Last update: October 2024

Fabio Brau

Curriculum Vitae

Via Perugia, 2
Orotelli (NU), Italy, 08020
(+39) 3407375199
fabio.br.92@hotmail.it
LinkedIn
fabio.brau@unica.it (Institutional)

Personal Information

Birth	May 2 1992, Nuoro, Italy
Nationality	Italy
Residence	Orotelli (NU), Italy
Domicile	Orotelli (NU), Italy

Bio

Fabio Brau is an Assistant Professor at the "Dipartimento di Ingengeria Elettrica e Elettronica" in the University of Cagliari, currently included in the PraLAB group. He graduated in Mathematics in 2019 at the University of Pisa with the curriculum in Numerical Analysis. He received a Ph.D in Emerging Digital Technologies in 2024 for the Thesis "Methods for Certifiable Robustness of Deep Neural Networks" at the University of Scuola Superiore Sant'Anna. His current research is centered on advancing the safety and reliability of Deep Neural Networks (DNNs) and Machine Learning Algorithms for applications in safety-critical systems.

Education and Training

Oct.2020 – Mar.2024 **Ph.D in Emerging Digital Technologies**, *Scuola Superiore Sant'Anna, Real-Time Systems Laboratory*, Department of Excellence in Robotics & AI, *EQF – 8.*
Thesis: Methods for Certifiable Robustness in Deep Neural Networks
CUM LAUDE

Jul 4.2022 – Jul 7.2022 **ARTISAN Summer School**, *Université Grenoble Alpes, Valance, France.*
Description: Role and effects of artificial intelligence and machine learning with regards to security applications.

Sep.2016 – Feb.2019 **Master Degree in Mathematics**, *University of Pisa*, Curriculum in Numerical Analysis and Applied Mathematics, Thesis in Optimization, *EQF – 7.*
110/110 L

Sep.2017 – Mar.2018 **Master M1 Acsyon**, *Université de Limoges*, Applied Mathematics.
Description: Methods and software (AMPL, Maple, Matlab, Sage, FreeFem++) to solve optimization problems, fitting data, stability of dynamic systems.

Sep.2011 – Dec.2015 **Bachelor's Degree in Mathematics**, *University of Pisa*, Curriculum in Foundations of Mathematics, Thesis in Logic, *EQF – 6.*
96/110

Work & Research Experience

Oct.2024 – **Assistant Professor**, *Departmento di Ingegneria Elettrica e Elettronica (DIEE), Cagliari University*, Cagliari (CA), Italy.
Description: Theoretical methods for enhancing the safety and the trustworthiness of artificial models for perception

Jan.2024 - Sep.2024 **Postdoctoral Research**, *Sant'Anna University*, Pisa (PI), Italy.
Description: Robust and Efficient Vision Perception models for a safety-critical embedded system

Mar.2023 - Aug.2023 **Visiting Ph.D Student**, *Institute of Science and Technologies of Austria, Klosterneuburg (AT)*, under the supervision of the Prof. Christoph Lampert.
Description: Trustworthy and safe AI models for Certified Robust Classification

Jan.2020 – Sep.2020 **Research Fellow**, *Sant'Anna University*, Pisa (PI).
Description: Artificial Intelligence for Cloud-NFV Data Center Operations in collaboration with Vodafone Italia S.p.A.

Jul.2019 – Dec.2019 **Analytic and Data: Data Scientist**, *Stage*, at Jakala, Milano (MI).
Activity: Neural Network Models for Recommender Systems, PCA and clustering for data driven analysis.

Publications

Feb.2024 **1-Lipschitz Layers Compared: Memory, Speed, and Certifiable Robustness**, *Bernd Prach*, Fabio Brau*, Giorgio Buttazzo, Christoph Lampert.*
CVF/IEEE Conference on Computer Vision and Pattern Recognition, Seattle (WA)

Feb.2023 **Robust-by-Design Classification via Unitary-Gradient Neural Networks** , *Fabio Brau, Giulio Rossolini, Alessandro Biondi, Giorgio Buttazzo.*
37th AAAI Conference on Artificial Intelligence, Washington DC.

Feb.2023 **Defending From Physically-Realizable Adversarial Attacks Through Internal Over-Activation Analysis** ,
Giulio Rossolini, Fabio Brau, Alessandro Biondi, Giorgio Buttazzo.
37th AAAI Conference on Artificial Intelligence, Washington DC.

Aug.2022 **On the Minimal Adversarial Perturbation for Deep Neural Networks with Provable Estimation Error** ,
Fabio Brau, Giulio Rossolini, Alessandro Biondi, Giorgio Buttazzo.
IEEE Transaction on Pattern Analysis and Machine Intelligence

Jun.2022 **Maximizing team synergy in AI-related interdisciplinary groups: an interdisciplinary-by-design iterative methodology** ,
Piercosma Bisconti, Davide Orsitto, Federica Fedorczyk, Fabio Brau, Marianna Capasso, Lorenzo De Marinis, Hüseyin Eken, Federica Merenda, Mirko Forti, Marco Pacini, Claudia Schettini.
Journal of Knowledge, Culture and Communication, AI&SOCIETY

Aug.2021 **Forecasting Operation Metrics for Virtualized Network Functions** ,
Tommaso Cucinotta, Giacomo Lanciano, Antonio Ritacco, Fabio Brau, Filippo Galli, Vincenzo Iannino, Marco Vannucci, Antonino Artale, Joao Barata, Enrica Sposato.
21st IEEE/ACM International Symposium on Cluster, Cloud and Internet Computing (IEEE CCGRID 2021).

Mar.2021 **Using Self-Organizing Maps for the Behavioral Analysis of Virtualized Network Functions** ,
Giacomo Lanciano, Antonio Ritacco, Fabio Brau, Tommaso Cucinotta, Marco Vannucci, Antonino Artale, Joao Barata, Enrica Sposato.
Cloud Computing and Services Science, CLOSER 2020, Communications in Computer and Information Science

Patents

Dec.2020 **Metodo per la gestione di risorse di un'infrastruttura per la network function virtualization.**, *T.Cucinotta, M.Vannucci, G.Lanciano, F.Galli,* ***F.Brau****, A.Artale, E.Sposato, L.N.P.Jorge.*, Filed IT Patent 102020000031034, December 2020..

Awards

Sep.2022 Best Contribution Award for the paper *"On the Minimal Adversarial Perturbation for Deep Neural Networks with Provable Estimation Error"* at Workshop on Artificial Intelligence and Smart Material Systems of the Department of Excellence on Robotics & AI of Scuola Superiore Sant'Anna, Pisa.

Feb.2019 Premio di studio per Tesi Magistrale *"Defenses Against Adversarial Examples in Deep Neural Networks"* della Fondazione Premi, Borse di Studio e Provvidenze dell'Università di Pisa

Personal Skills

Languages

Italian Mothertongue

English Listening (C1), Reading (C1), Speaking (B2), Writing (C1)

Digital Competences

Programming Languages
Python *(Pandas, PyTorch, Jupyter, PySpark)*
FORTRAN *(LAPACK, OpenMP)*
Bash, C, C++, Haskell.

Software Applications MATLAB, AMPL, Sage, LaTeX, Git, Linux

"Autorizzo il trattamento dei dati personali contenuti nel mio curriculum vitae in base allart. 13 del D. Lgs. 196/2003 e all art. 13 del Regolamento UE 2016/679 relativo alla protezione delle persone fisiche con riguardo al trattamento dei dati personali."