IEEE COMPSAC 2022
Co-Located Workshops Summary

Alfredo Cuzzocrea
iDEA Lab, University of Calabria
Rende, Italy
& LORIA, University of Lorraine
Nancy, France
alfredo.cuzzocrea@unical.it

Hiroki Kashiwazaki
National Institute of Informatics
Tokyo, Japan
reo_kashiwazaki@nii.ac.jp

Dave Towey
University of Nottingham Ningbo China
Zhejiang, China
Dave.Towey@nottingham.edu.cn

Ji-Jiang Yang
Tsinghua University
Beijing, China
yangjijiang@tsinghua.edu.cn

Abstract—**IEEE COMPSAC Workshops series is an established research event that complements the main focus of the IEEE COMPSAC conference, by focusing on specific topics that gain momentum in the research community. This paper introduces the overview of the IEEE COMPSAC 2022 co-located workshops, and discusses some open research issues that have emerged from the different workshops' topics and selected contributions.**

Keywords—Artificial Intelligence, Big Data, Machine Learning, Data Science, Smart Computing, Security, Trust, Privacy, Software

I. INTRODUCTION

This paper introduces the overview of the IEEE COMPSAC 2022 co-located workshops, and discusses some open research issues that have emerged from the different workshops' topics and selected contributions.
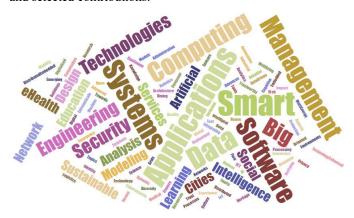

Fig. 1. Word Cloud of Topics of the IEEE COMPSAC 2022 Workshops

The IEEE COMPSAC Workshops series is an established research event that complements the breath of the main IEEE COMPSAC conference, by focusing on specific topics that, time by time, gain momentum in the research community. This year, IEEE COMPSAC finally accepted the proposals coming from 34 different workshops, which move the attention on a wide family of topics, ranging from *artificial intelligence* to *big data*, from *machine learning* to *data science*, from *medical computing* to *sustainability*, from *distributed technologies* to *security*, from

smart computing to *software*, from *trust & privacy* to *cultural heritage*, and so forth. Figure 1 shows the word cloud built on topics of the IEEE COMPSAC 2022 workshops. Topics of IEEE COMPSAC 2022 workshops are, nowadays, of high interest for the research community. For instance, the usage of artificial intelligence (AI) in the *medical sector* (e.g., [1]) plays a leading role, since AI ingested into *healthcare analytics* has the power to inlock true value from this kind of data, in order for enabling healthcare professionals to deliver timely and quality patient care.

On the other hand, big data, as well, play a leading role, since *big data management and analytics* (e.g., [2]) are now among hot-topics in emerging research, also stirred-up but a wide number of critical applications (e.g., [3]). The main issues faced-off by big data management and analytics proposals are represented by: (*i*) effectively and efficiently managing big data repositories during typical data management tasks like data representation, partitioning, indexing, querying, and so forth; (*ii*) effectively and efficiently extracting useful, actionable knowledge from these repositories, for decision making purposes.

Orthogonal to the latter axioms, several emerging contexts are now of strident relevance, and deserve truly attention. Among the latter, in the following we pinpoint the most significant ones. *Green Computing* (e.g., [4]), first, is an emerging context whose main aim consists in studying *how computational infrastructures impact on the environment*, and how to reduce such an impact significantly. Indeed, as widely recognized, every device of modern computing, being a small chip or, at the same, a big data center, is characterized by a *carbon price tag*. The issue, here, is how to design smaller, faster and more powerful devices, but with limited carbon footprint.

Smart Computing (e.g., [5]), second, is an important multi-disciplinary area where *advanced computational methods and technologies* are combined with *engineering approaches* to create systems, applications and new services that meet the needs of modern societies. Here, a wide collection of scientific areas converges, ranging from *business intelligence* to *security*, from *information retrieval* to *social science*, from *intelligent transportation systems* to *entertainment*, and so forth. The main

challenges are thus represented by data integration, software architecture design, and organization/harmonization.

II. WORKSHOPS' DETAILS

The following workshops have been selected by IEEE COMPSAC 2022:

1. ADMNET 2022 – 10th IEEE International Workshop on Architecture, Design, Deployment & Management of Networks & Applications;

2. AIML 2022 – 5th IEEE International Workshop on Advances in Artificial Intelligence & Machine Learning: Towards Trustworthy AI;

3. AINet 2022 – IEEE International Workshop on Artificial Intelligence for Intelligent Network Management;

4. AVKMT 2022 – 1st IEEE International Workshop on Advanced Visual Knowledge Management Tools;

5. BDCAA 2022 – 4th IEEE International Workshop on Big Data Computation, Analysis & Applications;

6. BDPROC 2022 – IEEE International Workshop on Big Data Processing on the Computing Continuum;

7. CCR 2022 – IEEE International Workshop on Emerging Topics in Cognitive Computing & Robotics;

8. CDS 2022 – 10th IEEE International Workshop on Consumer Devices, Systems & Services;

9. DADA 2022 – 4th IEEE International Workshop on Deep Analysis of Data-Driven Applications;

10. DBDM 2022 – 7th IEEE International Workshop on Distributed Big Data Management;

11. DDS-BDAF 2022 – 2nd IEEE International Workshop on Dynamic Data Science & Big Data Analytics in Finance;

12. DFM 2022 – 11th IEEE International Workshop on Data Flow Models and Extreme-Scale Computing;

13. DigitALITE 2022 – IEEE International Workshop on Digitalized Adaptive Learning & Immersive Technology Education;

14. ERT 2022 – IEEE International Workshop on Emergency Response Technologies;

15. ESAS 2022 – 17th IEEE International Workshop on E-Health Systems & Web Technologies;

16. ICT4SmartGrid 2022 – 3rd IEEE International Workshop on Rising ICT Solutions for Smart Grids as Multi-Energy Systems;

17. IDEI-CR 2022 – 1st IEEE International Workshop on Integrating Diversity, Equity & Inclusion in Cybersecurity Research;

18. IEESD 2022 – 12th IEEE International Workshop on Industrial Experience in Embedded Systems Design;

19. MediComp 2022 – 9th IEEE International Workshop on Medical Computing;

20. MSBC 2022 – IEEE International Workshop on Modeling for Sustainable Buildings and Smart Cities;

21. MVDA 2022 – 10th IEEE International Workshop on Modeling and Verifying Distributed-Embedded Applications;

22. NETSAP 2022 – The 12th IEEE International Workshop on Network Technologies for Security, Administration & Protection;

23. OER 2022 – 6th IEEE International Workshop on Open Education Resources;

24. QUORS 2022 – 16th IEEE International Workshop on Quality Oriented Reuse of Software;

25. SAPSE 2022 – 14th IEEE International Workshop on Security Aspects in Processes and Services Engineering;

26. SCA 2022 – 5th IEEE International Workshop on Smart Computing & Applications;

27. SDIM 2022 – 5th IEEE International Workshop on Secure Digital Identity Management;

28. SESISE 2022 – IEEE International Workshop on Software Engineering for Social Impact of Smart Environments;

29. SESS 2022 – 6th IEEE International Workshop on Software Engineering for Smart Systems;

30. SIS-SS 2022 – 5th IEEE International Workshop on Smart IoT Sensors & Social Systems for eHealth and Well-Being Applications;

31. SSMLS 2022 – 5th IEEE International Workshop on Smart and Sustainable Mobility & Logistics in Smart Cities;

32. STA 2022 – 14th IEEE International Workshop on Software Test Automation;

33. STPSA 2022 – 16th IEEE International Workshop on Security, Trust & Privacy for Software Applications;

34. TECH 2022 – 1st IEEE International Workshop on Technology-Enhanced Culture & Heritage.

Overall, the IEEE COMPSAC 2022 workshops have attracted a high number of quality submissions from all over the world, and the final acceptance rate was really competitive, leading to a high-quality global workshops program.

III. OPEN RESEARCH ISSUES AND FUTURE RESEARCH CHALLENGES

Following the excellent research work made in the context of the IEEE COMPSAC 2022 workshops, several research challenges have emerged. In the following, we report on some of the most noticeable ones:

- *Explainable AI*: explainable AI (e.g., [6]) identifies a collection of AI techniques where the results of the solutions are understandable to human beings. In this context, several research efforts must be still devoted, especially in the context of foundations and axioms, of course starting from the solid legacy of traditional AI methodologies and paradigms.

- *Deep Learning into Practice*: Deep Learning (e.g., [7]) fully exploits both *artificial neural networks* and *representation learning* in order to achieve more powerful and more accurate machine learning techniques and algorithms. While several progress has been done in the context of theory of Deep Learning, building powerful practical applications is still an open research challenge to be considered.

- *Immersive Paradigms*: Immersive approaches (e.g., [8]) *extend reality* or *create a new reality* by leveraging the 360-degrees space. These kind of applications are extremely useful not only in gaming, but also in all those hazardous environments where humans are at risk (e.g., heart-quaked buildings, mines, areas affected by avalanches, and so forth). In this context, disciplines like artificial intelligence, virtual reality, augmented reality, and so forth, are cooperatively combined to achieve the desired goals.

IV. Conclusions

This paper has introduced the overview of the IEEE COMPSAC 2022 co-located workshops, and discussed some open research issues that have emerged from the different workshops' topics and selected contributions.

From the analysis of workshops' contributions, it has emerged that artificial intelligence and big data for emerging applications, such as healthcare analytics, green computing, sustainability, smart computing and so forth, are the most relevant topics to be investigated by future research efforts.

References

[1] K.Z. Arefin, K.S. Alam Shuvo, M. Rabbani, P. Dobbs, L. Jepson, A. Leventhal, A.V. Van Heeke, S.I. Ahamed, "Towards Developing An EMR in Mental Health Care for Children's Mental Health Development among the Underserved Communities in USA," in *IEEE COMPSAC 2021*, pp. 688–693, 2021.

[2] H. Park, Y. Kim, "Determinants of Consumer Purchasing Factors through LDA Modeling Using YouTube Data," in *IEEE COMPSAC 2021*, pp. 1661–1666, 2021.

[3] Q. Jensen, F. Jagodzinski, T.Z. Islam, "FILCIO: Application Agnostic I/O Aggregation to Scale Scientific Workflows," in *IEEE COMPSAC 2021*, pp. 1587–1592, 2021.

[4] I. Ullah, M. Fayaz, M. Aman, D. Kim, "An Optimization Scheme for IoT Based Smart Greenhouse Climate Control with Efficient Energy Consumption," *Computing 104(2)*, pp. 433–457, 2022.

[5] C. Li, Y. Yu, J. Leckning, W. Xing, C.L. Fong, J.C. Grundy, D. Karolita, J. McIntosh, H.O. Obie, "A Human-Centric Approach to Building a Smarter and Better Parking Application," in *IEEE COMPSAC 2021*, pp. 514–519, 2021.

[6] X. Yin, C. Shi, S. Zhao, "Local and Global Feature Based Explainable Feature Envy Detection," in *IEEE COMPSAC 2021*, pp. 942–951, 2021.

[7] L. Qiao, G. Li, D. Yu, H. Liu, "Deep Feature Learning to Quantitative Prediction of Software Defects," in *IEEE COMPSAC 2021*, pp. 1401–1402, 2021.

[8] F. Lamberti, F. De Lorenzis, F.G. Pratticò, M. Migliorini, "An Immersive Virtual Reality Platform for Training CBRN Operators," in *IEEE COMPSAC 2021*, pp. 133–137, 2021.