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Ildar Batyrshin · Antonio Marín-Hernández (Eds.)

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Proceedings

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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 artificial intelligence (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, 7095, 7629, 7630, 8265, 8266, 8856, 8857, 9413, 9414, 10061, 10062, 10632, 10633, 11288, and 11289. Since its foundation in 2000, the conference has been growing in popularity and improving in quality.

The proceedings of MICAI 2019 contains 59 papers structured into four sections:

- Machine Learning
- Fuzzy Systems, Reasoning, and Intelligent Applications
- Computer Vision and Robotics
- Optimization and Planning

This book should be of interest to researchers in all fields of AI, students specializing in related topics, and for the public in general interested in recent developments in AI.

The conference received for evaluation 148 submissions from 16 countries: Argentina, Australia, Brazil, Cuba, Czech Republic, France, Germany, Mexico, Pakistan, Peru, Portugal, Russia, Spain, the United Kingdom, the USA, and Venezuela. Of these submissions, 59 papers were selected for publication in this volume after a peer-reviewing process carried out by the international Program Committee. The acceptance rate was 40%.

The international Program Committee consisted of 99 experts from 15 countries: Argentina, Brazil, Canada, Cuba, France, Greece, Ireland, Israel, Italy, Japan, Mexico, Portugal, Spain, the United Kingdom, and the USA.

MICAI 2019 was honored by the presence of renowned experts who gave excellent keynote lectures:

- Seth Hutchinson, Institute for Robotics and Intelligent Machines, Georgia Institute of Technology, USA
- Pablo Noriega, Artificial Intelligence Research Institute of the Spanish Scientific Research Council (III-CSIC), Spain
- Manuel Montes y Gómez, Instituto Nacional de Astrofísica, Óptica y Electrónica, Mexico
- Julian Togelius, New York University, USA

- Marley Vellasco, Computational Intelligence and Robotics Laboratory (LIRA) at PUC-Rio, Brazil

The technical program of the conference also featured seven tutorials:

- “Introduction to BDI Agent Programing with JaCa,” by Héctor Xavier Limón Riaño
- “Path Planning and Control for Robots,” by Rafael Eric Murrieta Cid
- “Trading Algorithms with Python: Learn to Buy and to Sell Shares on the Stock Market using Python and Artificial Intelligence Methods,” by Israel Hernández and Oscar Herrera
- “Computational Intelligence for Processing and Classification of Bio-Signals,” by Carlos Alberto Reyes García
- “New Models and Algorithms of Artificial Neural Networks,” by Juan Humberto Sossa Azuela
- “A Walk-Though of Deep-Learning-Based Object Detectors,” by Gilberto Ochoa-Ruiz
- “The RoboCup Logistics League: A Teaching and Research Testbed for Novel Concepts in Flexible Production,” by Gerald Steinbauer

Six workshops were held jointly with the conference:

- HIS 2019: 12th Workshop of Hybrid Intelligent Systems
- WILE 2019: 12th Workshop on Intelligent Learning Environments
- WIDSSI 2019: 5th International Workshop on Intelligent Decision Support Systems for Industry Application
- CIAPP 2019: the First Workshop on New Trends in Computational Intelligence and Applications
- The first Workshop on Causal Reasoning
- Machine Learning for Healthcare

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:

- First place: “RGB-D Camera and 2D Laser Integration for Robot Navigation in Dynamic Environments,” by Orlando Lara-Guzmán, Sergio A. Serrano, David Carrillo-López, and L. Enrique Sucar (Mexico)
- Second place: “Towards Constant Calculation in Disjunctive Inequalities using Wound Treatment Optimization,” by Hiram Ponce, José A. Marmolejo-Saucedo and Lourdes Martínez-Villaseñor (Mexico)
- Third place: “A Corpus-based Study of the Rate of Changes in Frequency of Syntactic Bigrams in English and Russian,” by Vladimir Bochkarev, Valery Solovyev, and Anna Shevlyakova (Russia)

The cultural program of the conference included a tour to Xalapa Anthropology Museum and two of the most recognized Mesoamerican Archaeological sites in Veracruz: Cempoala and Quiahuiztlán.

We want to thank all the people involved in the organization of this conference. In the first place, there 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 reviewers for their great effort spent on reviewing the submissions, the track chairs for their hard work, and the Program and Organizing Committee members.

We are deeply grateful to the Universidad Veracruzana for their warm hospitality towards MICA 2019. We would like to express our gratitude to Dr. Sara D. Ladrón de Guevara González (President of the University), Dr. María Magdalena Hernández Alarcón (Academic Secretary of the University), and with special thanks to Lic. Suri Génesis Sánchez Hernández for coordinating activities on the local arrangements. We also want to thank Dr. Ángel Rafael Trigos Landa (Research Director of the University). The entire submission, reviewing, and selection process, as well as preparation of the proceedings, was supported by the EasyChair system (www.easychair.org). Last but not least, we are grateful to Springer for their patience and help in the preparation of this volume.

October 2019

Lourdes Martínez-Villaseñor
Ildar Batyrshin
Antonio Marín-Hernández

Organization

MICAI 2019 was organized by the Mexican Society of Artificial Intelligence (SMIA – Sociedad Mexicana de Inteligencia Artificial) in collaboration with the Universidad Veracruzana, the Universidad Autónoma del Estado de Hidalgo, the Centro de Investigación en Computación of the Instituto Politécnico Nacional, and the Facultad de Ingeniería of the Universidad Panamericana.

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

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