

Ettore Ritacco



PERSONAL INFORMATION

- Current Position:
 - Researcher a University of Udine (<https://www.uniud.it>)
 - Research Scientist at ICAR-CNR (<http://www.icar.cnr.it>)
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RESEARCH INTERESTS

Expert on data science, data analytics and enabling technologies for data analytics. Studying Data Generation, Generative AI, User Profiling and Behavioral Modeling, Anomaly Detection, Smart Maintenance, Social Network Analysis, Recommendation, Information Propagation and Diffusion, Profiling for Cyber Security, Latent Factor and Deep Learning models. Interested in new frontiers of Computer Science and Technology aimed at analyzing Complex Big Data.

EDUCATION

- **Ph.D. in Engineering of Systems and Informatics, University of Calabria (November 2008 - February 2011).**
 - Thesis title: *Mining Imprecise Data using Domain Knowledge*. Supervisors Prof. Domenico Saccà and Dr. Giuseppe Manco.
- **Master's Degree in Computer Engineering (October 2004 – December 2006)**
 - Graduation summa cum laude. Thesis title: *Conjunctive Queries and Local Consistency: from tree structures to bounded-treewidth graphs*. Thesis supervised by Prof. Francesco Scarcello.
- **Bachelor's Degree in Computer Engineering (October 2001 – September 2004).**
 - Graduation summa cum laude. Thesis title: *Quantum Computing and Cryptography*. Thesis supervised by Prof. Francesco Scarcello.

PROFESSIONAL EXPERIENCE

- Starting from October 2022, he is a Researcher (RTDB) at University of Udine.
- From February 2015, he is also a Researcher at the Institute of High Performance Computing and Networks (ICAR-CNR) of the National Research Council of Italy, located in Rende (CS) (Italy).
- From October 2007 to January 2015, he was Research Fellow at ICAR-CNR.
- From January 2006 to September 2007, he was junior Software Architect at T&S s.r.l. – Technologies and Solutions, via Popilia 178/A, 87100 Cosenza (CS) – Italy.
- September 2007: he passed the government exam and licensed as a profession engineer.
- From 2008 to 2020, he was Assistant Professor at University of Calabria for the following courses:
 - *Machine Learning*. Department of Mathematics and Computer Science.
 - *Business Intelligence and Analytics*. Department of Mathematics and Computer Science.
 - *Data Warehouse and Data Mining*. Department of Mathematics and Computer Science.
 - *Data Mining and Knowledge Discovery*. Department of Mathematics and Computer Science.
 - *Data Mining and Knowledge discovery*. Department of Computer Science, Modeling, Electronics and Systems Engineering.
 - *Foundations of Computer Science*. Department of Computer Science, Modeling, Electronics and Systems Engineering.
- From July to August 2012, he was Professor of Data Mining for the Master Course of the Research Project "PONo1_00451 Tetris, New Open Source Services on Tetra" at ICT-SUD Competence Center, Rende (CS) Italy.
- In January 2013, he was Professor of Data Mining for the Master Course with protocol number 120000060 at the Department of Mathematics and Computer Science at University of Calabria.

SELECTED RESEARCH GRANTS

- **SecureOpenNets** - "Distributed Ledgers for secure open communities", funded by the Italian ministry of

research, is aimed at studying and developing distributed ledger models and methods to ensure data protection and data privacy, in order to develop collaborative business solutions for smart communities and digital rights. Specifically, the project will focus on algorithms and data structures for semantic indexing, monitoring and searching on decentralized ledgers, as well as machine learning and auditing methods on decentralized ledgers. Personal contribution:

- Definition, modeling and implementation of a tool for detecting alteration or substitution of products in a supply chain.
- Definition, modeling and implementation of a framework able to efficiently detect plagiarism.
- **VQA** - "Validated Question Answering" (n. F/190114/01/X44 - CUP: B28I20000040005 PON "IC" 2014-2020 FESR - And for sustainable growth - Sustainable manufacturing DM 05.03.2018 - DD 20/11/2018, art. 38, 47 e 48 D.P.R. n. 445 of 28/12/2000) is an industrial research and experimental development activity aimed at creating new methodologies, algorithms, and approaches for question-answering technologies that can leverage typical blockchain mechanisms to develop software solutions in various application contexts, with a particular focus on automating processes in the financial and healthcare industries. The goal of the project is to develop innovative tools for cognitive automation, also known as cognitive robotic process automation systems. These tools are aimed to simplify and automate complex tasks or entire business processes that require specific human cognitive abilities. Personal contribution:
 - Definition, modeling and implementation of a framework for monitoring, auditing, validating and certifying data labeling activities.
- **sgsecureDIG.IT** - Cybersecurity Technological District (2013-2016). Funded by the Italian ministry of research, it includes private organizations (Poste Italiane, NTT Data, ICT Sud Consortium), Academic institutions (University of Calabria, University of Reggio Calabria) and Research Institutions (CNR). The focus is on research on big data analytics aimed at cyber- security. Personal contribution:
 - Definition, modeling and implementation of mathematical framework able to profile users. The objective is to improve their security during their daily activity on different devices.
 - Definition and modeling of an Unauthorized Market Discovery Architecture. From the beginning of the smart-phone age, users are usual to download several apps from online markets. The developed framework aims to discover, within both the traditional and the deep web (TOR network), markets the publish applications without permission from the developers.
- **Vi-POC** - Virtual Power Operation Center (2013-2015). Aimed at exploiting big data analytics for forecasting and support the production of sustainable energy. Personal contribution:
 - Involvement in the definition of a system able to predict the quantity of electric power produced in photovoltaic and wind power plants.
- **FRAME** - A flexible knowledge-based framework for the management of complex information systems (2011-2014). The project is aimed at building an integrated platform for the analysis of unstructured and multimedia data, based on the adoption of complex data mining techniques. Personal contribution:
 - Definition, modeling and implementation of a semantic video tagger. The idea is to give semantics to a collection of videos in order to enable efficient research by content.
- **OpenKnowTech** - Technologies for integrating, managing and distributing data, processes and knowledge. Within the project, aim is to investigating open-source solutions to business intelligence. Personal contribution:
 - Involvement in the development of an open-source library, namely feed4weka (<https://sourceforge.net/projects/feed4weka/>), that extends the functionality of the mining tool Weka (<http://www.cs.waikato.ac.nz/ml/weka/>).
- **Pushing Intelligence into Workflow Systems** - The main objective here is defining techniques for designing, monitoring and optimizing workflows. The main tools are multi-relational technique for knowledge discovery. The candidate is scientific coordinator of this project. Personal contribution:
 - Definition, modeling and implementation of mining algorithms in hostile environment:
 - Imprecise data (high level of noise).
 - Imbalanced class distribution.
 - Low class separability.
- **IDEAS** - Development of an Integrated Development Environment for Applications and Solutions comprising components for Knowledge Discovery on complex data, Information Extraction on structured Data and Text Mining. Personal contribution:
 - Definition, modeling and implementation of spatio-temporal data types, for spatio-temporal data mining algorithms.
- **GeoPKDD** - The main objective was the definition of privacy-aware techniques for collecting, managing and analyzing spatio-temporal data. The candidate has contributed in the study of pattern languages for spatio-temporal data. Personal contribution:
 - Involvement in the definition of a formal framework for a declarative inductive query language for data mining tasks, adopted in the analysis of spatio-temporal data.

SPIN-OFF ACTIVITIES

- He is a shareholder of Open Knowledge Technologies S.r.l. (OKT). The company operates within the TechNest Spin-Off incubator of University of Calabria, and develops solutions for Recommendation, advertising and cybersecurity. Within the company, the candidate has the role of scientific advisor for the themes Data Mining, Recommender Systems, Social Network Analysis.

PUBLICATIONS

- 2023:
 - Erica Coppolillo, Carmela Comito, Marco Minici, Ettore Ritacco, Gianluigi Folino, Francesco Sergio Pisani, Massimo Guarascio, Giuseppe Manco: Fighting Misinformation, Radicalization and Bias in Social Media. *Ital-IA 2023*: 443-448
 - Erica Coppolillo, Daniela Gallo, Angelica Liguori, Simone Mungari, Ettore Ritacco, Giuseppe Manco: Siamese Network for Fake Item Detection. *SEBD 2023*: 430-438
 - Angelica Liguori, Simone Mungari, Ettore Ritacco, Francesco Ricca, Giuseppe Manco, Salvatore Iiritano: Neuro-Symbolic techniques for Predictive Maintenance. *SEBD 2023*: 459-468
 - Irena Koprinska, Paolo Mignone, Riccardo Guidotti, Szymon Jaroszewicz, Holger Fröning, Francesco Gullo, Pedro M. Ferreira, Damian Roqueiro, Gaia Ceddia, Slawomir Nowaczyk, João Gama, Rita P. Ribeiro, Ricard Gavaldà, Elio Masciari, Zbigniew W. Ras, Ettore Ritacco, Francesca Naretto, Andreas Theissler, Przemyslaw Biecek, Wouter Verbeke, Gregor Schiele, Franz Pernkopf, Michaela Blott, Ilaria Bordino, Ivan Luciano Danesi, Giovanni Ponti, Lorenzo Severini, Annalisa Appice, Giuseppina Andresini, Ibéria Medeiros, Guilherme Graça, Lee A. D. Cooper, Naghmeh Ghazaleh, Jonas Richiardi, Diego Saldana Miranda, Konstantinos Sechidis, Arif Canakoglu, Sara Pidò, Pietro Pinoli, Albert Bifet, Sepideh Pashami: Machine Learning and Principles and Practice of Knowledge Discovery in Databases - International Workshops of ECML PKDD 2022, Grenoble, France, September 19-23, 2022, Proceedings, Part I. *Communications in Computer and Information Science 1752*, Springer 2023, ISBN 978-3-031-23617-4
 - Irena Koprinska, Paolo Mignone, Riccardo Guidotti, Szymon Jaroszewicz, Holger Fröning, Francesco Gullo, Pedro M. Ferreira, Damian Roqueiro, Gaia Ceddia, Slawomir Nowaczyk, João Gama, Rita P. Ribeiro, Ricard Gavaldà, Elio Masciari, Zbigniew W. Ras, Ettore Ritacco, Francesca Naretto, Andreas Theissler, Przemyslaw Biecek, Wouter Verbeke, Gregor Schiele, Franz Pernkopf, Michaela Blott, Ilaria Bordino, Ivan Luciano Danesi, Giovanni Ponti, Lorenzo Severini, Annalisa Appice, Giuseppina Andresini, Ibéria Medeiros, Guilherme Graça, Lee A. D. Cooper, Naghmeh Ghazaleh, Jonas Richiardi, Diego Saldana Miranda, Konstantinos Sechidis, Arif Canakoglu, Sara Pidò, Pietro Pinoli, Albert Bifet, Sepideh Pashami: Machine Learning and Principles and Practice of Knowledge Discovery in Databases - International Workshops of ECML PKDD 2022, Grenoble, France, September 19-23, 2022, Proceedings, Part II. *Communications in Computer and Information Science 1753*, Springer 2023, ISBN 978-3-031-23632-7
 - Vito Barbara, Massimo Guarascio, Nicola Leone, Giuseppe Manco, Alessandro Quarta, Francesco Ricca, Ettore Ritacco: Neuro-Symbolic AI for Compliance Checking of Electrical Control Panels. *CoRR abs/2305.10113* (2023)
- 2022
 - Giuseppe Manco, Ettore Ritacco, Antonino Rullo, Domenico Saccà, Edoardo Serra: Machine learning methods for generating high dimensional discrete datasets. *WIREs Data Mining Knowl. Discov.* 12(2) (2022)
 - Vito Barbara, Dimitri Buelli, Massimo Guarascio, Stefano Ierace, Salvatore Iiritano, Giovanni Labocetta, Nicola Leone, Giuseppe Manco, Valerio Pesenti, Alessandro Quarta, Francesco Ricca, Ettore Ritacco: A Loosely-coupled Neural-symbolic approach to Compliance of Electric Panels. *CILC 2022*: 247-253
 - Giuseppe Manco, Ettore Ritacco, Antonino Rullo, Domenico Saccà, Edoardo Serra: Generating Synthetic Discrete Datasets with Machine Learning. *SEBD 2022*: 341-350
- 2021
 - Giuseppe Manco, Ettore Ritacco, Nicola Barbieri: A Factorization Approach for Survival Analysis on Diffusion Networks. *IEEE Trans. Knowl. Data Eng.* 33(1): 1-13 (2021)
 - Angelica Liguori, Giuseppe Manco, Francesco Sergio Pisani, Ettore Ritacco: Adversarial Regularized Reconstruction for Anomaly Detection and Generation. *ICDM 2021*: 1204-1209
 - Luciano Caroprese, Giuseppe Manco, Marco Minici, Francesco Sergio Pisani, Ettore Ritacco: Unbiasing Collaborative Filtering for Popularity-Aware Recommendation (Discussion Paper). *SEBD 2021*: 450-457
 - Angelica Liguori, Giuseppe Manco, Ettore Ritacco, Massimiliano Ruffolo, Salvatore Iiritano: A Deep Learning Approach for Unsupervised Failure Detection in Smart Industry (Discussion Paper). *SEBD 2021*: 474-481
- 2020
 - Antonio L. Alfeo, Mario G. C. A. Cimino, Giuseppe Manco, Ettore Ritacco, Gigliola Vaglini: Using an autoencoder in the design of an anomaly detector for smart manufacturing. *Pattern Recognit. Lett.* 136: 272-278 (2020)
 - Francesco Scicchitano, Angelica Liguori, Massimo Guarascio, Ettore Ritacco, Giuseppe Manco: Deep Autoencoder Ensembles for Anomaly Detection on Blockchain. *ISMIS 2020*: 448-456
 - Francesco Scicchitano, Angelica Liguori, Massimo Guarascio, Ettore Ritacco, Giuseppe Manco: A Deep Learning Approach for Detecting Security Attacks on Blockchain. *ITASEC 2020*: 212-222
 - Francesco Folino, Massimo Guarascio, Angelica Liguori, Giuseppe Manco, Luigi Pontieri, Ettore Ritacco: Exploiting Temporal Convolution for Activity Prediction in Process Analytics. *PKDD/ECML Workshops 2020*: 263-275
- 2019
 - Giuseppe Manco, Ettore Ritacco, Noveen Sachdeva, Massimo Guarascio: Deep Sequential Modeling for Recommendation. *SEBD 2019*

- Naveen Sachdeva, Giuseppe Manco, Ettore Ritacco, Vikram Pudi: Sequential Variational Autoencoders for Collaborative Filtering. *WSDM 2019*: 600-608
- Massimo Guarascio, Giuseppe Manco, Ettore Ritacco: Knowledge Discovery in Databases. *Encyclopedia of Bioinformatics and Computational Biology (1) 2019*: 336-341
- Massimo Guarascio, Giuseppe Manco, Ettore Ritacco: Deep Learning. *Encyclopedia of Bioinformatics and Computational Biology (1) 2019*: 634-647
- Giuseppe Manco, Ettore Ritacco, Massimo Guarascio: Network Topology. *Encyclopedia of Bioinformatics and Computational Biology (1) 2019*: 958-967
- Massimo Guarascio, Giuseppe Manco, Ettore Ritacco: Network Models. *Encyclopedia of Bioinformatics and Computational Biology (1) 2019*: 968-977
- 2018
 - Giuseppe Manco, Giuseppe Pirrò, Ettore Ritacco: Predicting Temporal Activation Patterns via Recurrent Neural Networks. *ISMIS 2018*: 347-356
 - Giuseppe Manco, Giuseppe Pirrò, Ettore Ritacco: Temporal Recurrent Activation Networks. *SEBD 2018*
 - Naveen Sachdeva, Giuseppe Manco, Ettore Ritacco, Vikram Pudi: Sequential Variational Autoencoders for Collaborative Filtering. *CoRR abs/1811.09975 (2018)*
- 2017
 - Giuseppe Manco, Ettore Ritacco, Pasquale Rullo, Lorenzo Gallucci, Will Astill, Dianne Kimber, Marco Antonelli: Fault detection and explanation through big data analysis on sensor streams. *Expert Syst. Appl. 87*: 141-156 (2017)
 - Massimo Guarascio, Ettore Ritacco, Daniele Biondo, Rocco Mammoliti, Alessandra Toma: Integrating a Framework for Discovering Alternative App Stores in a Mobile App Monitoring Platform. *NFMCP@PKDD/ECML 2017*: 107-121
 - Nicola Barbieri, Giuseppe Manco, Ettore Ritacco: Survival Factorization on Diffusion Networks. *ECML/PKDD (1) 2017*: 684-700
- 2016
 - Massimo Guarascio, Francesco Sergio Pisani, Ettore Ritacco, Pietro Sabatino: Profiling Human Behavior Through Multidimensional Latent Factor Modeling. *NFMCP@PKDD/ECML 2016*: 148-162
- 2014
 - Nicola Barbieri, Giuseppe Manco, Ettore Ritacco: Probabilistic Approaches to Recommendations. *Synthesis Lectures on Data Mining and Knowledge Discovery*, Morgan & Claypool Publishers 2014
- 2013
 - Gianni Costa, Giuseppe Manco, Riccardo Ortale, Ettore Ritacco: Hierarchical clustering of XML documents focused on structural components. *Data Knowl. Eng. 84*: 26-46 (2013)
 - Nicola Barbieri, Giuseppe Manco, Ettore Ritacco, Marco Carnuccio, Antonio Bevacqua: Probabilistic topic models for sequence data. *Mach. Learn. 93(1)*: 5-29 (2013)
 - Gianni Costa, Riccardo Ortale, Ettore Ritacco: X-Class: Associative Classification of XML Documents by Structure. *ACM Trans. Inf. Syst. 31(1)*: 3:1-3:40 (2013)
 - Antonio Bevacqua, Marco Carnuccio, Alfredo Cuzzocrea, Riccardo Ortale, Ettore Ritacco: A Semantic-based Framework for Supporting Interaction and Cooperation in Content-Based Web3.0 Applications. *SEBD 2013*: 131-138
- 2012
 - Antonio Bevacqua, Marco Carnuccio, Alfredo Cuzzocrea, Riccardo Ortale, Ettore Ritacco: Enforcing Interaction and Cooperation in Content-Based Web3.0 Applications. *APWeb 2012*: 472-483
 - Nicola Barbieri, Antonio Bevacqua, Marco Carnuccio, Giuseppe Manco, Ettore Ritacco: Probabilistic Sequence Modeling for Recommender Systems. *KDIR 2012*: 75-84
 - Nicola Barbieri, Giuseppe Manco, Riccardo Ortale, Ettore Ritacco: Balancing Prediction and Recommendation Accuracy: Hierarchical Latent Factors for Preference Data. *SDM 2012*: 1035-1046
 - Nicola Barbieri, Giuseppe Manco, Ettore Ritacco: Hierarchical Latent Factors for Preference Data. *SEBD 2012*: 251-256
- 2011
 - Gianni Costa, Giuseppe Manco, Riccardo Ortale, Ettore Ritacco: From global to local and viceversa: uses of associative rule learning for classification in imprecise environments. *Knowl. Inf. Syst. 33(1)*: 137-169 (2011)
 - Nicola Barbieri, Gianni Costa, Giuseppe Manco, Ettore Ritacco: Characterizing Relationships through Co-clustering - A Probabilistic Approach. *KDIR 2011*: 64-73
 - Nicola Barbieri, Gianni Costa, Giuseppe Manco, Ettore Ritacco: A Block Coclustering Model for Pattern Discovering in Users' Preference Data. *IC3K 2011*: 94-108
 - Gianni Costa, Riccardo Ortale, Ettore Ritacco: A Transactional Approach to Associative XML Classification by Content and Structure. *KDIR 2011*: 104-113
 - Gianni Costa, Riccardo Ortale, Ettore Ritacco: Learning Effective XML Classifiers Based on Discriminatory Structures and Nested Content. *IC3K 2011*: 156-171
 - Gianni Costa, Riccardo Ortale, Ettore Ritacco: Effective XML Classification Using Content and Structural Information via Rule Learning. *ICTAI 2011*: 102-109
 - Antonio Bevacqua, Marco Carnuccio, Riccardo Ortale, Ettore Ritacco: A new architectural paradigm for content-based web applications: Borè. *IDEAS 2011*: 192-196

- Nicola Barbieri, Giuseppe Manco, Ettore Ritacco: A Probabilistic Hierarchical Approach for Pattern Discovery in Collaborative Filtering Data. *SDM* 2011: 630-641
- Nicola Barbieri, Giuseppe Manco, Ettore Ritacco: A Probabilistic Hierarchical Approach for Pattern Discovery in Collaborative Filtering Data (Extended Abstract). *SEBD* 2011: 239-246
- 2010
 - Nicola Barbieri, Massimo Guarascio, Ettore Ritacco: An Empirical Comparison of Collaborative Filtering Approaches on Netflix Data. *IIR* 2010: 23-27
 - Gianni Costa, Giuseppe Manco, Riccardo Ortale, Ettore Ritacco: Fast and Effective Hierarchical Clustering of XML Documents by Structure. *SEBD* 2010: 358-369
- 2009
 - Gianni Costa, Massimo Guarascio, Giuseppe Manco, Riccardo Ortale, Ettore Ritacco: Rule Learning with Probabilistic Smoothing. *DaWaK* 2009: 428-440
 - Gianni Costa, Massimo Guarascio, Giuseppe Manco, Riccardo Ortale, Ettore Ritacco: A Hierarchical Rule-based Framework for Accurate Classification in Imprecise Domains. *SEBD* 2009: 261-272
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 - Riccardo Ortale, Ettore Ritacco, Nikos Pelekis, Roberto Trasarti, Gianni Costa, Fosca Giannotti, Giuseppe Manco, Chiara Renso, Yannis Theodoridis: The DAEDALUS framework: progressive querying and mining of movement data. *GIS* 2008: 52
 - Riccardo Ortale, Ettore Ritacco, Nikos Pelekis, Roberto Trasarti, Gianni Costa, Fosca Giannotti, Giuseppe Manco, Chiara Renso, Yannis Theodoridis: DAEDALUS: A knowledge discovery analysis framework for movement data. *SEBD* 2008: 191-198