center for Advanced Research (CINVESTAV), Mexico; *Unifying Logical and Statistical AI* by Pedro Domingos of the University of Washington, USA; and *Inconsistencies in Ontologies* by Andrei Voronkov of the University of Manchester, UK. We were also honored by the presence of our special guests who were among the founders of Artificial Intelligence research in Mexico: Adolfo Guzmán Arenas of the Center for Computing Research of the National Polytechnic Institute (CIC-IPN), Mexico, and José Negrete Martínez of the Veracruz University, Mexico, who presented invited lectures on the history of Artificial Intelligence and the ways of its future development. In addition to the oral technical session and the keynote lectures, the conference program included tutorials, workshops, and poster sessions, which were published in separate proceedings volumes and journal special issues.

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

1st place: *Statistics of Visual and Partial Depth Data for Mobile Robot Environment Modeling*, by Luz Abril Torres-Méndez and Gregory Dudek;

2nd place: *On Musical Performances Identification, Entropy and String Matching*, by Antonio Camarena-Ibarrola and Edgar Chávez;

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

Country / Region	Authors		Papers[1]		Country / Region	Authors		Papers[1]	
	Subm	Accp	Subm	Accp		Subm	Accp	Subm	Accp
Algeria	3	–	1.44	–	Israel	10	2	4	1
Argentina	13	–	5	–	Italy	22	–	5.45	–
Australia	4	2	3	1	Japan	16	7	5.9	3
Austria	2	2	1	1	Korea, South	128	56	46.83	18.86
Belgium	3	1	0.37	0.13	Lithuania	4	–	1.2	–
Brazil	55	14	15.13	4	Macedonia	1	–	0.22	–
Canada	10	1	3.32	0.32	Malaysia	9	2	3.3	1
Chile	39	12	13.98	3.76	Mexico	344	118	113.93	38.46
China	270	41	106.18	15.77	Norway	2	–	1	–
Colombia	4	2	1.38	0.44	Poland	6	–	1.88	–
Croatia	1	1	0.32	0.32	Portugal	15	–	3.51	–
Cuba	22	4	3.99	0.51	Romania	1	1	0.22	0.22
Denmark	2	–	0.26	–	Russia	1	–	0.22	–
Finland	2	2	1	1	Slovenia	1	1	0.32	0.32
France	6	3	2.2	0.66	Spain	65	35	19.19	9.89
Germany	9	1	2.71	0.32	Switzerland	1	–	0.13	–
Hong Kong	5	2	2.34	0.34	Taiwan	24	5	6	2
Hungary	1	–	0.22	–	Turkey	57	10	19.13	4
India	6	–	3	–	UK	13	3	5.5	0.61
Iran	6	–	5	–	USA	20	2	7.29	0.54
Ireland	2	2	1	1	Vietnam	2	2	0.64	0.64
					Total	1207	334	448	117

[1] Counted by authors: e.g., for a paper by 2 authors from UK and 1 from USA, we added ⅔ to UK and ⅓ to USA.

3rd place: *A Refined Evaluation Function for the MinLA Problem*, by Eduardo Rodriguez-Tello, Jin-Kao Hao, and Jose Torres-Jimenez;

Student: *Decision Forests with Oblique Decision Trees*, by Peter Jing Tan and David L. Dowe.

We want to thank all people 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 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 goes to the members of the Board of Directors of SMIA, particularly to Ángel Kuri and Raúl Monroy. Sulema Torres of CIC-IPN, Agustin Leon Barranco of INAOE, and Yulia Ledeneva of CIC-IPN devoted great effort to the preparation of the conference.

We would like to express our sincere gratitude to the Instituto Tecnológico de Apizaco, for their warm hospitality to MICAI 2006. First of all, special thanks to the Constitutional Governor of the State of Tlaxcala, Lic. Héctor Israel Ortiz Ortiz, for his valuable participation and support of the organization of this conference. We would also like to thank the Secretaría de Desarrollo Económico of the state of Tlaxcala for its financial support and for providing part of the infrastructure for the keynote

Table 2. Statistics of submissions and accepted papers by topic[2]

Accepted	Submitted	Topic
24	77	Machine Learning
21	85	Neural Networks
18	89	Other
18	57	Data Mining
16	62	Genetic Algorithms
16	47	Fuzzy logic
14	42	Natural Language Processing / Understanding
13	51	Hybrid Intelligent Systems
13	22	Uncertainty / Probabilistic Reasoning
10	46	Computer Vision
10	40	Knowledge Representation
9	36	Robotics
8	31	Knowledge Acquisition
8	25	Bioinformatics
7	32	Multiagent systems and Distributed AI
7	27	Planning and Scheduling
5	11	Intelligent Interfaces: Multimedia; Virtual Reality
4	21	Expert Systems / KBS
4	20	Navigation
4	8	Belief Revision
3	27	Ontologies
3	24	Knowledge Management
3	19	Model-Based Reasoning
3	17	Intelligent Tutoring Systems
3	11	Intelligent Organizations
2	13	Logic Programming
2	8	Common Sense Reasoning
2	8	Case-Based Reasoning
2	8	Assembly
2	7	Spatial and Temporal Reasoning
2	6	Qualitative Reasoning
2	5	Constraint Programming
1	14	Knowledge Verification; Sharing; Reuse
1	3	Automated Theorem Proving
–	16	Philosophical and Methodological Issues of AI
–	6	Nonmonotonic Reasoning

[2] According to the topics indicated by the authors. A paper may have more than one topic.

lectures. We are deeply grateful to the Secretaría de Turismo of the State of Tlaxcala for its help with the organization of the tourist visits to local attractions and folk carnivals of the State of Tlaxcala. Nothing would have been possible without the financial support of our sponsors—Intel and Arknus—for the entire conference organization. We express our gratitude to the conference staff and Local Committee.

The entire submission, reviewing, and selection process, as well as putting together the proceedings was supported for free by the EasyChair system (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 Springer staff's great patience and help in editing this volume.

October 2006

Alexander Gelbukh
Carlos Alberto Reyes García

Organization

MICAI 2006 was organized by the Mexican Society for Artificial Intelligence (SMIA) in collaboration with the Instituto Tecnológico de Apizaco, which hosted the conference, as well as the Center for Computing Research of the National Polytechnic Institute (CIC-IPN), the Instituto Nacional de Astrofísica Óptica y Electrónica (INAOE), the Instituto Tecnológico Autónomo de México (ITAM), and the Instituto Tecnológico de Estudios Superiores de Monterrey (ITESM), Mexico.

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Table of Contents

Uncertainty and Qualitative Reasoning

Evolutionary Algorithms and Swarm Intelligence

Neural Networks

Optimization and Scheduling

Machine Learning and Feature Selection

Classification

Knowledge Discovery

Computer Vision

Image Processing and Image Retrieval

Natural Language Processing

Information Retrieval and Text Classification

Speech Processing

Multiagent Systems

Robotics

Bioinformatics and Medical Applications