GIOVANNI CIATTO

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IN SHORT

Post-doctoral research fellow at University of Bologna, with a PhD in Data Science and Computation and a MSc in Computer Science and Engineering. Main research interests comprehend the area of artificial intelligence, logic programming, multi-agent systems, and distributed systems. In particular, my contributions have a focus on the models, architectures, and infrastructures for symbolic reasoning and sub-symbolic processing, there including *(i)* knowledge injection and extraction of symbolic knowledge into/from sub-symbolic predictors, *(ii)* logic and agent-oriented programming, and *(iii)* the engineering of software technologies laying at their intersection.

EDUCATION

Research Fellow, "Assegnista di ricerca" **April, 2022 → March, 2023**
Department of Informatics – Science and Engineering (DISI) *University of Bologna, Italy*

- Project title: "Ingegnerizzazione di sistemi ibridi basati su logica computazionale per la XAI"
- Goal: designing and prototyping software solutions for eXplanable AI (XAI) combining computational logic and machine learning
- Supervisor: Prof. Andrea Omicini

PhD Degree **November, 2017 → June, 2022**
Data Science and Computation (4y PhD programme) *University of Bologna, Italy*

- Studies in the field of artificial intelligence, focusing on novel enabling approaches, architectures and technologies combining logic programming with machine learning
- Supervisor: Prof. Andrea Omicini
- Thesis: "On the role of Computational Logic in Data Science: representing, learning, reasoning, and explaining knowledge"
  - external site: http://amsdottorato.unibo.it/10192

Visiting PhD Student **May, 2019 → August, 2019**
University of Applied Sciences Western Switzerland (HES-SO) *Sierre, Valais, Switzerland*

- Studies in the field of eXplanable Artificial Intelligence (XAI) and Multi Agent Systems (MAS)
- References: Prof. Michael Ignaz Schumacher, Dr. Davide Calvaresi

Research Fellow, "Assegnista di ricerca" **April, 2017 → October, 2017**
Department of Informatics – Science and Engineering (DISI) *University of Bologna, Italy*

- Project title: "Language and platform techniques for complex software systems development"
- Goal: producing a translation framework & runtime aimed at automatically converting COBOL sources into .NET sources
- Supervisor: Prof. Mirko Viroli
- Reference: Mr. Andrea Patrignani

Internship **June, 2016 → December, 2016**
I3S Laboratory *University of Nice–Sophia Antipolis, France*

· Studies in the field of theoretical informatics applied to third generation neural networks
· Supervisors: Prof. Gianluigi Zavattaro, Prof. Cinzia Di Giusto, Prof. Elisabetta De Maria

Master's degree **October, 2014 → March, 2017**
Computer Science and Engineering *University of Bologna, Italy*

· Studies in the field of programming paradigms, computational models, distributed systems coordination, robotics, machine learning and artificial vision, web applications, business intelligence, model-driven software engineering
· Final mark: 110/110 *cum laude*
· Thesis: "Third generation neural networks: formalization as timed automata, validation and learning"
  – Summary: Modeling of spiking neural networks by means of the "timed automata" formalism, validation of the so-achieved model and proposal of a learning approach
  – Supervisor: Prof. Gianluigi Zavattaro
  – Co-supervisors: Prof. Cinzia Di Giusto, Prof. Elisabetta De Maria
  – External site: `http://amslaurea.unibo.it/12947`

Internship **October, 2013 → February, 2014**
A GUI for the Alchemist Simulator *APICe lab, University of Bologna, Cesena, Italy*

· Design and implementation of a GUI for the Alchemist simulator and its integration with OpenStreetMap
· Supervisor: Prof. Mirko Viroli

Bachelor's degree **September, 2011 → October, 2014**
Electronics, informatics and telecommunications engineering *University of Bologna, Italy*

· Studies in the field of networking, signal processing, software engineering and programming languages.
· Final mark: 110/110 *cum laude*
· Thesis: "Impiego combinato di GPS, BLE e riconoscimento di immagini per individuare entità nella realtà aumentata"
  – Summary: Steering a user perceiving an augmented world by integrating GPS for long distances, bluetooth beacons for indoor localization, and marker recognition for closer objects.
  – Supervisor: Prof. Prof. Mirko Viroli
  – External site: `http://amslaurea.unibo.it/7658`

High-school diploma **2006 → 2011**
Scientific curriculum *Liceo Scientifico "C. Caminiti", S. Teresa di Riva (ME), Italy*

· Final mark 98/100

FACULTY ACTIVITY

Students Representative in Departement Executive Board **September, 2019 → June, 2022**
Dep. of Computer Science and Engineering (DISI) *University of Bologna*

· `https://disi.unibo.it/it/dipartimento/organizzazione/organi-di-dipartimento`

PhD students Representative in Departement Council **July, 2019 → June, 2022**
Dep. of Computer Science and Engineering (DISI) *University of Bologna*

· `https://disi.unibo.it/it/Dipartimento/il-consiglio-di-dipartimento`

PhD students Representative in PhD Programme Board **June, 2019 → April, 2021**
PhD "Data Science and Computation" Programme *University of Bologna*

· Reference: Prof. Andrea Cavalli, PhD Programm Coordinator

Co-Supervised Theses **2017 → Ongoing**
Bachelor and Master Theses *University of Bologna*

· Logic ecosystems meet meta-interpretivative learning: design and experiments on 2p-Kt (27/05/2022) — Luca Nannini
· Extending the 2P-Kt ecosystem with Concurrent Logic Programming support (16/12/2021) — Andrea Giordano
· Il Ragionamento Logico come Forma di Apprendimento: Sviluppo di Un Framework per ILP (22/07/2021) — Giovanni Speciale
· Hyperledger: Architettura, Struttura e Tecnologie applicate alla Blockchain (22/07/2021) — Cristiano Aprigliano
· Enhancing Symbolic AI Ecosystems with Probabilistic Logic Programming: a Kotlin Multi-Platform Case Study (21/07/2021) — Jason Dellaluce
· Spatial Tuples nel mondo reale: il caso di Unity e Google Maps (28/05/2021) — Marco Pastore
· Logic Reasoning in BDI Agents: Current Trends and Spatial Integrations (28/05/2021) — Maicol Forti
· Engineering Angle-of-Arrival-based Indoor Localization Systems (26/03/2021) — Shapour Nemati
· Integrazione tra Programmazione Logica e Reti Neurali: esperimenti in 2p-Kt (04/02/2021) — Matteo Castiglio
· Interpretable Prediction of Galactic Cosmic-Ray Short-Term Variations with Artificial Neural Networks (17/12/2020) — Federico Sabbatini
· Serializzazione di termini logici: progetto e sviluppo in tuProlog, JSON e YAML (22/07/2020) — Riccardo Varotto
· Progetto e sviluppo di un modulo per la persistenza di clausole logiche: esperimenti in tuProlog-Kotlin (22/07/2020) — Ilaria Crivellari
· Progettazione e implementazione di un'interfaccia Android per il motore Prolog 2P-Kt (22/07/2020) — Andrea Dipietro
· AI simbolica e sub-simbolica per XAI: stato dell'arte ed esperimenti con reti neurali e vincoli logici (19/03/2020) — Giuseppe Pisano
· Analisi comparata di tecnologie open-source per l'elaborazione di flussi di dati (12/12/2019) — Matteo Minardi
· Simulazione di Agenti BDI basati su Prolog in Alchemist (12/12/2019) — Filippo Nicolini
· 2p-Kt: A Kotlin-based, Multi-Platform Framework for Symbolic AI (12/12/2019) — Enrico Siboni
· Blockchain e Internet of Things: realizzazione di un'applicazione decentralizzata per l'affitto di case vacanza (21/03/2019) — Matteo Saccomanni
· Logic-based coordination: a semantic approach to self-composition of services (21/03/2019) — Ashley Caselli
· Tecnologia Blockchain: un'analisi tecnica e sviluppo di un'applicazione decentralizzata (21/03/2019) — Andrea Cardiota
· Testing automatico per una implementazione dello standard OpenGL (18/10/2018) — Edoardo Antonini
· Coordination as a Web Service: una moderna implementazione del modello Linda (18/10/2018) — Lorenzo Rizzato
· Multi-sensing Data Fusion: Target tracking via particle filtering (18/10/2018) — Alessandro Contro
· Blockchain: modello generale e tassonomia delle componenti chiave (22/03/2018) — Alex Collini
· La programmazione logica per l'Internet of Things: il caso di studio del frigorifero intelligente (15/12/2017) — Nicola Atti
· Progettazione di un framework integrato per tecniche sub-simboliche e simboliche: Verso l'eXplainable AI (A.Y. 2018-2019) — Jason Dellaluce

· Gradle, Kotlin e lo sviluppo di un'applicazione multipiattaforma (A.Y. 2018-2019) — Mariano Caldara

SCIENTIFIC ACTIVITY

Tutorial lecturer at PRIMA 2022 **Nov. 2022**
24^{th} *International Conference on Principles and Practice of Multi-Agent Systems* *Valencia, Spain*

· Tutorials about Symbolic Knowledge Extraction and Injection tools
· `https://prima2022.webs.upv.es/tutorials/`
· References: Dr. Reyhan Aydogan

Reviewer at AAAI 2023 **Aug., 2022 → Oct. 2022**
37^{th} *AAAI Conference on Artificial Intelligence*

· References: Dr. Stefano Mariani

Area Editor for the ACL Newsletter **Aug., 2022 → Ongoing**
The electronic newsletter of the Association for Logic Programming

· Area: "Programming methodology and software engineering"
· `https://g61.5e4.myftpupload.com/the-association-for-logic-programming/alp-newsletters/`
· References: Prof. Agostino Dovier, Enrico Pontelli

Organizing Chair of CILC 2022 **June, 2022**
Blended Workshop *Bologna, Italy, Jun. 29 – Jul. 1, 2022*

· 37^{th} Italian Conference on Computational Logic
· `http://cilc2022.apice.unibo.it/`
· Edited proceedings: [CCO22]

Track chair of EXTRAAMAS 2022 **May, 2022**
Workshop, co-hosted by AAMAS 2022 *Auckland, New Zeland, May 9–13, 2022*

· Special Track on "The chist-ERA of XAI"
· "4^{th} International Workshop on EXplainable and TRAnsparent AI and Multi-Agent Systems
· `https://extraamas.ehealth.hevs.ch/`

Program Committee Membership for EAAI 2022 **November, 2021**
Workshop, co-hosted by AAAI 2022 *Vancouver, Canada, Feb. 28 – Mar. 1, 2022*

· "Explainable Agency in Artificial Intelligence" Workshop
· `https://sites.google.com/view/eaai-ws-2022/organization`

Guest Editor of IA 2021 **September, 2021**
WOA Special Issue

· "Intelligenza Artificiale" Journal
· `https://www.iospress.com/catalog/journals/intelligenza-artificiale`
· Edited volume: [Cal+22]

Organizing Chair of WOA 2021 **September, 2021**
Blended Workshop *Bologna, Italy, Sept. 1–3, 2021*

· 22^{th} Workshop "From Objects to Agents"
· `http://woa2021.apice.unibo.it/`
· Edited proceedings: `http://ceur-ws.org/Vol-2963`

Program Committee Membership for ICHMS 2021 **June, 2021**
Virtual Conference *Magdeburg, Germany, Sept. 8–10, 2021*

· 2021 IEEE "International Conference on Human-Machine Systems"
· https://www.ichms2021.de/#committee

Publicity Chair of EXTRAAMAS 2021 **May, 2021**
Virtual Workshop, co-hosted by AAMAS 2021 *London, UK, May 3–7, 2021*

· 21^{th} International Workshop on EXplainable and TRAnsparent AI and Multi-Agent Systems
· https://link.springer.com/book/10.1007%2F978-3-030-82017-6
· https://extraamas.ehealth.hevs.ch/

Organizing Chair of WOA 2020 **September, 2020**
Virtual Workshop *Bologna, Italy, Sept. 14–16, 2020*

· 21^{th} Workshop "From Objects to Agents"
· http://ceur-ws.org/Vol-2706
· http://woa2020.apice.unibo.it/

Lecturer at WOA 2018 Doctoral School **June 27, 2018**
19th Workshop From Objects to Agents (WOA) *Palermo, Italy*

· Talk title: "Blockchain & Smart Contracts: Basics and Perspectives for MAS"
· Reference: http://diid.unipa.it/roboticslab/woa2018/index.php/mini-school

PROJECT MANAGEMENT ACTIVITY

EXPECTATION (G.A. CHIST-ERA-19-XAI-005)

Work Package Leader **Apr. 2021 → Ongoing**
WP2 – Modelling INTRA-Agent explainability

· Principal Investigator: Prof. Michael Ignaz Schumacher
· Italian Partners' Scientific & Technical Coordinator: Prof. Andrea Omicini
· Project Web-site: https://expectation.ehealth.hevs.ch

TEACHING ACTIVITY

UNIVERSITY, 2^{nd} CYCLE (MASTER'S DEGREE COURSES)

Teacher of the course "Intelligent System Engineering" (Module 2) **Feb. → May., 2023**
School of Engineering and Architecture *University of Bologna, Italy*

· Computational models, methods, and technologies for the engineering of intelligent agents and intelligent systems
· Language: English
· Supervisor: Prof. Andrea Omicini
· Course Info: https://www.unibo.it/it/didattica/insegnamenti/insegnamento/2022/455810

Teacher of the course "Distributed Systems" (Module 2) **Sep. → Dec., 2022**
School of Engineering and Architecture *University of Bologna, Italy*

· Distributed architectures, ReSTfull Web-Services, Containers, Agent-based technologies and middlewares
· Language: Italian
· Supervisor: Prof. Andrea Omicini

· Course Info: `https://www.unibo.it/it/didattica/insegnamenti/insegnamento/2022/412591`

Teacher of the course "Intelligent System Engineering" (Module 3) **Feb. → May., 2022**
School of Engineering and Architecture *University of Bologna, Italy*

· Computational models, methods, and technologies for the engineering of intelligent agents and intelligent systems
· Language: English
· Supervisor: Prof. Andrea Omicini
· Course Info: `https://www.unibo.it/it/didattica/insegnamenti/insegnamento/2021/455810`

Teaching assistant for the course "Distributed Systems" **Sept. → Dec., 2021**
School of Engineering and Architecture *University of Bologna, Italy*

· Distributed architectures, ReSTfull Web-Services, Containers, Agent-based technologies and middlewares.
· Supervisor: Prof. Andrea Omicini
· Course Info: `https://apice.unibo.it/xwiki/bin/view/Courses/Sd2122`

Teaching assistant for the course "Distributed Systems" **Sept. → Dec., 2020**
School of Engineering and Architecture *University of Bologna, Italy*

· Distributed architectures, ReSTfull Web-Services, Containers, Agent-based technologies and middlewares
· Supervisor: Prof. Andrea Omicini
· Course Info: `https://apice.unibo.it/xwiki/bin/view/Courses/Sd2021`

Teaching assistant for the course "Distributed Systems" **Sept. → Dec., 2019**
School of Engineering and Architecture *University of Bologna, Italy*

· Distributed architectures, ReSTfull Web-Services, Containers, Agent-based technologies and middlewares. Computational logic, logic programming and Prolog.
· Supervisor: Prof. Andrea Omicini
· Course Info: `https://apice.unibo.it/xwiki/bin/view/Courses/Sd1920`

Teaching assistant for the course "Distributed Systems" **Sept. → Dec., 2018**
School of Engineering and Architecture *University of Bologna, Italy*

· Distributed architectures, ReSTfull Web-Services, Containers, Agent-based technologies and middlewares. Computational logic, logic programming and Prolog.
· Supervisor: Prof. Andrea Omicini
· Course Info: `http://apice.unibo.it/xwiki/bin/view/Courses/OOP1819`

Teaching assistant for the course "Distributed Systems" **Sept. → Dec., 2017**
School of Engineering and Architecture *University of Bologna, Italy*

· Distributed architectures. Agent-based technologies and middlewares. Computational logic, logic programming and Prolog.
· Supervisor: Prof. Andrea Omicini
· Course Info: `http://apice.unibo.it/xwiki/bin/view/Courses/Sd1718`

University, 1^{st} cycle (Bachelor's Degree Courses)

Teacher of the course "Computer Science Fundamentals" (Module 2) **Feb. → May., 2023**
School of Engineering and Architecture *University of Bologna, Italy*

· Programming in C Fundamentals: control structures, functions, arrays, pointers

- Language: Italian
- Supervisor: Dr. Roberto Casadei
- Course Info: `https://www.unibo.it/it/didattica/insegnamenti/insegnamento/2022/455810`

Teacher of the course "Computer Science Fundamentals" (Module 1) **Feb. → May., 2022**
School of Engineering and Architecture *University of Bologna, Italy*

- Programming in C Fundamentals: control structures, functions, arrays, pointers
- Language: Italian
- Supervisor: Dr. Roberto Casadei
- Course Info: `https://www.unibo.it/it/didattica/insegnamenti/insegnamento/2021/455810`

Teaching assistant for the course "Object oriented programming" **Sept. → Dec., 2018**
School of Engineering and Architecture *University of Bologna, Italy*

- Foundations of the object oriented programming paradigm, design patterns, concurrency basics, and GUI development in Java + C# and .NET basics
- Supervisor: Prof. Mirko Viroli
- Course Info: `http://apice.unibo.it/xwiki/bin/view/Courses/Sd1819`

Teaching assistant for the course "Object oriented programming" **Sept. → Dec., 2018**
School of Engineering and Architecture *University of Bologna, Italy*

- Foundations of the object oriented programming paradigm, design patterns, concurrency basics, and GUI development in Java + C# and .NET basics
- Supervisor: Prof. Mirko Viroli
- Course Info: `http://apice.unibo.it/xwiki/bin/view/Courses/Sd1819`

Teaching assistant for the course "Object oriented programming" **Sept. → Dec., 2017**
School of Engineering and Architecture *University of Bologna, Italy*

- Foundations of the object oriented programming paradigm, design patterns, concurrency basics, and GUI development in Java
- Supervisor: Prof. Mirko Viroli
- Course Info: `http://apice.unibo.it/xwiki/bin/view/Courses/OOP1718`

Masters

Lecturer at Bologna Business School **Nov. 14-15, 2018**
Amadori Graduate Program *Bologna, Italy*

- Talk title: "Blockchain & Smart Contracts: What are they? Do we need them?"

Industry

Teacher of the course "ENG18 – Basic OO Programming in C#" **Oct. 2022**
IMA S.p.A. *Bologna, Italy*

- .NET solution and project management, collections and exceptions in .NET, advanced mechanisms of C#
- IMA Web site: `https://ima.it`
- Reference: formazione@ima.it

Teacher of the course "ENG19 – Advanced OO Programming in C#" **Apr. → Jun., 2021**
IMA S.p.A. *Bologna, Italy*

· Test-driven development in .NET, OOP Design patterns, domain driven design, concurrency and multithreading in .NET
· IMA Web site: `https://ima.it`
· Reference: formazione@ima.it

Teacher of the course "ENG18 – Basic OO Programming in C#" **Mar. → Apr., 2021**
IMA S.p.A. *Bologna, Italy*

· .NET solution and project management, collections and exceptions in .NET, advanced mechanisms of C#
· IMA Web site: `https://ima.it`
· Reference: formazione@ima.it

Teacher at professional education course **Mar. 5–8, 2020**
IFTS course by FORMart *Cesena, Italy*

· Talks topics: Cloud Computing and Blockchain Technologies
· References: Prof. Alessandro Ricci

Teacher at professional education course **Feb. 20-28, 2019**
IFTS course by FORMart *Cesena, Italy*

· Talks topics: Cloud Computing and Blockchain Technologies
· References: Prof. Alessandro Ricci

OTHER ACTIVITIES

System Engineer **2022**
StairwAI European Project *Cesena, Italy*

· Summary: operating a cluster of Huawei servers via Docker
· References: Prof. Michela Milano, Eng. Enrico Fiumana

DEVELOPMENT OF RESEARCH-RELATED SOFTWARE

tuProlog (2P) [CCO21a] **April, 2019 → Ongoing**

· A logic programming framework supporting multi-paradigm programming via a clean, seamless, and bidirectional integration between the logic and object-oriented paradigms
· `http://tuprolog.unibo.it`
· `https://github.com/tuProlog/2p-kt`

TuSoW [Cia+19d] **December, 2018 → Ongoing**

· Tuple Spaces over the Web: a framework for the coordination of distributed software agents via LINDA-like tuple spaces
· `https://github.com/CoordaaS/TuSoW`

2ppy (2P in Python) **September, 2021 → Ongoing**

· Porting of 2P on Python
· `https://github.com/tuProlog/2ppy`

Psyke [Sab+21] **October, 2021 → Ongoing**

· Platform for Symbolic Knowledge Extraction (in the form of logic rules) out of sub-symbolic predictors
· `https://github.com/psykei/psyke-python`

Psyki [Sab+21] **Feb, 2022 → Ongoing**

- Platform for Symbolic Knowledge Injection (in the form of logic rules) into neural networks
- `https://github.com/psykei/psyki-python`

LANGUAGE SELF-ASSESSMENT

	Listening	Reading	Interaction	Speaking	Writing
Italian	Native language				
English	C1	C1	C1	C1	C1
French	B1	B1	A1	A1	B1

TECHNICAL STRENGTHS

Hardware configuration	Desktop & notebook PCs assembling
Programming Paradigms	imperative, object oriented, functional, logic, constraint programming
Software configuration	Windows and Linux installation and configuration
Programming Languages	Java, Scala, Xtend, C# & VB.Net, Haskell, Prolog, JavaScript, C, Python, Minizinc, COBOL, Kotlin
Data Analysis Tools	Python + Pandas/NumPy
Networking	Socket (TCP & UDP), HTTP, RESTful WebAPI
Databases	SQL, PostgreSQL, MySQL, IBM Informix
Development tools	Git, Mercurial, Maven, Gradle, Swagger, Xtext, ANTLR
Markup languages	XML, HTML, Markdown, LaTeX
IDEs	Eclipse, IntelliJ Idea, Visual Studio (Code), Android Studio, PyCharm
System administration	Docker, Kubernetes, Ansible, SSH

ADDITIONAL INFORMATION

About me: I am an Software experienced developer and designer. I can both work alone or as a team, with or without my favorite IDEs. I often exploit version control system such as Git – often in combination with continuos integration and delivery tools such as GitLab or GitHub actions –, to automate the management of my software or LaTeX projects. I prefer a *model-* and *test-driven* approach when designing software but I can easily switch my mind to some agile approach, like SCRUM, if needed.

Interests: formal models and languages, from both the designer and user point of view; MAS & coordination within distributed systems; logic or other declarative paradigms; artificial intelligence and machine learning; learning as much languages as possible!

Giovanni Ciatto, September 26, 2022

Articles in Journals

[Cal+18b] Roberta Calegari, Giovanni Ciatto, Stefano Mariani, Enrico Denti, and Andrea Omicini. "LPaaS as Micro-intelligence: Enhancing IoT with Symbolic Reasoning". In: *Big Data and Cognitive Computing* 2.3 (2018). DOI: 10.3390/bdcc2030023. URL: http://www.mdpi.com/2504-2289/2/3/23.

[Cal+20a] Roberta Calegari, Giovanni Ciatto, Enrico Denti, and Andrea Omicini. "Logic-based Technologies for Intelligent Systems: State of the Art and Perspectives". In: *Information* 11.3 (Mar. 2020). Ed. by Willy Susilo. Special Issue "10th Anniversary of Information—Emerging Research Challenges", pp. 1–29. ISSN: 2078-2489. DOI: 10.3390/info11030167. URL: http://www.mdpi.com/2078-2489/11/3/167.

[Cal+21b] Roberta Calegari, Giovanni Ciatto, Viviana Mascardi, and Andrea Omicini. "Logic-based Technologies for Multi-agent Systems: A Systematic Literature Review". In: *Autonomous Agents and Multi-Agent Systems* 35.1 (2021). Ed. by Federico Bergenti, Matteo Baldoni, Michael Winikoff, and Amal El Fallah Seghrouchni. Collection "Current Trends in Research on Software Agents and Agent-Based Software Development", 1:1–1:67. ISSN: 1387-2532. DOI: 10.1007/s10458-020-09478-3. URL: http://link.springer.com/10.1007/s10458-020-09478-3.

[CCO20] Roberta Calegari, Giovanni Ciatto, and Andrea Omicini. "On the integration of symbolic and sub-symbolic techniques for XAI: A survey". In: *Intelligenza Artificiale* 14.1 (2020). Ed. by Matteo Baldoni, Federico Bergenti, Stefania Monica, and Giuseppe Vizzari, pp. 7–32. DOI: 10.3233/IA-190036. URL: http://content.iospress.com/articles/intelligenza-artificiale/ia190036.

[CCO21a] Giovanni Ciatto, Roberta Calegari, and Andrea Omicini. "2P-Kt: A Logic-Based Ecosystem for Symbolic AI". In: *SoftwareX* 16 (Dec. 2021), 100817:1–7. ISSN: 2352-7110. DOI: 10.1016/j.softx.2021.100817. URL: https://www.sciencedirect.com/science/article/pii/S2352711021001126.

[Cia+20c] Giovanni Ciatto, Giovanna Di Marzo Serugendo, Maxime Louvel, Stefano Mariani, Andrea Omicini, and Franco Zambonelli. "Twenty Years of Coordination Technologies: COORDINATION contribution to the State of Art". In: *Journal of Logical and Algebraic Methods in Programming* 113 (June 2020). Ed. by Rocco De Nicola, pp. 1–25. ISSN: 2352-2208. DOI: 10.1016/j.jlamp.2020.100531. URL: http://www.sciencedirect.com/science/article/pii/S235222082030016X.

[Cia+20e] Giovanni Ciatto, Stefano Mariani, Alfredo Maffi, and Andrea Omicini. "Blockchain-Based Coordination: Assessing the Expressive Power of Smart Contracts". In: *Information* 11.1 (Jan. 2020). Ed. by Davide Calvaresi, Alevtina Dubovitskaya, Michael Schumacher, and Kuldar Taveter. Special Issue "Blockchain Technologies for Multi-Agent Systems", pp. 1–20. ISSN: 2078-2489. DOI: 10.3390/info11010052. URL: http://www.mdpi.com/2078-2489/11/1/52.

[Cia+20f] Giovanni Ciatto, Stefano Mariani, Andrea Omicini, and Franco Zambonelli. "From Agents to Blockchain: Stairway to Integration". In: *Applied Sciences*. Advances in Blockchain Technology and Applications 2020 10.21 (2020). Ed. by Roberto Tonelli, Marco Ortu, and Andrea Pinna. Special Issue "Advances in Blockchain Technology and Applications 2020", 7460:1–7460:22. ISSN: 2076-3417. DOI: 10.3390/app10217460. URL: https://www.mdpi.com/2076-3417/10/21/7460.

[CMO18b] Giovanni Ciatto, Stefano Mariani, and Andrea Omicini. "ReSpecTX: Programming Interaction Made Easy". In: *Computer Science and Information Systems* 15.3 (Oct. 2018). Ed. by Costin Bădică and Bogdan Trawiński. Special Section: Contemporary Topics in Intelligent Distributed Computing, pp. 655–682. ISSN: 1820-0214. DOI: 10.2298/CSIS180111031C. URL: http://www.comsis.org/archive.php?show=ppridc-7418.

[Kör+22] Philipp Körner, Michael Beuschel, João Barbosa, Vítor Santos Costa, Verónica Dahl, Manuel V. Hermenegildo, Jose F. Morales, Jan Wielemaker, Daniel Diaz, Salvador Abreu, and Giovanni Ciatto. "Fifty Years of Prolog and Beyond". In: *Theory and Practice of Logic Programming* (2022), pp. 1–83. DOI: 10.1017/S1471068422000102. URL: https://www.cambridge.org/core/journals/theory-and-practice-of-logic-programming/article/fifty-years-of-prolog-and-beyond/3A5329B6E3639879301A6D44346FD1DD.

[Sab+22] Federico Sabbatini, Giovanni Ciatto, Roberta Calegari, and Andrea Omicini. "Symbolic knowledge extraction from opaque ML predictors in PSyKE: Platform design & experiments". In: *Intelligenza Artificiale* 16.1 (July 2022). Ed. by Roberta Calegari, Giovanni Ciatto, Andrea Omicini, and Giuseppe Vizzari, pp. 27–48. ISSN: 1724-8035. DOI: 10.3233/IA-210120. URL: https://content.iospress.com/articles/intelligenza-artificiale/ia220141.

Paper in Proceedings

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