

Torino, 10th of December, 2020

Rosa Meo: Curriculum vitae

Rosa Meo held the Laurea Degree in Electronic Engineering at Politecnico di Torino and overcame the habilitation at the Engineering Profession in 1993. She held the PhD in Computer and Systems Engineering at Politecnico di Torino in 1997.

She became a tenure track researcher in 1999 at Dipartimento di Informatica of Università di Torino and associate professor at the same Department in 2005.

She enabled herself at the Italian Ministry of University Research (MUR) for the Full Professor role (PO) for the scientific disciplinary sectors of Computer Science (INF-01) and also for Engineering in Information Science (ING-INF-05).

Research Activities

Rosa Meo's research activity is in Data Mining, Machine Learning and Databases, in particular at the intersection of the design of query languages and of dedicated systems fitted to manage and analyse big data volumes, like the *inductive databases*, aiming at knowledge discovery from huge amount of data, today called *big data*.

Many of her scientific works are the result of the application of Machine Learning and Data Mining to different domains in funded projects, like the following ones:

- **Development of the MINE RULE system**, a query language for databases equipped with a specialised optimiser: the development was done in European project CinQ (IST-2000-26469) in 2001-2004, whose Principal Investigator for the University of Torino was Rosa Meo.
- **Extraction of the dependencies between variables**, describing events in the patients medical records (research projects funded by ARESS) that has led to the development of the system *DepMiner*.
- Research on trajectories by vehicles monitored by Unmanned Aircraft Vehicles (UAV) in applications of traffic surveillance (SKY-ISTAR project with SELEX ES-Leonardo that has led to the development of the system *SeqMiner* in 2013)
- **Recognition in regions of anomalous events, densed distributed in geographic maps**, augmented by signals received from social media for the automatic generation of thematic maps (*MetaDataRetrieval e Geosummary*) in the context of the projects SMAT-F1 and SMAT-F2 (funded in the context of Consortium Areospace PQR 2007-13)
- **Anomaly detection in money transfers from bank accounts** with a Machine Learning semi-supervised and active approach that have the advantage that they work even with a reduced amount of supervised data and require little involvement from the user (in the project Anti-Money Laundering, funded by Piedmont Region that has led to the development of the system *TalenTO*)
- **Recognition of the emotions** in messages from the users of the platforms of social media, like Twitter.

- **Recognition of frauds** in click-streams with technology of *Privacy Preserving Data Mining* that adopt the model of *differential privacy* (in the context of the funded project from European Union Toreador on Big Data, HPC e Data Analytics – RIA 688797).
- From March 2018-February 2021 she is participating to the project on **Smart Factory 4.0**, HOME, funded by FESR from Piedmont Region. Rosa Meo is responsible for WP 4.2.1 and WP. 4.2.2. on data analysis of energy sensors in manufacturing plants and about data modeling on HPC platforms and NOSQL databases for the analysis and the management of big data.
- She participated to the project BECOME (funded by CRT Foundations, in 2017), on optimisation of resources with the data analysis on the patients at Emergency Rooms and about the calls of ambulances.
- She is participating to the MUME (MUoversi MEglio) project, funded by Piedmont Region (POR-FESR 2014-2020), 2017-2019, as a subcontractor for the company SSB-Progetti in Torino and in collaboration with 5T and Multimedia Grifo, on **car-sharing** with Natural Language interfaces (called *chat-bots*) and gamification strategies with the aim to improve the local public transport system.
- Collaboration with ANAC (Autorità Nazionale Anti Corruzione) in the context of a research collaboration signed by ANAC and Università di Torino, in which Rosa Meo and prof. Gabriella Racca are the Principal Investigators for the data analysis in the **big data of the Information Systems of the Public Administrations** in Italy, focused on discovery of anomalies, inefficiencies, suggestions of best practices for the execution of tenders for procurements, services and public works.
- The application of the database technology to data mining problems has been accelerated thanks to the development of **XML**, for data exchange and its flexibility, suitable to offer **support to the process of knowledge discovery**.
- She proposed some theoretical tools for Data Mining based on concepts of **information theory** (papers on ACM TODS 2000 and on IEEE TOIT 2002). The aim is to extract the significant dependencies **among a high number of variables** that are used to described examples. This reserach path was started by the *Delta values*, that are computed by the difference in probability from the sers of observations and a probability reference (named *maximum independence*) obtained maximizing entropy associated to the set of variables. The probability of maximum independency extends the concept of **statistical independence to more than two variables**.
- Rosa Meo has applid these concepts and **measures derived from Statistics**, such as the **Goodman-Kruskal τ** , to learning tasks such as classification, clustering, automatic generation of ontologies of concepts, and variables selection (feature selection).
- She applied in an original way the formal topic of **Formal Concept Analysis (FCA)** derived from Mathematics to the representation of interesting patterns, found in data and in their research and extraction, also executed in an incremental way.
- Such research activity has been recognised also at the International level and the edited book on Inductive Databases, published in 2004 by Springer-Verlag, LNAI 2682 is an evidence.

Invited talks

1. “The path of Data Analysis in the Information System on Public Procurements Tenders” at the Workshop "The future of public contracts: fusion of data analysis and innovation”, held in Torino, 28 March 2019, organised by Raffaella Racca with ANAC and the Public Administrators of the Piedmont territory and more in general in Italy.
2. Invited talk (40 minutes) at the Workshop “Data Analysis: what companies need, what Public Administrations need” on Machine Learning, 10th of January 2019, at Campus Luigi Einaudi, University of Torino.
3. Invited talk (1 h) on "Privacy preserving data mining: a promise and a challenge" at the Second Interdisciplinary Forum, Scuola di Studi Superiori at University of Torino (SSST): "Machine Learning: Applications and effects on society" (17th of November, 2017).
4. “First Bertinoro Workshop on Data Mining”, Ottobre 2005, 24-27, Bertinoro, Italy. The Workshop was organised by Alin Dobra (Cornell Univ., NY), Prabhakar Raghavan (Verity Corp.), Raghu Ramakrishnan (Univ. Wisconsin – Madison).
5. First International Workshop on Integrating Data Mining, Database and Information Retrieval (IDDI 2005), at **DEXA 2005**, Copenhagen, Denmark, August, 22, 2005. Organizzatori: Giuseppe Psaila (Università di Bergamo, Italy) and Gloria Borgogna (Consiglio Nazionale delle Ricerche and Istituto per La Dinamica dei Processi Ambientali, Bergamo, Italy).
6. Invited talk and participation to working group on the topic “Data Mining: the Next Generation”, a **Dagstuhl**, Luglio 2004, organised by R. Agrawal (IBM Almaden Center, USA), R. Ramakrishnan (Univ. Wisconsin - Madison, USA), J. C. Freytag (HU Berlin, Germany).
7. Invited talk on “Systems and Query Languages in Data Mining” in a Working Group on “Detecting Local Patterns” at **Dagstuhl**, April 2004, organised by J-F. Boulicaut (INSA, Lionne, Francia), Morik (Univ. Dortmund, Germania) e Siebes (CWI, Amsterdam).
8. Invited Talk at the Workshop on “Inductive Databases and Constraint-Based Mining”, Hintertzen, Marzo 2004, organizzato da De Raedt (Univ. Albert-Ludwigs, Freiburg, Germania).
9. Invited talk on the topic “Business Mission Intelligence”, Bergamo, Italia, Maggio, 27-28, 2004. Organizzato come giornata di lavoro per le PMI, Boole Institute, Gruppo SOI.

Awards:

- **SELEX Innovation Award** in 2012 for the results obtained in the research project “*Knowledge Discovery on a Huge Volume of Data*”, funded by SELEX-ES (Finmeccanica).
- From February 2020 Rosa Meo is one of the two academic experts from Italy (together with Dino Pedreschi from University of Pisa) at the OCDE Working Group (ONE-AI) on Monitoring Artificial Intelligence systems and on the

Development of Guidelines for the generation of a Trustworthy Artificial Intelligence.

Rosa Meo has organised many Conferences and International Workshops like ECML/PKDD, and events in this Conference, and to IEEE ICDM, ACM Symposium on Applied Computing and at International Conference EDBT (2002).

Some of the recent publications and editorship activity

- **Co-editor** (con Toon Calders, Floriana Esposito, Eyke Hüllermeier) della “Special issue of the ECML/PKDD 2014 journal track”, in MACHINE LEARNING, Vol. 97, Springer International Publishing AG., 2014, pp. 1–3. doi: 10.1007/s10994-014-5468-6.
- **Co-editor** (con Toon Calders, Floriana Esposito, Eyke Hüllermeier) della “Special issue of the ECML/PKDD 2014 journal track” in DATA MINING and KNOWLEDGE DISCOVERY, Vol. 28, Springer International Publishing AG., 2014, pp. 1129–1133. doi: 10.1007/s10618-014-0374-x. url: <http://www.kluweronline.com/issn/1384-5810>.
- [DBSupportDM, 2004] Rosa Meo, Pier Luca Lanzi, Mika Klemettinen (eds.), *Database Support for Data Mining Applications*, Springer-Verlag, 2004, LNAI 2682 (available from www.springeronline.com). ISSN: 0302-9743, ISBN: 3-540-22479-3.
- **Associate Editor di IEEE TKDE** (Transactions on Knowledge and Data Engineering) 2017- 2019
- **Associate Editor di KAIS** (Knowledge And Information Systems di Elsevier) 2016-2019

Rosa Meo has over 70 articles published with peer-reviews on International Journals and International Proceedings of Conferences, such as:

1. [INFORMATION SYSTEMS FRONTIERS 2020] Giovanni Battista Gardino, Rosa Meo, Giuseppe Craparotta. “*Multi-view Latent Learning Applied to Fashion Industry*”, in Information Systems Frontiers, Springer Nature, 4 April 2020, <https://link.springer.com/article/10.1007/s10796-020-10005-8>, DOI: 10.1007/s10796-020-10005-8, EID: 2-s2.0-85084631691, ISBN: 15729419 13873326, **94 article accesses**.
2. [SPORTS SCIENCES, 2018] Mirko Lai, Rosa Meo, Rossano Schifanella, and Emilio Sulis. “*The role of the network of matches on predicting success in table tennis*”. In: JOURNAL OF SPORTS SCIENCES (2018), pp. 1–8. doi: 10.1080/02640414.2018.1482813. url: <http://dx.doi.org/10.1080/02640414.2018.1482813>.
3. [TNNLS, 2017] Dino Ienco, Ruggero G. Pensa, and Rosa Meo. “*A Semisupervised Approach to the Detection and Characterization of Outliers in Categorical Data*”. In: IEEE TRANSACTIONS ON NEURAL NETWORKS AND LEARNING SYSTEMS 28 (2017), pp. 1017–1029. doi: 10.1109/TNNLS.2016.2526063. url: <http://ieeexplore.ieee.org/document/7412753/>. SCOPUS: 16 Citazioni
4. [TOIT 2017] Rosa Meo and Emilio Sulis. “*Processing Affect in Social Media: A Comparison of Methods to Distinguish Emotions in Tweets*”. In: ACM TRANSACTIONS ON INTERNET TECHNOLOGY 17 (2017), pp. 1–25. doi: 10.1145/2996187. url: <http://dl.acm.org/citation.cfm?id=2996187>. Citations on Google Scholar: 11, SCOPUS: 6
5. [IS, 2017] Giuseppe Rizzo, Rosa Meo, Ruggero G. Pensa, Giacomo Falcone, and Raphaël Troncy. “*Shaping City Neighborhoods Leveraging Crowd Sensors*”. In: INFORMATION SYSTEMS 64 (2017), pp. 368–378.

doi: 10.1016/j.is.2016.06.009.

url: <http://www.sciencedirect.com/science/article/pii/S0306437916302915>.

Citations on Google Scholar: 8, SCOPUS: 4

6. [GEAM, 2014] Guido Nigrelli, Marco Raschellà, and Rosa Meo. “*Un database relazionale WEB-based sulle rotte nell’arginatura maestra del fiume Po*”. In: GEAM. GEOINGEGNERIA AMBIENTALE E MINERARIA 142 (2014), pp. 49–54. issn: 11219041.
url: http://www.patroneditore.com/Geam/2014/142/6450/un_database_relazionale_web-based_sulle_rotte_nell_arginatura_maestra_del_fiume_po.html.
7. [DAMI, 2014] R. G. Pensa, D. Ienco, and R. Meo. “*Hierarchical Co-Clustering: Off-line and Incremental Approaches*”. In: DATA MINING AND KNOWLEDGE DISCOVERY 28 (2014), pp. 31–64. doi: 10.1007/s10618-012-0292-8. url: <http://www.springerlink.com/content/n106440h8321270g/>.
citazioni: SCOPUS: 12, WOS: 11
8. [IJOICI, 2014] Elena Roglia and Rosa Meo. “*A SOA-Based Module for the Production of Geo-Summaries*”. In: INTERNATIONAL JOURNAL OF ORGANIZATIONAL AND COLLECTIVE INTELLIGENCE 4 (2014), pp. 63–75. doi: 10.4018/ijoci.2014010106.
url: <http://www.igi-global.com/article/a-soa-based-module-for-the-production-of-geo-summaries/105089>.
9. [DAMI, 2013] D. Ienco, C. Robardet, R. G. Pensa, and R. Meo. “*Parameter-Less Co-Clustering for Star-Structured Heterogeneous Data*”. In: DATA MINING AND KNOWLEDGE DISCOVERY 26 (2013), pp. 217–254.
doi: 10.1007/s10618-012-0248-z.
url: <http://www.springerlink.com/content/4qr677415h616232/>.
Citations: Google Scholar: 35, SCOPUS: 33, WOS: 16
10. [POLARIS 2013] S. Viola, C. M. Choor, V. Mellano, F. Ciarraaglia, R. Meo, M. Botta, and R. Esposito. “*Autonomous Abnormal Behaviour Detection in Intelligence Surveillance and Reconnaissance (ISR) Applications*”. In: POLARIS 14 (2013), pp. 56–61.
11. [TKDD, 2012] D. Ienco, R. G. Pensa, and R. Meo. “*From Context to Distance: Learning Dissimilarity for Categorical Data Clustering*”. In: ACM TRANSACTIONS ON KNOWLEDGE DISCOVERY FROM DATA 6 (2012), pp. 1–25. doi: 10.1145/2133360.2133361.
url: <http://dl.acm.org/citation.cfm?id=2133361&CFID=324194746&-CFTOKEN=51300725>.
Citations: Google Scholar: 59, SCOPUS: 37, WOS: 29
12. [PATTERN RECO, 2012] R. Meo, D. Bakar, and D. Ienco. “*LODE: A distance-based classifier built on ensembles of positive and negative observations*”. In: PATTERN RECOGNITION 45 (2012), pp. 1409–1425.
doi: 10.1016/j.patcog.2011.10.015.
url: <http://www.sciencedirect.com/science/article/pii/S0031320311004390>.
Google Scholar: 11, SCOPUS: 9, WOS: 8
13. [SENSORS, 2012] R. Meo, E. Roglia, and A. Bottino. “*The Exploitation of Data from Remote and Human Sensors for Environment Monitoring in the SMAT Project*”. In: SENSORS 12 (2012), pp. 17504–17535. doi: 10.3390/s121217504. url: <http://www.mdpi.com/1424-8220/12/12/17504>.
Google Scholar: 14, SCOPUS: 10
14. [AAI, 2007] A. Gallo, R. Esposito, R. Meo, and M. Botta. “*Incremental extraction of association rules in applicative domains*”. In: APPLIED ARTIFICIAL INTELLIGENCE 21 (2007), pp. 297–315. issn: 0883-9514.

15. [JIIS, 2006] R. Esposito, R. Meo, and M. Botta. “*Answering constraint-based mining queries on itemsets using previous materialized results*”. In: JOURNAL OF INTELLIGENT INFORMATION SYSTEMS 26(1) (2006), pp. 95–111. doi: 10.1007/s10844-006-5453-z.
16. [IEEE TOIT, 2002] Rosa Meo. “*Maximum Independence and Mutual Information*”. In: IEEE TRANSACTIONS ON INFORMATION THEORY 48 (2002), pp. 318–324. doi: 10.1109/18.971763.
url:<http://ieeexplore.ieee.org/Xplore/defdeny.jsp?url=/stamp/stamp.jsp?tp=x&arnumber=00971763&code=21>.
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17. [ACM TODS, 2000] Rosa Meo. “*Theory of Dependence Values*”. In: ACM TRANSACTIONS ON DATABASE SYSTEMS 25 (2000), pp. 380–406. doi: <http://doi.acm.org/10.1145/363951.363956>.
url: <http://portal.acm.org/citation.cfm?doid=363951.363956>.
Citations: Google Scholar: 52, SCOPUS: 23, WOS: 14
18. [DMKD, 1998] Rosa Meo, G. Psaila, and S. Ceri. “*An Extension to SQL for Mining Association Rules in SQL*”. In: DATA MINING AND KNOWLEDGE DISCOVERY 2 (1998), pp. 195–224. doi:10.1023/A:1009774406717.
url: <http://www.springerlink.com/content/157188431q027173/>.
Citations: Google Scholar: 196, SCOPUS: 109, WOS: 77

Signed
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