Andrea Agiollo

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Education

Nov 2020 - Jan 2024

PhD student in Computer Science and Engineering
Alma Mater Studiorum - Università di Bologna, Bologna, Italy
I am currently pursuing a PhD in Computer Science and Engineering at the University of Bologna, Italy, and with the collaboration of Electrolux Professional S.P.A. I'm conducting research work in Artificial Intelligence, Machine learning, eXplainable Artificial Intelligence and Cybersecurity.

Aug 2023 - Nov 2023

Visiting PhD student in Computer Science and Engineering
Purdue University, Lafayette, Indiana, United States of America
I had the opportunity to spend three months as a visiting PhD at Purdue University. Here, my research efforts focused on the intersection of neuro-symbolic integration techniques and the properties of neural network learning process, focusing on memorization, minimum flatness and many others. Throughout this experience, I had the pleasure of collaborating with an international research group, strengthening my knowledge of the inner properties of sub-symbolic models.

Oct 2022 - Feb 2023

Visiting PhD student in Computer Science and Engineering
Technische Universiteit Delft - Delft, The Netherlands
During my PhD experience, I had the opportunity to spend five months as a visiting PhD at TU Delft. Here, my research efforts focused on eXplainable Artificial Intelligence (XAI) techniques to extract knowledge from a trained Large Language model used for text classification and morality alignment. Throughout this experience, I had the pleasure to collaborate with an international research group, strengthening my knowledge of XAI and Natural Language Processing.

Sep 2018 - Jul 2020

Master of Science in ICT for Internet and Multimedia
Università degli Studi di Padova, Padua, Italy
Final vote: 110/110 cum laude.
Within this course of study, I mainly followed courses with main focus areas such as Telecommunications, Artificial Intelligence, Cybersecurity, and Networking. The master's thesis developed for the achievement of this title concerned the development of an Intrusion Detection System based on Artificial Intelligence techniques for the identification of specific attacks within an IoT network.

Sep 2019 - Jul 2020

Master of Science in in Communication Engineering
National Taiwan University, Taipei, Taiwan

Final vote: 4.23/4.3.

I obtained this title thanks to a double degree course undertaken by the University of Padua. This path gave me the opportunity to move to Taipei for a year and study at NTU. Within this project I continued the path undertaken in Padua, following courses focusing mainly on Artificial Intelligence and Cybersecurity. I also carried out a research activity at this University concerning the application of AI techniques for Cybersecurity mechanisms, which later resulted in my master's thesis.

Oct 2015 - Jul 2018	**Bachelor in Information Engineering** **Università degli Studi di Padova, Padua, Italy** *Final vote*: 110/110 cum laude. Following this course of study, I learned the basics of engineering, computer science, telecommunications and automation. The three-year thesis developed for the achievement of this title concerns the development of neural networks for the recognition and segmentation of internal scenarios.
Sep 2017 - Jan 2018	**Erasmus** **University of Aberdeen, Aberdeen, Scotland, United Kingdom** I took part in a 5 months Erasmus project at the University of Aberdeen, Scotland. This project has allowed me to develop and enrich my knowledge of the English language, which is essential for the continuation of my academic career. Within this project, I also learned the basics of automatic controls and artificial intelligence.

Publications

Journals

Andrea Agiollo, Andrea Rafanelli, Matteo Magnini, Giovanni Ciatto, and Andrea Omicini. "Symbolic Knowledge Injection meets Intelligent Agents: QoS metrics and experiments". In: *Autonomous Agents and Multi-Agent Systems* 37.2 (June 2023), 27:1–27:30. ISSN: 1573-7454. DOI: 10.1007/s10458-023-09609-6

Andrea Agiollo, Enkeleda Bardhi, Mauro Conti, Nicolò Dal Fabbro, and Riccardo Lazzeretti. "Anonymous Federated Learning via Named-Data Networking". In: *Future Generation Computer Systems* (2023)

Andrea Agiollo, Mauro Conti, Pallavi Kaliyar, TsungNan Lin, and Luca Pajola. "DETONAR: Detection of Routing Attacks in RPL-based IoT". in: *IEEE Transactions on Network and Service Management* 18.2 (2021), pp. 1178–1190. DOI: 10.1109/TNSM.2021.3075496

Andrea Agiollo and Andrea Omicini. "Load Classification: A Case Study for Applying Neural Networks in Hyper-Constrained Embedded Devices". In: *Applied Sciences* 11.24 (Dec. 2021). Special Issue "Artificial Intelligence and Data Engineering in Engineering Applications". ISSN: 2076-3417. DOI: 10.3390/app112411957

Conferences e Workshops	Andrea Agiollo and Andrea Omicini. "Measuring Trustworthiness in Neuro-Symbolic Integration". In: *Proceedings of the 18th Conference on Computer Science and Intelligence Systems*. Vol. 35. Annals of Computer Sciences and Information Systems. Sept. 2023, pp. 1–10. ISBN: 978-83-969601-0-8. DOI: 10.15439/2023F6019

Andrea Agiollo, Enkeleda Bardhi, Mauro Conti, Riccardo Lazzeretti, Eleonora Losiouk, and Andrea Omicini. "GNN4IFA: Interest Flooding Attack Detection With Graph Neural Networks". In: *2023 IEEE 8th European Symposium on Security and Privacy (EuroS&P)*. IEEE Computer Society. Delft, Netherlands: IEEE Computer Society, July 2023, pp. 615–630. ISBN: 978-1-6654-6512-0. DOI: 10.1109/EuroSP57164.2023.00043

Andrea Agiollo, Luciano C. Siebert, Pradeep K. Murukannaiah, and Andrea Omicini. "The Quarrel of Local Post-hoc Explainers for Moral Values Classification in Natural Language Processing". In: *Explainable and Transparent AI and Multi-Agent Systems. Fifth International Workshop, EXTRAAMAS 2023, London, UK, May 29, 2023*. 2023

Mattia Passeri, Andrea Agiollo, and Andrea Omicini. "Peer-Reviewed Federated Learning". In: *WOA 2023 – 24th Workshop "From Objects to Agents"*. Ed. by Rino Falcone, Cristiano Castelfranchi, Alessandro Sapienza, and Filippo Cantucci. Vol. 3579. CEUR Workshop Proceedings. Sun SITE Central Europe, RWTH Aachen University, Nov. 2023, pp. 49–65

Andrea Agiollo and Andrea Omicini. "GNN2GNN: Graph neural networks to generate neural networks". In: *Uncertainty in Artificial Intelligence*. PMLR. 2022, pp. 32–42

Andrea Agiollo, Andrea Rafanelli, and Andrea Omicini. "Towards Quality-of-Service Metrics for Symbolic Knowledge Injection". In: *WOA 2022 – 23nd Workshop "From Objects to Agents"*. 2022

Andrea Agiollo, Giovanni Ciatto, and Andrea Omicini. "*Shallow2Deep*: Restraining Neural Networks Opacity through Neural Architecture Search". In: *Explainable and Transparent AI and Multi-Agent Systems. Third International Workshop, EXTRAAMAS 2021, Virtual Event, May 3–7, 2021, Revised Selected Papers*. Cham, Switzerland, 2021, pp. 63–82. URL: http://link.springer.com/10.1007/978-3-030-82017-6_5

Andrea Agiollo, Giovanni Ciatto, and Andrea Omicini. "Graph Neural Networks as the Copula Mundi between Logic and Machine Learning: A Roadmap". In: *WOA 2021 – 22nd Workshop "From Objects to Agents"*. Ed. by Roberta Calegari, Giovanni Ciatto, Enrico Denti, Andrea Omicini, and Giovanni Sartor. 2021, pp. 98–115. URL: http://ceur-ws.org/Vol-2963/paper18.pdf

Umberto Michieli, Maria Camporese, Andrea Agiollo, Giampaolo Pagnutti, and Pietro Zanuttigh. "Region Merging Driven by Deep Learning for RGB-D Segmentation and Labeling". In: *13th International Conference on Distributed Smart Cameras (ICDSC2019)*. 2019, 9:1–9:6. URL: https://doi.org/10.1145/3349801.3349810

Research Interests

Machine Learning	Machine Learning and Deep Learning techniques are some of my main interests. Their use in various fields, from Computer Vision to Data Analysis, shows their potential. In particular, a solid interest in this area is aimed at artificial intelligence for computationally inefficient devices.
Autonomous Agents	I am interested in the set of techniques enabling complex interaction among intelligent agents and between agents and human counterparts, focusing specifically on extracting and processing agents' knowledge. In this context, I am also interested in the procedures to integrate human-understandable knowledge into intelligent agents relying on ML and DL approaches.
Explainable AI	Many of the Artificial Intelligence techniques turn out to be unexplainable. One of my research interests focuses precisely on identifying techniques that make it possible to understand and explain AI algorithms that otherwise would not be explainable.
Cybersecurity	The world of information security is one of my main research interests. This interest includes both the defence mechanisms adopted by telecommunication systems to avoid hacking, interception, data loss, breach of confidentiality and the offensive mechanisms used by attackers.

Relevant Activities

Patents	Andrea Comina, Andrea Agiollo, and Andrea Omicini. Title: "*Dishwasher for Treating Washware*". Status: Under submission. Submitted on March 08th 2023 to the European Patent Office.
Conferences Organisation	PC member for the 39th Conference on Uncertainty in Artificial Intelligence (UAI-23). I was nominated top-reviewer by the Program Chairs.
	PC member for the 38th AAAI Conference on Artificial Intelligence (AAAI-24).
	PC member for the 37th AAAI Conference on Artificial Intelligence (AAAI-23).
Teaching	Teacher Assistant (Tutor) for the "Fondamenti di Informatica" course – A.Y. 2021/2022.
	Teacher Assistant (Tutor) for the "Fondamenti di Informatica" course – A.Y. 2022/2023.

Technical Skills

Operating Systems	*Desktop*: MacOS, Windows, Linux. *Mobile*: Android, iOS.
Programming Languages	*Advanced*: python, java, C++, LaTeX. *Intermediate*: C, C#, MATLAB, Kotlin, Bash Linux. *Basic*: HTML, JavaScript, Prolog.

ML/DL Frameworks	*Advanced*: Pytorch, TensorFlow, Keras, Scikit-Learn . *Basic*: DL4J, ONNX.
Development Tools	*Versioning*: git. *Testing*: Unittest, JUnit. *Others*: IntelliJ, PyCharm, Visual Studio.

Languages

Italian	Native
English	Advance - C1
Spanish	Base - A1