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Félix Castro · Sabino Miranda-Jiménez
Miguel González-Mendoza (Eds.)

Advances in Computational Intelligence

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Proceedings, Part II

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In memoriam

Dr. José Negrete Martínez

Preface

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

We dedicate this set of two volumes to the bright memory of Dr. José Negrete Martínez, the founder of the SMIA back in 1986, its first president, whose contribution to the promotion of artificial intelligence in our country is difficult to overestimate.

MICA conferences publish high-quality papers in all areas of artificial intelligence and its applications. The proceedings of the previous MICA events have been published by Springer in its *Lecture Notes in Artificial Intelligence* series, as volumes 1793, 2313, 2972, 3789, 4293, 4827, 5317, 5845, 6437, 6438, 7094, 7095, 7629, 7630, 8265, 8266, 8856, 8857, 9413, 9414, 10061, and 10062. Since its foundation in 2000, the conference has been growing in popularity and improving in quality.

With MICA 2017, we celebrated the 30th anniversary of the SMIA, which was officially registered in 1987. Accordingly, MICA 2017 featured a round table with the participation of a number of former presidents of the SMIA, including its founder Dr. José Negrete Martínez; this happened to be one of his last public appearances.

The proceedings of MICA 2017 are published in two volumes. The first volume, *Advances in Soft Computing*, contains 30 papers structured into four sections:

- Neural Networks
- Evolutionary Algorithms and Optimization
- Hybrid Intelligent Systems and Fuzzy Logic
- Machine Learning and Data Mining

The second volume, *Advances in Computational Intelligence*, contains 30 papers structured into three sections:

- Natural Language Processing and Social Networks
- Intelligent Tutoring Systems and Educational Applications
- Image Processing and Pattern Recognition

This two-volume set will be of interest for researchers in all areas of artificial intelligence, students specializing in related topics, and for the general public interested in recent developments in artificial intelligence.

The conference received 203 submissions for evaluation from 23 countries: Argentina, Belgium, Brazil, Chile, Colombia, Cuba, Ecuador, France, India, Iran, Ireland, Malaysia, Mexico, Morocco, Pakistan, Paraguay, Peru, Portugal, Russia, South Africa, Spain, Ukraine, and USA. Of these submissions, 61 papers were selected for publication in these two volumes after the peer-reviewing process carried out by the international Program Committee. Thus, the acceptance rate was 30%.

The international Program Committee consisted of 192 experts from 19 countries: Argentina, Benin, Brazil, Canada, Colombia, Cuba, Finland, France, Greece, Israel, Italy, Japan, Mexico, Portugal, Singapore, Spain, UK, USA, and Uruguay.

MICAI 2017 was honored by the presence of renowned experts, who gave excellent keynote lectures:

- Pierre Baldi, University of California, Irvine, USA
- Hamido Fujita, Iwate Prefectural University, Japan
- Tamar Solorio, University of Houston, USA
- Eduardo Morales Manzanares, INAOE, Mexico
- Jeff Dean, Google, USA

The technical program of the conference also featured eight tutorials:

- “Artificial Hydrocarbon Networks and Their Applications,” by Hiram Eredín Ponce Espinosa
- “Building a Digital Ecosystem Using FIWARE,” by Nestor Velasco-Bermeo, Miguel González Mendoza, and Jesus Favela
- “Computational Biology,” by Gabriel Del Rio and Carlos Brizuela
- “Data Science: A Quick Introduction,” by Mauricio Alonso Sánchez Herrera
- “Introduction to Data Mining with Python,” by Mario Garcia Valdez
- “Sentiment Analysis,” by Alexander Gelbukh
- “Similarity, Correlation and Association Measures in Data Analysis: New Looks and New Measures,” by Ildar Batyrshin
- “The Wavelet Transform in Soft Computing,” by Oscar Herrera Alcántara

Three workshops were held jointly with the conference:

- HIS 2017: 10th Workshop on Hybrid Intelligent Systems
- WIDSSI 2017: Third International Workshop on Intelligent Decision Support Systems for Industry
- WILE 2017: 10th Workshop on Intelligent Learning Environments

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

- Best paper: “On the Many-Objective Pickup and Delivery Problem: Analysis of the Performance of Three Evolutionary Algorithms,” by Abel García-Nájera, Antonio López-Jaimes, and Saúl Zapotecas-Martínez (Mexico)
- Best student paper: “Human Activity Recognition on Mobile Devices Using Artificial Hydrocarbon Networks,” by Hiram Ponce, Guillermo González, Luis Miralles-Pechuán, and Lourdes Martínez-Villaseñor (Mexico)

The latter paper was selected among all papers of which the first author was a full-time student, excluding the paper that received the best paper award.

In addition, at MICAI 2017 the winners of the national contest of theses on artificial intelligence, organized by the Mexican Society of Artificial Intelligence (SMIA), were announced:

- Best PhD thesis, first place: “Image Classification Through Text Mining Techniques,” by Adrián Pastor López Monroy with his advisors Manuel Montes-y-Gómez, Hugo Jair Escalante, and Fabio A. González
- Best PhD thesis, second place: “Hardware Acceleration of Frequent Itemsets Mining on Data Streams,” by Lázaro Bustio Martínez with his advisors René Cumplido and Raudel Hernandez-León
- Best PhD thesis, third place: “Evolución Diferencial par Resolver Problemas de Optimización Dinámica con Restricciones,” by María Yaneli Ameca Alducin with her advisors Nicandro Cruz Ramírez and Efrén Mezura Montes
- Best MSc thesis, first place: “Redes Neuronales de Tercera Generación Aplicadas al Reconocimiento de Imaginación de Movimientos en Registros de Electroencefalografía,” by Ruben Isaac Cariño Escobar with his advisors Roberto Antonio Vázquez Espinoza de los Monteros and Josefina Gutiérrez Martínez
- Best MSc thesis, second place: “Distinción de Estados de Actividad e Inactividad Lingüística para Interfaces Eerebro Computadora,” by Luis Alfredo Moctezuma Pascual with his advisors Maya Carrillo Ruiz and Alejandro A. Torres Garcia
- Best MSc thesis, third place (shared): “Clasificación de Patrones de Bando Obtenidos Mediante Western Blot para el Diagnóstico de Cáncer de Mama,” by Diana María Sánchez Silva with her advisors Héctor Gabriel Acosta Mesa and Tania Romo González de la Parra
- Best MSc thesis, third place (shared): “Multimodal Sentiment Analysis in Social Media using Deep Learning with Convolutional Neural Networks,” by Navonil Majumder with his advisor Alexander Gelbukh

The cultural program of the conference included tours to the La Bufadora natural attraction and the tour of wine production route.

We want to thank all 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 effort 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 thank Dr. Juan Manuel Ocegueda Hernández, Rector of the Universidad Autónoma de Baja California, and Dr. Silvio Guido Lorenzo Marinone Moschetto, Director General of the Centro de Investigación Científica y de Educación Superior de Ensenada, along with all the members of their teams, for their invaluable help in the organization of the conference. We express our great gratitude to Dr. Blanca Rosa García Rivera, Dr. Juan Iván Nieto Hipólito, and Dr. Juan Crisóstomo Tapia Mercado for all the support provided to this event. We are deeply grateful to the student assistants from UABC and CICESE, who were very helpful at all stages of the organization. We are deeply grateful to the conference staff and to all members of the Local Committee headed by Dora Luz Flores Gutiérrez, Everardo Gutiérrez López, and Carlos Alberto Brizuela Rodríguez. The entire submission, reviewing, and selection process, as well as preparation of the proceedings, was supported free of charge by the

EasyChair system (www.easychair.org). Finally, yet importantly, we are very grateful to the staff at Springer for their patience and help in the preparation of this volume.

February 2018

Félix Castro
Sabino Miranda-Jiménez
Miguel González-Mendoza

Organization

MICAI 2017 was organized by the Mexican Society of Artificial Intelligence (SMIA, Sociedad Mexicana de Inteligencia Artificial) in collaboration with the Universidad Autónoma de Baja California (UABC), the Centro de Investigación Científica y de Educación Superior de Ensenada (CICESE), the Universidad Autónoma del Estado de Hidalgo (UAEH), the Centro de Investigación e Innovación en Tecnologías de la Información y Comunicación (INFOTEC), the Tecnológico de Monterrey CEM, the Centro de Investigación en Computación del Instituto Politécnico Nacional (CIC-IPN), and the Universidad Autónoma Metropolitana Azcapotzalco (UAM).

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

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