18th Conference on Computer Science and Intelligence Systems (FedCSIS 2023)

CONFERENCE REPORT

The 18th edition of the Conference on Computer Science and Intelligence Systems (FedCSIS 2023; www.fedcsis.org) took place in Warsaw, Poland, on 17-20, September 2023. This year, for the first time since 2019, conference took place fully on-site, in the facilities of the Department of Electronics and Information Technology of the Warsaw University of Technology.

FedCSIS 2023 was co-chaired Jarosław Arabas and Sławomir Zadrozny, while Przemysław Biecek 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 of Polish Academy of Sciences, as well as the Faculty of Electronics and Information Technology and the Faculty of Mathematics and Information Sciences of the Warsaw University of Technology.

FedCSIS 2023 was technically co-sponsored by 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, Committee of Computer Science of Polish Academy of Sciences, and Mazovia Cluster ICT.

Moreover, two years ago, the FedCSIS conference series formed a strategic alliance with QED Software, a Polish software company developing AI-based products, and this collaboration has been continued.

FedCSIS 2023 was sponsored by QED Software, Samsung, Hewlett Packard Enterprise, Łukasiewicz Research Network – Institute of Innovative Technologies EMAG, MDPI, Sages, Efigo, and CloudFerro.

This year, another round of evolutionary adaptations, to the FedCSIS conference series, took place. Specifically, they concerned the conference structure. Post conference publications (Proceedings, Position Papers and Communication Papers volumes) illustrate the direction of this evolutionary process. In short, starting from 2023, FedCSIS conferences have Main Track with five Topical Areas, Thematic Tracks and, possibly, Competitions. The new structure emphasizes the integrity of the conference. For all five Topical Areas, situated within a general domain of Computer Science, the continually emerging topic of Intelligence Systems, stands as the common denominator. All Thematic Tracks refer to Intelligence Systems as well, though from different perspectives. Even Competitions, having strong roots in the realm of artificial intelligence, data science, machine learning, computer vision, and natural language processing, are regarded as a path toward introducing more Intelligence into Computer Science and IT.

During FedCSIS 2023, the keynote ectures were delivered by:

- Lipika Dey, Tata Consultancy Services, India, *Deciphering Clinical Narratives – Augmented Intelligence for Decision Making in Health Care Sector*

- Marta Kwiatkowska, University of Oxford, UK, *When to trust AI...*

- Andrea Omicini, Alma Mater Studiorum – Università di Bologna, Italy, *Measuring Trustworthiness in Neuro-Symbolic Integration*

- Roman Słowiński, Poznań University of Technology, Poland, *Multiple Criteria Decision Aiding by Constructive Preference Learning*

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

- Gianpiero Cattaneo, Retired from University of Milano-Bicocca, Italy, *Abstract Approach to Entropy and Co-Entropy in Measurable and Probability Spaces*

- Jerzy Nawrocki, Poznan University of Technology, Poland, *Towards reliable rule mining about code smells: The McPython approach*

FedCSIS 2023 consisted of Main Track (comprising five Topical Areas), Thematic Tracks and Competitions. Here, the designated Topical Areas were:

- Artificial Intelligence in Applications

- Science & Systems

- Systems and Applications

- Technology for Business and Society

- Software, System and Service Engineering

Thematic Tracks:

- Advances in Programming Languages

- AI in Agriculture

- AI in Digital Humanities, Computational Social Sciences and Economics Research

- Challenges for Natural Language Processing

- Complex Networks – Theory and Application

- Computational Optimization

- Computer Aspects of Numerical Algorithms

- Cyber Security, Privacy and Trust

- Data Science in Health, Ecology and Commerce

- Distributed Edge AI – Risks and Challenges

- Information Systems Management

- Internet of Things – Enablers, Challenges and Applications

- Knowledge Acquisition and Management

- Meta Environment for Citizens, Business and Entertainment

- Multimedia Applications and Processing

- Practical Aspects of and Solutions for Software Engineering

- Recent Advances in Information Technology – Doctoral Symposium

- Rough Sets: Theory and Applications

- Scalable Computing

- Software Engineering for Cyber-Physical Systems

Competitions:

• Data Mining Competition

• PolEval Competition

• CAICCAIC: Center for Artificial Intelligence Challenge on Conversational AI Correctness

• Temporal Image Caption Retrieval Competition

Traditionally, during FedCSIS 2023, the Zdzisław Pawlak Award was presented to the best papers from across the whole conference. Here, note that the five Topical Areas of FedCSIS reflect the five fundamental aspects of understanding, developing, and applying Intelligence Systems. This topical integrity is emphasized by the Professor Zdzisław Pawlak Award, presented in four categories (regardless of the Topical Area/Thematic Track that the work was contributing to): Best Paper, Young Researcher, Industry Cooperation, and International Cooperation. In this context it is also important to stress that although Professor Zdzisław Pawlak has been often recognized as "the father of Polish Artificial Intelligence", his research achievements have gone far beyond AI itself, in particular, toward AI applications and Intelligence Systems as we mean them.

This year, the Zdzisław Pawlak Award Committee (a part of FedCSIS Senior Program Committee) had a particularly hard task to select a single winner of the Best Paper Award. Therefore, after discussion, additional paper was recognized with the Distinction Award. Overall, the following contributions have been awarded:

• In the category **Best Paper**: Julian Premm, Hagen Peukert, Dennis Rössel, Mareike Silber, for the paper „Analysis of a GPT-3 chatbot with respect to its input in a sales dialogue"

• Additional **Distinction Award**: Giovanna Castellano, Pasquale De Marinis, Gennaro Vessio, for the paper „Applying Knowledge Distillation to Improve Weed Mapping With Drones"

• In the category **Young Researcher**: Anastasiya Danilenka, for the paper „Mitigating the effects of non-IID data in federated learning with a self-adver-sarial balancing method"

• In the category **Industry Cooperation**: Mikołaj Pudo, Mateusz Wosik, Artur Janicki, for the paper „Open Vocabulary Keyword Spotting with Small-Footprint ASR-based Architecture and Language Models"

• In the category **International Cooperation Award**: Samaneh Mohammadi, Mohammadreza Mohammadi, Sima Sinaei, Ehsan Nowroozi, Francesco Flammini, Mauro Conti, for the paper „Balancing Privacy and Accuracy in Federated Learning for Speech Emotion Recognition"

The Industry Cooperation Award was sponsored by the QED Software, the International Cooperation Award – by the MDPI publisher, while the remaining awards were sponsored by the Mazovia Branch of the Polish Information Processing Society. Here, it is also worth noting that each of those five papers comes from a different Topical Area, or Thematic Track. Yet, they are all perfectly aligned with the FedCSIS vision and common denominator.

This year four Competitions have been organized within the scope of FedCSIS. Here are their winners:

(A) POLEVAL – an annual Natural Language Processing challenge, organized since 2017. This year three tasks have been proposed: (1) Punctuation prediction from conversational language; winner Oskar Bujacz, (2) Abbreviation disambiguation; winner

Krzysztof Wróbel, and (3) Passage Retrieval; winner Jakub Pokrywka.

(B) Data Mining Competition 2023 – Cybersecurity Threat Detection in the Behavior of IoT Devices. The winners were teams consisting of: (1) Chang Lin, (2) Dymitr Ruta, Ming Liu, Ling Cen, (3) Sławomir Pioroński, Tomasz Górecki, and (4) Ming Liu, Ling Cen, Dymitr Ruta.

(C) Center for Artificial Intelligence Challenge on Conversational AI Correctness – the goal of this competition is to develop Natural Language Understanding models that are robust against speech recognition errors. This year the winning team consisted of: Szymon Jadczak and Rafał Jaworski.

(D) Temporal Image Caption Retrieval Competition – the task was based on the Chronicling America and Challenging America projects. The winner was: Patryk Kaszuba.

English was the exclusive conference language. In 2023, the FedCSIS conference attracted 358 submissions. Out of submitted contributions, after obtaining at least two reviews for each paper, 70 articles were accepted as regular full papers (acceptance rate of 19.55%), while 79 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, regardless of COVID-19 and other disruptions, FedCSIS conference series remains one of more competitive conference series.

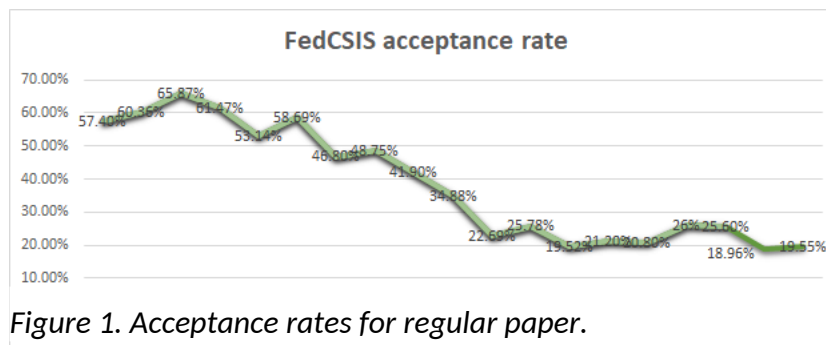Conference Proceedings also include 5 invited contributions from current and past FedCSIS

Figure 1. Acceptance rates for regular paper.

keynote speakers. Two more volumes of post-conference publications have been completed. Here, one of them consists of 15 position papers, while the other presents 47 communication papers. Accepted contributions represented 40 countries.

Conference materials were initially published on the conference WWW site (as Preprints). After the conference, final versions of full and short papers have been indexed in the IEEE Digital Library (ART: ISBN 978-83-969601-0-8, IEEE Catalog Number CFP2385N-ART, USB: ISBN 978-83-967447-9-1, IEEE Catalog Number CFP2385N-USB, WEB: ISBN 978-83-967447-8-4, ISSN 2300-5963, DOI 10.15439/978-83-967447-8-4); furthermore, they will be sent to the Scopus and the Clarivate Web of Science for indexing. Position Papers and Communication Papers were published as a separate volumes (ISSN 2300-5963; ISBN 978-83-969601-1-5 (Web), 978-83-969601-2-2 (USB), DOI: 10.15439/978-83-969601-1-5, for Position Papers, and ISBN 978-83-969601-3-9 (Web), 978-83-969601-4-6 (USB), DOI: 10.15439/978-83-969601-3-98 for Communication Papers). Moreover, Proceedings, Position Papers and Communication Papers of the FedCSIS 2023 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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