

17th Conference on Computer Science and Intelligence Systems (FedCSIS 2022)

CONFERENCE REPORT

The 17th edition of the Conference on Computer Science and Intelligence Systems (FedCSIS 2022; www.fedcsis.org) took place in Sofia, Bulgaria, on 4-7, 2022. This year, the first two days of the conference took place in the facilities of the Crisis Management and Disaster Response Centre of Excellence in Sofia, Bulgaria. The remaining two days have been realized as an online conference.

The main Conference Chair of FedCSIS 2022 was Stefka Fidanova, while Nina Dobrinkova acted as the Chair of the Organizing Committee. This year, FedCSIS was organized by the Polish Information Processing Society (Mazovia Chapter), IEEE Poland Section Computer Society Chapter, Systems Research Institute Polish Academy of Sciences, Warsaw University of Technology, Wrocław University of Economics and Institute of Information and Communication Technologies, Bulgarian Academy of Sciences.

FedCSIS 2022 was technically co-sponsored by: IEEE Bulgarian Section, IEEE Poland Section, IEEE Czechoslovakia Section Computer Society Chapter, IEEE Poland Section Systems, Man, and Cybernetics Society Chapter, IEEE Poland Section Computational Intelligence Society Chapter, IEEE Poland Section Control System Society Chapter, Committee of Computer Science of the Polish Academy of Sciences, Mazovia Cluster ICT, Poland and Bulgarian Section of SIAM.

Moreover, last year the FedCSIS conference series formed the strategic alliance with QED Software, a Polish software company developing AI-based technologies and acting as the technological co-founder in the AI-driven start-ups. This collaboration has been continued.

During FedCSIS 2022, the keynote lectures were delivered by:

- Krassimir Atanassov, Bulgarian Academy of Sciences, Sofia, Bulgaria: *“Remarks on Index Matrices”*,
- Chris Cornelis, Ghent University, Department of Applied Mathematics, Computer Science and Statistics: *“Hybridization of Fuzzy Sets and Rough Sets: Achievements and Opportunities”*,
- Ivan Lukovic, University of Belgrade, Faculty of Organizational Sciences, *“Organizational Capability for Information Management – Do We Feel a Big Data Crisis?”*,
- Stefano Mariani on behalf of Franco Zambonelli (due to serious health issues encountered right before the conference), University of Modena e Reggio Emilia, Italy: *“Individual and Collective Self-development”*.

Moreover, this year, two special guests delivered invited talks:

- Bogusław Cyganek, who was awarded the 2021 Wiley-IEEE Press Award, for his recent book *“Introduction to Programming with C++ for Engineers”*,

- Andrzej Skowron, who delivered the talk: “*Rough Sets Turn 40: From Information Systems to Intelligent Systems*”, which was devoted to the 40th anniversary of introduction, by late Professor Zdzisław Pawlak, of the theory of Rough Sets.

FedCSIS 2022 consisted of five Tracks and a special event for Doctoral School Students. Within each Track, topical Technical Sessions have been organized. Each Technical Session was split into fully on site and fully online sub-sessions. Some of Technical Sessions have been associated with the FedCSIS conference series for many years, while some of them are relatively new. The role of the technical Sessions is to focus and enrich discussions on selected areas, pertinent to the general scope of each Track. The list of Tracks, and topical Technical Sessions organized within their scope, was as follows.

- **Track 1: Advanced Artificial Intelligence in Applications (17th Symposium AAIA'22)**
 - Artificial Intelligence for Next-Generation Diagnostic Imaging (1st Workshop AI4NextGenDI'22)
 - Artificial Intelligence in Machine Vision and Graphics (4th Workshop AIMaViG'22)
 - Personalization and Recommender Systems (1st Workshop PeRS'22)
 - Rough Sets: Theory and Applications (4th International Symposium RSTA'22)
 - Computational Optimization (15th International Workshop WCO'22)
- **Track 2: Computer Science & Systems (CSS'22)**
 - Computer Aspects of Numerical Algorithms (15th Workshop CANA'22)
 - Concurrency, Specification and Programming (30th International Symposium CS&P'22)
 - Multimedia Applications and Processing (15th International Symposium MMAP'22)
 - Scalable Computing (12th Workshop WSC'22)
- **Track 3: Network Systems and Applications (NSA'22)**
 - Complex Networks - Theory and Application (1st Workshop CN-TA'22)
 - Internet of Things – Enablers, Challenges and Applications (6th Workshop IoT-ECAW'22)
 - Cyber Security, Privacy, and Trust (3rd International Forum NEMESIS'22)
- **Track 4: Advances in Information Systems and Technology (AIST'22)**
 - Data Science in Health, Ecology and Commerce (4th Workshop DSH'22)
 - Information Systems Management (17th Conference ISM'22)
 - Knowledge Acquisition and Management (28th Conference KAM'22)
- **Track 5: Software and System Engineering (S3E'22)**
 - Cyber-Physical Systems (9th International Workshop IWCPs'22)
 - Model Driven Approaches in System Development (7th Workshop MDASD'22)
 - Software Engineering (42nd IEEE Workshop SEW'22)
- **7th Doctoral Symposium on Recent Advances in Information Technology (DS-RAIT'22)**

During FedCSIS 2022, for the second time, the Zdzisław Pawlak award was presented to the best papers from across the whole conference. It was done to further underscore the fact that scientific achievements of Professor Pawlak had gone far beyond Artificial

Intelligence. This year, the following contributions have been awarded, in three categories:

- In the category **Best Paper**: Kamil Rybiński (Warsaw University of Technology, Poland) and Michał Śmiałek (Warsaw University of Technology, Poland) for the paper: *“Beyond Low-Code Development: Marrying Requirements Models and Knowledge Representations”*.
- In the category **Industry Cooperation**: Ghada Moualla (Orange Labs, France), Sebastien Bolle (Orange Labs, France), Marc Douet (Orange Labs, France) and Eric Rutten (INRIA, France) for the paper: *“Self-adaptive Device Management for the IoT Using Constraint Solving”*.
- In the category **Young Researcher**: Eyad Kannout (University of Warsaw, Poland), Michał Grodzki (University of Warsaw, Poland) and Marek Grzegorowski (University of Warsaw, Poland) for the paper: *“Utilizing Frequent Pattern Mining for Solving Cold-Start Problem in Recommender Systems”*.

Moreover, the Award Committee decided to fund two extra Young Researcher distinctions:

- Aleksandra Bączkiewicz (University of Szczecin, Poland) for the paper: *“Towards Temporal Multi-Criteria Assessment of Sustainable RES Exploitation in European Countries”*.
- Aleksandra Weiss (Scientific Circle of Robotics UWM in Olsztyn, Poland), Marcin Młyński (Scientific Circle of Robotics UWM in Olsztyn, Poland) and Piotr Artiemjew (University of Warmia and Mazury, Poland) for the paper: *“About Classifiers Quality Assessment: Balanced Accuracy Curve (BAC) as an alternative for ROC and PR Curve”*.

All the above awards and distinctions were jointly sponsored by the Mazovia Branch of the Polish Information Processing Society and by QED Software.

FedCSIS 2022 also hosted the Data Mining Competition (already for the 5th time during the history of the FedCSIS conferences) co-organized by QED Software at the online platform KnowledgePit, and sponsored by Control System Software, a Polish company which develops decision support and optimization systems in the areas of transportation, spedition, and logistics.

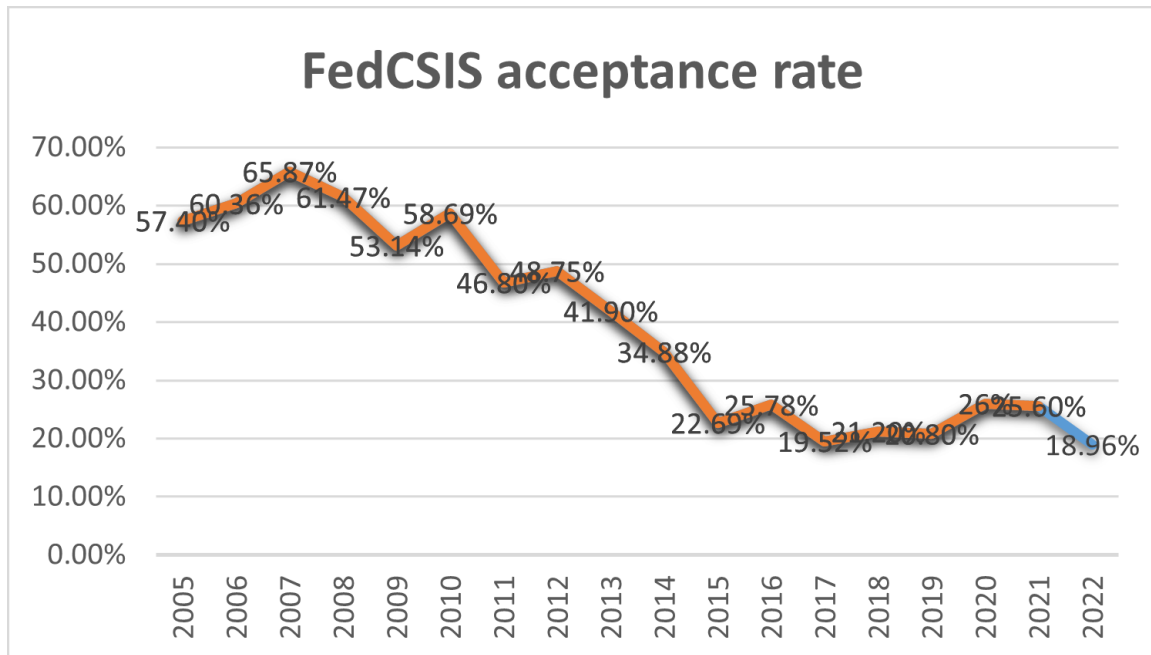
The competition attracted 130 teams from 24 countries. The papers describing the most interesting solutions submitted to the competition were included in the FedCSIS 2022 proceedings (in the special section of **Track 1**). The following papers represent the best solutions awarded by Control System Software:

- Paper describing **the winning solution**: Dymitr Ruta (Khalifa University, UAE), Ming Liu (Khalifa University, UAE), Ling Cen (Khalifa University, UAE), Quang Hieu Vu (VNG

Corporation, Vietnam), *“Diversified gradient boosting ensembles for prediction of the cost of forwarding contracts”*

- Paper describing **the 2nd best solution**: Haitao Xiao, (Chinese Academy of Sciences, China), Yuling Liu (Chinese Academy of Sciences, China), Dan Du (Chinese Academy of Sciences, China), Zhigang Lu (Chinese Academy of Sciences, China), *“An Approach for Predicting the Costs of Forwarding Contracts using Gradient Boosting”*
- Paper describing **the 3rd best solution**: Quang Hieu Vu (VNG Corporation, Vietnam), Ling Cen (Khalifa University, UAE), Dymitr Ruta (Khalifa University, UAE), Ming Liu (Khalifa University, UAE), *“Key Factors to Consider when Predicting the Costs of Forwarding Contracts”*
- Paper describing **the most practical solution**: Sławomir Pioroński (Adam Mickiewicz University, Poland), Tomasz Górecki (Adam Mickiewicz University, Poland), *“Using gradient boosting trees to predict the costs of forwarding contracts”*

English was the exclusive conference language. In 2022, the FedCSIS conference attracted 290 submissions. Out of submitted contributions, after obtaining at least two reviews for each paper, 55 articles were accepted as regular full papers (acceptance rate of 18.96%), 63 articles were accepted as regular short papers. The long-term trend (captured since the first event that was the predecessor of the current conferences) of the acceptance rate, of full regular papers, is illustrated in the figure below. It shows that FedCSIS 2022 was the most competitive conference thus far.



Conference Proceedings include also 5 invited contributions from current and past FedCSIS keynote speakers. Two more volumes of post-conference publications have been

completed. Here, one of them consists of 16 position papers, while the other presents 43 communication papers. Accepted contributions represented 41 countries.

Conference materials were initially published on the conference WWW site (as Preprints). After the conference, full and short papers have been indexed in the IEEE Digital Library (ISBN Web 978-83-962423-9-6, ISBN USB 978-83-965897-0-5, ISBN Art 978-83-965897-1-2, IEEE Catalog Number CFP2285N-ART (ART), CFP2285N-USB (USB), ISSN 2300-5963 and DOI 10.15439/978-83-962423-9-6); furthermore, they will be sent to the Clarivate Web of Science for indexing. Position Papers and Communication Papers were published as a separate volumes (ISSN 2300-5963, ISBN Web 978-83-965897-2-9 ISBN USB 978-83-965897-3-6, and DOI 10.15439/978-83-965897-2-9 ISBN Web 978-83-965897-4-3 and ISBN USB 978-83-965897-5-0 and DOI 10.15439/978-83-965897-4-3 for Communication Papers) Moreover, Proceedings, Position Papers and Communication Papers of the FedCSIS 2022 Conference (in their final version) were posted at the conference WWW site – available through the Archive section of the www.fedcsis.org web-site (alongside publications from **all** past conferences). It should be stressed that **only** papers presented in the conference were published in either form (the FedCSIS conference series strictly adheres to the “IEEE No-show Policy”).

Respectfully submitted by the FedCSIS Conference Series Chairs,
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