

# Lecture Notes in Artificial Intelligence 7630

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# Advances in Computational Intelligence

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# Preface

The Mexican International Conference on Artificial Intelligence (MICAI) is a yearly international conference series that has been organized by the Mexican Society of Artificial Intelligence (SMIA) since 2000. MICAI is a major international AI forum and the main event in the academic life of the country's growing AI community.

MICAI conferences publish high-quality papers in all areas of AI and its applications. The proceedings of the previous MICAI events have been published by Springer in its *Lecture Notes in Artificial Intelligence* (LNAI) series, vol. 1793, 2313, 2972, 3789, 4293, 4827, 5317, 5845, 6437, 6438, 7094, and 7095. Since its foundation in 2000, the conference has been growing in popularity and improving in quality.

The proceedings of MICAI 2012 are published in two volumes. The first volume, *Advances in Artificial Intelligence*, contains 40 papers structured into five sections:

- Machine Learning and Pattern Recognition
- Computer Vision and Image Processing
- Robotics
- Knowledge Representation, Reasoning, and Scheduling
- Medical Applications of Artificial Intelligence

The second volume, *Advances in Computational Intelligence*, contains 40 papers structured into four sections:

- Natural Language Processing
- Evolutionary and Nature-Inspired Metaheuristic Algorithms
- Neural Networks and Hybrid Intelligent Systems
- Fuzzy Systems and Probabilistic Models in Decision Making

Both books will be of interest for researchers in all fields of AI, students specializing in related topics, and for the general public interested in recent developments in AI.

The conference received for evaluation 224 submissions by 461 authors from 28 countries: Algeria, Austria, Belgium, Brazil, Canada, China, Colombia, Cuba, Czech Republic, France, Hungary, India, Iran, Israel, Japan, Luxembourg, Mexico, The Netherlands, New Zealand, Pakistan, Paraguay, Peru, Poland, Russia, Spain, Tunisia, UK, and USA. Of these submissions, 77 papers were selected for publication in these two volumes after a peer-reviewing process carried out by the international Program Committee. The acceptance rate was 34.3%.

MICAI 2012 was honored by the presence of such renowned experts as Ulises Cortés of the Universitat Politècnica de Catalunya, Spain; Joydeep Ghosh of the University of Texas, USA; Jixin Ma of Greenwich College, UK; Roy A. Maxion of

Carnegie Mellon University, USA; Grigori Sidorov of the Instituto Politécnico Nacional, Mexico; and Ian Witten of the University of Waikato, New Zealand, who gave excellent keynote lectures. The technical program of the conference also featured nine tutorials presented by Ulises Cortes, Alexander Gelbukh, Jean Bernard Hayet, Sergio Ledezma, Jixin Ma, Roy A. Maxion, Horacio Rostro González, Grigori Sidorov, and Ian Witten. Two workshops were held jointly with the conference: the 5th Workshop on Intelligent Learning Environments and the 5th Workshop on Hybrid Intelligent Systems.

In particular, in addition to regular papers, the volumes contain three invited papers by keynote speakers and their collaborators:

- “Empirical Study of Machine Learning-Based Approach for Opinion Mining in Tweets,” by Grigori Sidorov, Sabino Miranda-Jiménez, Francisco Viveros-Jiménez, Alexander Gelbukh, Noé Castro-Sánchez, Francisco Velásquez, Ismael Díaz-Rangel, Sergio Suárez-Guerra, Alejandro Treviño, and Juan Gordon
- “AI-Based Fall Management Services. The Role of the i-Walker in I-DONTFALL,” by Ulises Cortés, Antonio Martínez-Velasco, Cristian Barrué, and Roberta Annicchiarico
- “Syntactic Dependency-Based N-grams as Classification Features,” by Grigori Sidorov, Francisco Velasquez, Efstathios Stamatatos, Alexander Gelbukh, and Liliana Chanona-Hernández

The authors of the following papers received the Best Paper Award on the basis of the paper’s overall quality, significance, and originality of the reported results:

- 1<sup>st</sup> place: “Toward the Creation of Semantic Models Based on Computer-Aided Designs,” by Nestor Velasco Bermeo, Miguel González Mendoza, Alexander García Castro, and Irais Heras Dueñas (Mexico, USA)
- 2<sup>nd</sup> place: “A New Branch and Bound Algorithm for the Cyclic Bandwidth Problem,” by Hillel Romero-Monsivais, Eduardo Rodríguez-Tello, and Gabriel Ramírez (Mexico)
- 3<sup>rd</sup> place: “Modelling, Aggregation, and Simulation of a Dynamic Biological System Through Fuzzy Cognitive Maps,” by Gonzalo Nápoles, Isel Grau, Maikel León, and Ricardo Grau (Cuba)

The authors of the following paper selected among all papers of which the first author was a full-time student, excluding the papers listed above, received the Best Student Paper Award:

- 1<sup>st</sup> place: “Fuzzy Clustering for Semi-Supervised Learning—Case Study: Construction of an Emotion Lexicon,” by Soujanya Poria, Alexander Gelbukh, Dipankar Das, and Sivaji Bandyopadhyay (India, Mexico).

In addition, the attendees of the Special Session voted for the following works to receive the Best Poster Award (these papers are included in a separate Special Session proceedings volume):

- 1<sup>st</sup> place: “EMG Pattern Recognition System Based on Neural Networks,” by Juan Carlos Gonzalez-Ibarra, Carlos Soubervielle-Montalvo, Omar Vital-Ochoa, and Hector Gerardo Perez-Gonzalez (Mexico)
- 2<sup>nd</sup> place: “Conflict Resolution in Multiagent Systems: Balancing Optimality and Learning Speed,” by Aaron Rocha-Rocha, Enrique Munoz de Cote, Saul Pomares Hernandez, and Enrique Sucar Succar (Mexico)
- 3<sup>rd</sup> place: “Conception and Implementation of a Supermarket Shopping Assistant System,” by Antonio Marin-Hernandez, Guillermo de Jesús Hoyos-Rivera, Marlon García-Arroyo, and Luis Felipe Marin-Urias (Mexico)

We want to thank all the people involved in the organization of this conference. In the first place, these are the authors of the papers published in this book: it is their research work that gives value to the book and to the work of the organizers. We thank the Track Chairs for their hard work, the Program Committee members and additional reviewers for their great effort spent on reviewing the submissions.

We would like to express our sincere gratitude to the Coordinación para la Innovación y Aplicación de la Ciencia y la Tecnología (CIACyT) of the Universidad Autónoma de San Luis Potosí, CONSYS TELECOM, ACOMEE, Magnetica FM, Faragauss System, Fundación Nikola Tesla, Panadería Penny, and Universidad Politécnica de San Luis Potosí (UPSLP) for their generous support, and in particular to UPSLP for providing the infrastructure for the keynote talks, tutorials, workshops, and technical presentations. We also thank the Oficina de Congresos y Convenciones de San Luis Potosí (OCCSLP) for its valuable effort in organizing the cultural program as well as other logistics activities.

We are deeply grateful to the conference staff and to all members of the Local Committee headed by Omar Montaña Rivas. In particular, we thank Rafael Llamas Contreras, the Logistics Chair, and Gabriela Zárate Rasillo, the OCCSLP representative, for their great effort in resolving logistics issues. Very special thanks go to Liliana Gámez Zavala and Ana María González Ávila for their help in advertizing MICAÍ and handling all publicity-related issues.

We are indebted to José Antonio Loyola Alarcón, the Rector of the Universidad Politécnica de San Luis Potosí, for giving us the wonderful opportunity of organizing the conference at this university and for his unconditional support in the organization of the conference in all its stages. We would also like to express our sincere gratitude to the Vice Rector’s Office of the UPSLP headed by Francisco Javier Delgado Rojas; to Igor León O’Farrill, Treasurer General of the UPSLP, and Francisco Cruz Oradaz Salazar, Head of the Facultad de Tecnologías de Información y Telemática, for their warm hospitality.

We gratefully acknowledge support received from the following projects: WIQ-EI (Web Information Quality Evaluation Initiative, European project 269180),

PICCO10-120 (ICYT, Mexico City Government), and CONACYT 122030-DST India project “Answer Validation Through Textual Entailment.” The entire submission, reviewing, and selection process, as well as preparation of the proceedings, was supported for free by the EasyChair system ([www.easychair.org](http://www.easychair.org)). Last but not least, we are grateful to Springer for their patience and help in the preparation of this volume.

November 2012

Ildar Batyrshin  
Miguel González Mendoza

# Organization

## Conference Organization

MICAI 2012 was organized by the Mexican Society of Artificial Intelligence (SMIA, Sociedad Mexicana de Inteligencia Artificial) in collaboration with the Universidad Politécnica de San Luis Potosí (UPSLP), Centro de Investigación en Computación del Instituto Politécnico Nacional (CIC-IPN), Instituto Nacional de Astrofísica, Óptica y Electrónica (INAOE), Universidad Nacional Autónoma de México (UNAM), Universidad Autónoma de México (UAM), Instituto Tecnológico de Estudios Superiores de Monterrey (ITESM), Universidad Autónoma de Estado de Hidalgo (UAEH), and Instituto Mexicano de Petróleo (IMP).

The MICAI series website is: [www.MICAI.org](http://www.MICAI.org). The website of the Mexican Society of Artificial Intelligence, SMIA, is: [www.SMIA.mx](http://www.SMIA.mx). Contact options and additional information can be found on these websites.

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