Sommario del Curriculum Vitae
Aurelio Uncini

Funzione

Professore Ordinario presso il Dipartimento di Ingegneria dell'Informazione, Elettronica e Telecomunicazioni (DIET) - Sapienza Università di Roma.

Responsabile e fondatore del laboratorio di ricerca *Intelligent Signal Processing and Multi Media* (ISPAMM) presso il DIET, dove coordina un gruppo di ricerca interdisciplinare.

Comitato direttivo del *Cyber Intelligence and Information Security* (CIS), centro di ricerca presso la Sapienza.

Member of the board of Doctoral School in Information and Communications Technologies at Sapienza University of Rome Italy.

Membro della Commissione di Ricerca per la valutazione di prodotti e progetti di ricerca per la macro area D - Ingegneria civile-industriale informatrica, dell'informazione e scienze statistiche; Sapienza University of Rome Italy.

Membro della Commissione per la Abilitazione Scientifica Nazionale (ASN) 2018-2020.

Attività

Dal 2005 è Professore Ordinario presso il Dipartimento di Ingegneria dell'Informazione, Elettronica e Telecomunicazioni (DIET) - Sapienza Università di Roma.

Dal 2016 - Vice Presidente of AES

2012 - 2015 Presidente della *Audio Engineering Society (AES) Italian Section*.

2010 - 2013 Vice Preside della Facoltà di Ingegneria dell'Informazione, Informatica e Statistica (I3S) di Sapienza Università di Roma.

1998 - 2004 Pofessore Associato press il Dipartimento INFO-COM di Sapienza Università di Roma.

1994 - 1998 Ricercatore presso la Università Polotecnica delle Marche, Ancona.

Aree di Ricerca

L'attività di ricerca di Aurelio Uncini riguarda principalmente aspetti metodologici e tecnologici relative a:

Circuit Theory
- Digital FIR-IIR filter with power-of-two arithmetic design
- Circuit-theoretic approach for learning algorithms design
- Non linear filter design
- Collaborative adaptive filters

Adaptive Algorithms
- Efficient algorithms for adaptive filtering
- Frequency domain adaptive algorithms
- Space-time domain adaptive filtering
- Array processing algorithms for beamforming and detection of arrivals algorithms
- Hypercomplex adaptive algortihms
- Blind signal processing
- Sparse signal processing

Distributed Learning Algorithms,
- Distributed neural networks
- Distributed semi-supervised learning algorithm
- Distributed spectral clustering
- Consensus Strategies

Neural Networks for Machine Learning
- Artificial neural network architecture
- Deep neural network architecture
- Random vector functional link networks
- A unsupervised and semi-supervised learning-algorithm
- Recurrent neural networks
- Deep Neural Networks for Big-Data Applications.

Learning algorithms
- On-line learning for recurrent neural networks
- Metaheuristic algorithms design for machine learning
- Frequency domain algorithms
- Meta-heuristics for combinatorial

optimization and learning

Nonlinear Signal Processing,

- Functional-link adaptive filters
- Spline adaptive filters
- Spline neural networks for signal processing

Optimization Algorithms for Circuits Design,

- Meta-heuristics for combinatorial optimization and learning
- On-line meta-heuristics for adaptive filtering

Speech and Audio Processing

- Audio signal recovery in adverse environment.
- Speech enhancements and recognition
- Acoustic echo cancellation
- Intelligent acoustic interface
- End-to-end Audio Processing

Attività didattica attuale

Dal 2018 - Machine Learning, Master Degree (Laurea Magistrale) Telecommunication Engineering

Dal 2005 - Audio Signal Processing, Master Degree (Laurea Magistrale) Telecommunication Engineering.

Dal 2005 - Neural Networks , Master Degree (Laurea Magistrale) Artificial Intelligence and Robotics.

Attività istituzionali

Nell'ambito del proprio Dipartimento partecipa alle attività istituzionali. Ha fatto parte di commissioni per il riordino dell'ordinamento accademico presso il CdA di Ing. delle Telecomunicazioni e Ing. Informatica.

Dal 2018 è membro della Commissione di Ricerca per la Università degli Studi "La Sapienza" - Roma.

È membro del Collegio Docenti di Dottorato di Ricerca in Scienza e Tecnica dell'Informazione e della Comunicazione.

Nel periodo novembre 2011-2013 è stato Vicepreside della Facoltà di Ingegneria dell'Informazione Informatica e Statistica.

Dal 2016 – è Vice Presidente of AES

Dal 2012 al 2015 è stato Presidente dell'Audio Engineering Society (AES). È promotore di iniziative finalizzate a promuovere attività didattiche e di ricerca convenzionata tra aziende e Università., in particolare è organizzatore delle seguenti conferenze/incontri/ws:

AES Organization Activities period 2012-2016

AES Workshop on "Architectural acoustics for indoor and theatres, auditorium and events" SIAE: Fiera di Bologna, October 18, 2012.

AES Workshop on "Listen to the sound! Sound recording history and innovation in acoustic sensors", Sogliano al Rubicone – Italy, November 29, 2012

AES Meeting on "Multiformat Sound Design," SAE Institute, Milano, December 12, 2012

AES Meeting on " Workflow of cinematographic sound," Post in Europe / CESMA – Milano, May 18, 2013.

AES Italian-Section Conference "Technologies for Digital Audio and Music," Sapienza Università di Roma, Roma,

AES Workshop on 3D Audio for Acoustic and Architecture, Università di Bologna, Italy, November 11, 2013.

AES Meeting on "Sound quality," FIM: Fiera Internazionale della Musica, Genoa, Italy, May 17, 2014.

AES Meeting on "Wireless Audio," Milan (MI), Italy, November 23, 2015

AES Meeting on "The sound synthesis of Laurens Hammond," Complesso Universitario di Monte S. Angelo, Naples, November 9, 2015.

AES Italian-Section Conference, "Technologies for Digital Audio and Music, Sapienza Università di Roma, Roma, June 24, 2015.

AES Meeting on "Musical Instruments: environment and recording," Genova, Italy, May16, 2015

AES Meeting on “Mastering, Loudness and Compression,” Florence (Italy), April 18, 2015.

AES Meeting on “Miking and sound reproduction for 3D audio systems,” Genova, Italy, April 16, 2015.

AES Meeting on “Hearing acuity in the time domain; broadband design of audio systems,” University of Rome "Tor Vergata", Rome, Italy, April 2, 2016

Collaborazioni scientifiche e incarichi internazionali

Egli è socio delle Società Scientifiche Nazionali ed Internazionali quali: AES, IEEE, AEI, INNS e SIREN.

È co-fondatore del IEEE TC: “Blind Signal Processing” della Società IEEE- Circuits and System

È co-fondatore del IEEE TC: IEEE TC: “Machine Learning for Signal Processing” della Società IEEE-Signal Processing (già Neural Networks for Signal Processing).

Vice-chair of "Intelligent Systems Applications Technical Committee - Computational Audio Processing" Task Force, IEEE Computational Intelligent Society.

Recent Special Sessions organization and Chairing on International Conferences

Organisation Special Session “Computational Intelligence Algorithms for Digital Audio Applications”, World Congress on Computational Intelligence (WCCI 2014), IEEE, Beijing, China, 06.-09.07.2014.

Organisation Special Session “Computational Intelligence Algorithms for Digital Audio Applications”, International Joint Conference on Neural Networks (IJCNN), INNS/IEEE, Killarney, Ireland 11.-16.07.2015.

Organisation Special Session “Computational Intelligence Algorithms for Digital Audio Applications”, , International Joint Conference on Neural Networks (IJCNN), INNS/IEEE, Vancouver, Canada, IEEE, 25.-29.07.2016.

Organisation Special Session “Computational Intelligence Algorithms for Digital Audio Applications”, , International Joint Conference on Neural Networks (IJCNN), INNS/IEEE, Anchorage, AK, IEEE, 14.-19.05.2017.

Organisation Special Session “Deep Neural Audio Processing”, International Joint Conference on Neural Networks (IJCNN) as part of the IEEE World Congress on Computational Intelligence (WCCI), INNS/IEEE, Rio, Brazil, IEEE, 08.-13.07.2018.

Organisation and Chairing Special Session “Deep Neural Audio Processing, International Joint Conference on Neural Networks (IJCNN), INNS/IEEE, Budapest, Hungary, 12.-14.07.2019.

Organisation and Chairing Special Session “Deep Neural Audio Processing”, International Joint Conference on Neural Networks (IJCNN)/World Congress on Computational Intelligence (WCCI), INNS/IEEE, Glasgow, UK, 19.-24.07.2020.

Chair of International Conferences

General Chair of ET2018, XXXIV Meeting of Electrotechnical Researcher (ET 2018) June 14 15 2018 .

General Chair or AES Italian-Section Conference, “Music Technologies,” Sapienza Università di Roma, Roma, June 12, 2013.

General Chair or AES Italian-Section Conference, “Technologies for Digital Audio and Music, Sapienza Università di Roma, Roma, June 24, 2015.

Program Chair of IEEE International Workshop on Machine Learning for Signal Processing (MLSP2016), Vietri sul Mare, Salerno, Italy September 13-16, 2016,

Special Issues
2003 Guest Editor Special issue on evolving solution with neural networks , Neurocomputing,, 55:3-4 (2003), pp. 417-419.

2010 Guest Editor Special Section on Blind Signal Processing and Its Applications, IEEE Transactions on Circuits and Systems I: Regular Papers Year: 2010 | Volume: 57, Issue: 7

2018 Guest Editor Special Issue "Computational Intelligence for End-to-End Audio Processing" IEEE Transactions on Emerging Topics in Computational Intelligence, Year: 2018 | Volume: 2, Issue: 2 |

Keynote and tutorial invited speaker
Seventh International Conference on Engineering Applications of Neural Networks (EANN'2001), Cagliari, Italy June 16-18, 2001

International Joint Conference on Neural Networks IJCNN2003, Portland, Oregon, July 20-24, 2003, Keynote on "Processing of audio signals by neural networks,"

Editorial Activity
Member of the Editorial Board, Electronics, MDPI Open Access Journal, (Section Board for 'Computer Science & Engineering').

Member of the Editorial Board, Future Internet, MDPI Open Access Journal, (Section Big Data and Augmented Intelligence).

Member of the Editorial Board, Journal of Acoustics, Hapres Open Access Journal.

Progetti di ricerca istituzionalie

E' attualmente coordinator di sede (Unità di Roma la Sapienza) del PRIN 2015 (Progetti di Rilevante Interesse Nazionale - Research Italy) dal titolo: GAUChO - A Green Adaptive Fog Computing and Networking Architecture (36 mesi).

Pubblicazioni dal 2018 -

1. J Pomponi, S Scardapane, A Uncini, "Bayesian neural networks with maximum mean discrepancy regularization", Neurocomputing 453, 428-437, 2021
2. Eleonora Grassucci, Danilo Comminiello, Aurelio Uncini, "An information-theoretic perspective on proper quaternion variational autoencoders", Entropy 23 (7), 856, 2021.
3. Eleonora Grassucci, Danilo Comminiello, Aurelio Uncini, "A Quaternion-Valued Variational Autoencoder", IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2021.
4. A Falvo, D Comminiello, S Scardapane, M Scarpiniti, A Uncini, "A Wide Multimodal Dense U-Net for Fast Magnetic Resonance Imaging" 28th European Signal Processing Conference (EUSIPCO), 1274-1278, 2021.
5. M Scarpiniti, D Comminiello, A Uncini, YC Lee, "Deep recurrent neural networks for audio classification in construction sites", 28th European Signal Processing Conference (EUSIPCO), 810-814, 2021.
6. M Scarpiniti, D Comminiello, F Muciaccia, A Uncini, "Quaternion Widely Linear Forecasting of Air Quality", Progresses in Artificial Intelligence and Neural Systems, 393-403, 2021.
7. E Grassucci, S Scardapane, D Comminiello, A Uncini, "Flexible generative adversarial networks with non-parametric activation functions", Progresses in Artificial Intelligence and Neural Systems, 67-77, 2021.
8. A Falvo, D Comminiello, S Scardapane, M Scarpiniti, A Uncini, "A multimodal deep network for

the reconstruction of T2W MR images", Progresses in Artificial Intelligence and Neural Systems, 423-431, 2021.

9. A Maccagno, A Mastropietro, U Mazziotta, M Scarpiniti, YC Lee, A Uncini, "A CNN approach for audio classification in construction sites", Progresses in Artificial Intelligence and Neural Systems, 371-381, 2021
10. I Spinelli, S Scardapane, M Scarpiniti, A Uncini, "Efficient data augmentation using graph imputation neural networks", Progresses in Artificial Intelligence and Neural Systems, 57-66, 2021.
11. I Spinelli, S Scardapane, A Uncini, "Adaptive propagation graph convolutional network," IEEE Transactions on Neural Networks and Learning Systems, 2021.
12. R Vecchi, S Scardapane, D Comminiello, A Uncini, "Compressing deep-quaternion neural networks with targeted regularization," CAAI Transactions on Intelligence Technology 5 (3), 172-176, 2020.
13. YC Lee, M Scarpiniti, A Uncini, "Advanced sound classifiers and performance analyses for accurate audio-based construction project monitoring," Journal of Computing in Civil Engineering 34 (5), 04020030, 2020.
14. S Scardapane, M Scarpiniti, E Baccarelli, A Uncini, "Why should we add early exits to neural networks?", Cognitive Computation 12 (5), 954-966, 2020.
15. I Spinelli, S Scardapane, A Uncini, "Missing data imputation with adversarially-trained graph convolutional networks", Neural Networks 129, 249-260, 2021.
16. J Pomponi, S Scardapane, V Lomonaco, A Uncini, "Efficient Continual Learning in Neural Networks with Embedding Regularization" Neurocomputing, https://doi.org/10.1016/j.neucom.2020.01.093, February 20, 2020.
17. E Baccarelli, S Scardapane, M Scarpiniti, A Momenzadeh, A Uncini, "Optimized Training and Scalable Implementation of Conditional Deep Neural Networks with Early Exits for Fog-supported IoT applications," Information Sciences, https://doi.org/10.1016/j.ins.2020.02.041, Volume 521, Pages 107-143, June 2020.
18. M Scarpiniti, S Scardapane, D Comminiello, A Uncini, "Music Genre Classification Using Stacked Auto-Encoders," In: Esposito A., Faundez-Zanuy M., Morabito F., Pasero E. (eds) Neural Approaches to Dynamics of Signal Exchanges. Smart Innovation, Systems and Technologies, vol 151. Springer, Singapore, ISBN 978-981-13-8950-4, June 2019.
19. M Scarpiniti, D Comminiello, A Uncini, "Convex Combination of Spline Adaptive Filters," 2019 27th European Signal Processing Conference (EUSIPCO), DOI: 10.23919/EUSIPCO.2019.8903134, A Coruna, Spain, 2-6 Sept. 2019.
20. D Comminiello, M Scarpiniti, R Parisi, A Uncini, "Frequency-domain adaptive filtering: From real to hypercomplex signal processing," ICASSP 2019 - 2019 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), DOI: 10.1109/ICASSP.2019.8683403, Brighton, UK, 12-17 May 2019.
21. S Scardapane, S Van Vaerenbergh, D Comminiello, A Uncini, "Widely Linear Kernels for Complex-Valued Kernel Activation Functions," ICASSP 2019 - 2019 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), DOI: 10.1109/ICASSP.2019.8683864, Brighton, UK, 12-17 May 2019.
22. D Comminiello, M Lella, S Scardapane, A Uncini, "Quaternion convolutional neural networks for detection and localization of 3d sound events," ICASSP 2019 - 2019 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), DOI:10.1109/ICASSP.2019.8682711, Brighton, UK, 12-17 May 2019.
23. S Scardapane, S Van Vaerenbergh, S Totaro, A Uncini, "Kafnets: Kernel-based non-parametric activation functions for neural networks," Neural Networks Vol. 110, pp.19-32, February 2019.
24. Mahdieh Izadpanahkakhk, Seyyed Mohammad Razavi, Mehran Taghipour-Gorjikolaie, Seyyed Hamid Zahiri, Aurelio Uncini, "Joint feature fusion and optimization via deep discriminative model for mobile palmprint verification", J. of Electronic Imaging, 043026 . https://doi.org/10.1117/1.JEI.28.4.043026, 28(4), August 2019.
25. Mahdieh Izadpanahkakhk, Seyyed Mohammad Razavi, Mehran Taghipour-Gorjikolaie, Seyyed Hamid Zahiri, Aurelio Uncini, "Novel mobile palmprint databases for biometric authentication", International Journal of Grid and Utility Computing, 10 (5), 465-474, 2019, https://doi.org/10.1504/IJGUC.2019.102016

26. M Scarpiniti, E Baccarelli, A Momenzadeh, A Uncini, "SmartFog: Training the Fog for the Energy-Saving Analytics of Smart-Meter Data," Applied Sciences 9 (19), 4193
27. D Comminiello, M Scarpiniti, LA Azpicueta-Ruiz, A Uncini "Steady-State Performance of an Adaptive Combined MISO Filter Using the Multichannel Affine Projection Algorithm", Algorithms 12 (1), 2
28. Antonio Falvo ; Danilo Comminiello ; Simone Scardapane ; Michele Scarpiniti ; Aurelio Uncini, "A Multimodal Dense U-Net For Accelerating Multiple Sclerosis MRI," 2019 IEEE 29th International Workshop on Machine Learning for Signal Processing (MLSP), DOI: 10.1109/MLSP.2019.8918781, , Pittsburgh, PA, USA, 13-16 Oct. 2019.
29. Ortolani, F., Comminiello, D., Scarpiniti, M., Uncini, A., "On 4-dimensional hypercomplex algebras in adaptive signal processing", Smart Innovation, Systems and Technologies, 2019.
30. Scarpiniti, M., Scardapane, S., Comminiello, D., Parisi, R., Uncini, A. "Separation of drum and bass from monaural tracks", Smart Innovation, Systems and Technologies, 2019.
31. Comminiello, D., Scarpiniti, M., Scardapane, S., Parisi, R., Uncini, A., "A low-complexity linear-in-the-parameters nonlinear filter for distorted speech signals", Smart Innovation, Systems and Technologies, 2019.
32. Izadpanahkakhk, M., Razavi, S.M., Taghipour-Gorjikolaie, M., Zahiri, S.H., Uncini, A. "Deep region of interest and feature extraction models for palmprint verification using convolutional neural networks transfer learning", Applied Sciences (Switzerland) Appl. Sci. Vol. 8, Nr.7, 1210; doi:10.3390/app8071210, 2018
33. Scardapane, S., Wang, D., Uncini, A., "Bayesian random vector functional-link networks for robust data modeling", IEEE transactions on cybernetics 48 (7), 2018.
34. D. Comminiello, M. Scarpiniti, S. Scardapane, A Uncini, "Sparse Functional Link Adaptive Filter Using an L1-Norm Regularization", IEEE International Symposium on Circuits and Systems (ISCAS), 1-5, 2018.
35. M Scarpiniti, E Baccarelli, PGV Naranjo, A Uncini, "Energy performance of heuristics and meta-heuristics for real-time joint resource scaling and consolidation in virtualized networked data centers", The Journal of Supercomputing 74 (5), 2161-2198, 2, 2018
36. S Squartini, B Schuller, A Uncini, CK Ting, "Guest Editorial Special Issue on Computational Intelligence for End-to-End Audio Processing", IEEE Transactions on Emerging Topics in Computational Intelligence 2 (2), 89-91, 2018.
37. S Scardapane, S Van Vaerenbergh, A Hussain, A Uncini "Complex-valued Neural Networks with Non-parametric Activation Functions" , IEEE Transactions on Emerging Topics in Computational Intelligence, DOI: 10.1109/TETCI.2018.2872600, October, 2018.
38. Simone Scardapane, Michele Scarpiniti, Danilo Comminiello, Aurelio Uncini, "Learning Activation Functions from Data Using Cubic Spline Interpolation", WIRN 2017 2017: Neural Advances in Processing Nonlinear Dynamic Signals pp 73-83, First Online: 22 July 2018.
39. S Scardapane, R Altilio, V Ciccarelli, A Uncini, M Panella, "Privacy-preserving data mining for distributed medical scenarios", Multidisciplinary Approaches to Neural Computing, 119-128, 3, 2018.
40. M Scarpiniti, S Scardapane, D Comminiello, R Parisi, A Uncini, "Effective Blind Source Separation Based on the Adam Algorithm", Smart Innovation, Systems and Technologies , Multidisciplinary Approaches to Neural Computing, 57-66, 2018.
41. Simone Scardapane ; Steven Van Vaerenbergh ; Danilo Comminiello ; Aurelio Uncini, "Improving Graph Convolutional Networks with Non-Parametric Activation Functions," 2018 26th European Signal Processing Conference (EUSIPCO), DOI: 10.23919/EUSIPCO.2018.8553465,. Rome Italy, 3-7 Sept. 2018.
42. Simone Scardapane ; Steven Van Vaerenbergh ; Danilo Comminiello ; Simone Totaro ; Aurelio Uncini, "RECURRENT NEURAL NETWORKS WITH FLEXIBLE GATES USING KERNEL ACTIVATION FUNCTIONS," 2018 IEEE 28th International Workshop on Machine Learning for Signal Processing (MLSP), DOI: 10.1109/MLSP.2018.8516994, Aalborg, Denmark, 17-20 Sept. 2018.
43. R. Fierimonte, S. Scardapane, A. Uncini, M. Panella, "Fully decentralized semi-supervised learning via privacy-preserving matrix completion", IEEE transactions on neural networks and learning systems 28 (11), 2699-2711, 2017. ISSN: 2162-237X, DOI: 10.1109/TNNLS.2016.2597444

Roma, 15 Nopvembre 2021

Prof. Aurelio Uncini