

Advances in Theory and Applications of Artificial Intelligence

Hamido Fujita, Philippe Fournier-Viger, Jun Sasaki, Moonis Ali

■ *The 33rd International Conference on Industrial, Engineering, and Other Applications of Applied Intelligent Systems was held in Kitakyushu, Japan on 22 to 25 September 2020. This report provides an overview and summary of the conference.*

This year, the 33rd meeting of the International Conference on Industrial, Engineering, and Other Applications of Applied Intelligent Systems 2020¹ was held in Kitakyushu, Japan from 22 to 25 September 2020. The International Conference on Industrial, Engineering, and Other Applications of Applied Intelligent Systems focuses on artificial intelligence (AI) and its applications. This long-standing conference has been held every year since 1988. To date, the conference has been located in twenty different countries.

The 2020 conference was sponsored by the International Society of Applied Intelligence and was held in cooperation with Springer; Kitakyushu City; the KDDI Foundation; the Association for the Advancement of Artificial Intelligence; the Association for Computing Machinery; the Austrian Association for Artificial Intelligence; the Institute of Electrical and Electronics Engineers; the Catalan Association for Artificial Intelligence; the Graz University of Technology; the Italian Artificial Intelligence Association; Iwate Prefectural University, Japan; the Japanese Society for Artificial Intelligence; the Lithuanian Computer Society; the Spanish Society for Artificial Intelligence; the Society for the Study of AI and the Simulation of Behavior; the Taiwanese Association for Consumer Electronics; the Taiwanese Association for Artificial Intelligence; Texas State University; and the University of Klagenfurt.

This year, one-hundred and nineteen papers were submitted to the conference. The papers were submitted either to the main track or to one of special sessions: Collective Intelligence in Social Media and Intelligent Knowledge Engineering in Decision-Making Systems. An international program committee composed of eighty-two researchers from thirty-six countries evaluated each paper during a three-review double-blind peer review process. Sixty-two full papers and seventeen short papers were selected for publication in the conference proceedings, which were published in Springer's *Lectures Notes in Artificial Intelligence* series.² Nine additional papers were selected as poster papers and published in a separate proceeding.

The published papers cover both theoretical advances in AI as well as applications of applied intelligence systems to solve real-life problems in all areas including science, industry, engineering, robotics and automation, finance and business, bioinformatics, medicine, cyberspace, and human-machine interactions. Each of the accepted papers was presented either in person or as an online presentation. After the conference, authors whose papers received excellent evaluations were invited to submit an extended version of their paper for the Best of International Conference on Industrial, Engineering, and Other Applications of Applied Intelligent Systems 2020's special issue in the journal *Applied Intelligence*.³

The world-wide Coronavirus-19 pandemic that was ongoing during the conference prohibited many participants from traveling to Japan. These authors presented their papers online during the conference webinar. We had twenty-nine participants from Japan, but the majority of participants registered were from outside of Japan. Despite the time-zone differences, the conference attendance rate was ninety-six percent. Among the seventy-nine papers published in Springer Conference Proceedings,⁴ fifty-nine papers were presented online, and twenty papers presented in person at the Kitakyushu Conference. All the poster papers⁵ were presented online. It was a nice experience to notice that many participants were attending the presentations, and many sessions' chairs were participating in the mandate of the conference regardless of the time-zone differences.

Keynote Presentations

Three keynote presentations were given by distinguished researchers. Tao Wu (Shanghai Jiao Tong University) described an intelligent medical robot-based telemedicine platform for use between medical alliances. This offers various services to improve the quality and efficiency of medical services, in a talk entitled *Intelligence, Wisdom, and Enjoyment: Practice and Exploration of Intelligent Telemedicine Robot Based on Human in the Loop*.

In his talk about AI and Data Science Research for Social Good: Challenges and Opportunities, Ee-Peng Lim (Singapore Management University) emphasized that research can provide positive changes to society. As examples, he presented a probabilistic labor market model that was used to analyze job data from Singapore, and a mobile application that can keep track of the food consumed by users from pictures using image recognition.

In the talk *On Use of Sentiment Analysis in Group Decision-Making*, Enrique Herrera Viedma presented the problem of group decision-making, that is, how a group of experts can reach an agreement to take decisions through negotiation. He presented AI-based models where sentiment analysis reveals user preferences from textual content, to serve as a basis for decision-making.

The three distinguished researchers were presented with medals honoring their contribution to the conference.

Best Paper Awards

This year, five awards, all sponsored by the publisher Springer, were given to reward the best contributions in five categories. Ten nominees were selected based on the overall review scores. The conference award committee made the final determination of the winners.

The Best Paper Award, representing the best overall contribution, was given to Dolly Sapra and Andy D. Pimentel for their paper "Constrained Evolutionary Piecemeal Training to Design Efficient Neural Networks."

The Best Application Paper Award was presented to Wei Zhang and Chris Challis for their paper "Automatic Identification of Account Sharing for Video Streaming Services."

The Best Theory Paper Award was presented to Fan Zhang, Jianshen Zhu, Rachaya Chiewvanichakorn, Aleksandar Shurbevski, Hiroshi Nagamochi, and Tatsuya Akutsu for their paper "A New Integer Linear Programming Formulation to the Inverse QSAR/QSPR for Acyclic Chemical Compounds Using Skeleton Trees."

The Best Special Session Paper was awarded to Wei Song, Lu Liu, and Chaomin Huang for their paper "TKU-CE: Cross-Entropy Method for Mining Top-K High Utility Item Sets."

Finally, the Best Poster Paper went to "The Time Efficient Centralization Measure for Social Networks Assessment" by Rafal Palak and Krystian Wojkiewicz.

The 2021 Conference

In 2021, the 34th International Conference on Industrial, Engineering, and Other Applications of Applied Intelligent Systems⁶ will be held in Kuala Lumpur, Malaysia from 26 to 29 July 2021. As in previous years, contributions are welcome on theoretical aspects of AI, as well as applications of intelligent systems in innovative fields such as robotics, drone navigation, sensor networks medicine, and the internet of things.

Notes

1. jsasaki3.wixsite.com/ieaaie2020
2. link.springer.com/book/10.1007/978-3-030-55789-8
3. www.springer.com/journal/10489
4. <https://www.springer.com/gp/authors-editors/conference-proceedings>
5. jsasaki3.wixsite.com/ieaaie2020
6. ieaaie2021.wordpress.com

Hamido Fujita is a professor of computer science at Iwate Prefectural University, Takizawa, Iwate, Japan.

Philippe Fournier-Viger is a professor of computer science at the Harbin Institute of Technology (Shenzhen), Shenzhen, China.

Jun Sasaki is a professor of computer science at Iwate Prefectural University, Takizawa, Iwate, Japan.

Moonis Ali is a professor of computer science at Texas State University, San Marcos, Texas, USA.