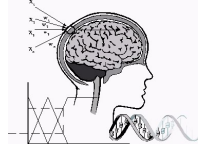




International

*Innovation in Knowledge Based and Intelligent
Engineering Systems*



INVITED SESSION SUMMARY

Title of Session:

“Federated Learning: Advances and Open Challenges in Distributed and Cooperative Learning Models”

Name of Chair:

Fiammetta Marulli and Laura Verde

Details of Session:

Federated Learning and Cooperative NN are growing in importance and number of applications, enabling the computational capabilities of the modern distributed networks, that generating a wealth of data each day. Federated and Cooperative Learning is promising in mitigating the issues concerning privacy protection and private information sharing. It is increasingly attractive to store data locally and push network computation to the edge devices. Federated learning has emerged as a training paradigm in such settings but it raises new questions at the intersection of machine learning and systems and requires fundamental advances in privacy, large-scale machine learning, and distributed optimization areas. Federated learning and classical distributed learning share a similar goal of minimizing the empirical risk over distributed entities. However, solving this objective in the federated settings poses some fundamental challenges as Privacy Concerns, Systems Heterogeneity, Statistical Heterogeneity, Expensive Communication, Trust in Federation Membership. According to both the recent experiences and the trends addressed by the most authoritative players in the AI field (Facebook AI, Google AI), supported also by the availability of specific frameworks (cfr. TensorFlow Federated, e.g.), Federated and Cooperative Learning are among the most recent and challenging paradigm related to machine learning and to its implementations by Deep Neural Networks, also considering that such great open issues are related to security aspects, like vulnerabilities to both data and model poisoning attacks, to the trustworthiness and robustness of the models as well as the quality evaluation of federated learning models against real-world data when that data is not available in a data center.

Important dates

Submission of Papers: 18 May 2022

Notification of Acceptance: 21 May 2022

Upload Final Publication Files: 03 June 2022

Website URL (if any):

<https://www.matfis.unicampania.it/dipartimento/docenti?MATRICOLA=057175>

<https://www.matfis.unicampania.it/dipartimento/docenti?MATRICOLA=711049>

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della Campania “Luigi Vanvitelli” – Caserta, Italy

Short Bio of the Candidate Chair:

Fiammetta Marulli is currently an Assistant PROFESSOR at the Dept. of Maths and Physics of the University of Campania, in Caserta, Italy. She is a titular of Data Analytics teaching course in that university and Software Engineering at the Computer Science and Engineering Dept. of University of Campania. She got her Ph.D. in 2016 at the University of Naples Federico II, with a dissertation dealing with Natural Language Processing techniques applied to IoT applications in the Cultural Heritage domain. She worked for many years as a research fellow at National Research Council of Italy (ICAR- CNR). Her past and current interest of research deal with Artificial Intelligence, Deep Learning, and Deep Neural Networks applied to Cloud and Distributed Systems, IoT advanced applications. She is the author of more than 40 papers on International Journals and Conferences.

Related Experiences as Special Sessions/Workshops Chair:

- Chair of the “Artificial Intelligence for Emerging IoT Systems: Open Challenges and Novel Perspectives” Special Sessions within the IOTBDS2020 and IOTBDS2021 Conferences;
- Chair at the “2021 IEEE CSR Workshop on Resilient Artificial Intelligence (RAI)” within the IEEE CSR Conference, 2021
- Chair of the “ Special Session on Federated Learning and Cooperative Neural Networks” within the IEEE IJCNN 2021 Conference, 2021.
- Chair of the “ Special Session on Federated Learning and Cooperative Neural Networks” within the IEEE WCCI - IJCNN 2022 Conference, 2022.
- Chair of the Invited Session on “Fake News and Information Literacy: Current State, Open Issues and Challenges in Automatic and AI-based Detection, Generation and Analytical Support Systems” (IS14) within the 14th International KES Conference Intelligent Decision Technologies (IDT 2022)

Laura Verde received the master’s degree in biomedical engineering from the University of Naples Federico II, Italy, in 2011, and the Ph.D. degree in Information and Communication Technology and Engineering from University of Naples Parthenope, in 2019.

She is currently a Researcher at Department of Mathematics and Physics of University of Campania "Luigi Vanvitelli". She worked for many years as Research Fellow at Institute of High Performance Computing and Networking (ICAR) –National Research Council of Italy (CNR) and Adjunct Professor of Computer Science at the University of Naples "Federico II".

Her research interests include artificial intelligence algorithms, signal processing, mobile solutions. She has authored more than 25 papers in international journals and conferences and is a member of several program committees of international scientific events and review for many international journals.

Experiences as Special Sessions/Workshops Chair:

- Publicity chair of 1st Workshop on Artificial Intelligence and Internet of Things for Digital Health (AIOT4DH 2021)
- Publicity chair of 2021 IEEE CSR Workshop on Resilient Artificial Intelligence (RAI 2021)
- Publicity chair of ICTS4eHealth 2020 - 5th Edition of the IEEE Workshop on ICT Solutions for ehealth, 2020
- Publicity chair of AldSH: International Workshop on AI-driven Smart Healthcare, 2020
- Session Chair of the 2nd International Conference on Information and Communication Technologies for Ageing Well and e-Health (ICT4AWE 2016)
- Chair of the Invited Session on “Fake News and Information Literacy: Current State, Open Issues and Challenges in Automatic and AI-based Detection, Generation and Analytical Support Systems” (IS14) within the 14th International KES Conference Intelligent Decision Technologies (IDT 2022)