

Course Title

The role of AI in Modern Business Process Management

Teacher(s)

Vincenzo Pasquadibisceglie

Course Website (optional)

Code: -

Course description (min 150, max 300 words)

The course is part of the training activities promoted by the project FAIR - Future AI Research (PE000013) - spoke 6 "Symbiotic AI". The course aims to provide general concepts and specific examples as a sound basis for applying data analysis and AI techniques to improve the efficiency and effectiveness of process management by considering a symbiotic approach where human process stakeholders can understand, use and recycle AI knowledge for improving process management. During the course, students will acquire the necessary skills to use data as a strategic tool to better understand business processes (e.g. business and healthcare management processes, financial processes, manufacturing and maintenance processes) by using existing tools to extract and visualize process models from data, extract characteristics of processes (e.g. distribution of activities performed, users involved, variability of observed activity sequences, organization of users), monitor the conformity of running processes to expected models, identify and visualize anomalies. Students will learn to use data analysis software and libraries, such as PROM [1] or PM4PY [2], to explore, analyze and interpret process data.

[1] <https://promtools.org/>

[2] <https://pm4py.fit.fraunhofer.de/>

Course period

March-April 2025

SSD

ING-INF/05

Course References (optional)

[1] van der Aalst, W. M. P. (2016), *Process Mining: Data Science in Action*, Springer.

[2] van der Aalst, W.M.P., Carmona, J. *Process Mining Handbook*, Springer.

Credits and Hours

3 credits, 2 of lectures (16 hours) and one of practice (15 hour), for a total of 31 hours.

Exam Modality

Two alternatives are available to the student to pass this exam (Teacher(s) may choose other modalities):

1. Paper presentation. Students present the content of 1 paper suggested by the teacher. No groups are allowed.
2. Project. Students implement and experimentally validate an algorithm or its variation from a paper suggested by the teacher. Projects can be done in groups of 1-3 students, depending on the algorithm.

Teacher(s) CV

PERSONAL INFORMATION

Family name, First name: Pasquadibisceglie Vincenzo

Researcher unique identifier(s) ORCID: 0000-0002-7273-3882

Date of birth: 10.03.1992

Nationality: Italian

URL for web site: <https://persone.ict.uniba.it/rubrica/vincenzo.pasquadibisceglie>

• EDUCATION

- 03.03.2022 PhD in Computer Sciences and Mathematics.
2 Department of Computer Science, University of Bari Aldo Moro, Italy.
 PhD Supervisor: Annalisa Appice.
- 2015-201 Master's degree in Computer Science.
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 Department of Computer Science, University of Bari Aldo Moro, Italy.

• CURRENT POSITION(S)

- 27.02.2023 Current Position: RTDa – Assistant professor (non-tenure track) - FAIR - Future AI Research
26.02.2026 (PE00000013), Spoke 6 - Symbiotic AI (CUP H97G22000210007), under the NRRP MUR
 program funded by the NextGenerationEU.
 Department of Computer Science, University of Bari Aldo Moro, Italy.

• PREVIOUS POSITION(S)

- 02.02.2023 Position held: Occasional contract.
- 26.02.2023 Name of collaborators: Annalisa Appice.
 Topic: Predictive Process Monitoring – KOMETA – Knowledge Community for Efficient
 Training through Virtual Technologies, Azione 1.4 “Promozione di nuovi mercati per
 l’innovazione” – Avviso pubblico INNOLABS- approvato con A.D. n. 13 del 08/02/2017,
 A.D. n. 37 del 28/03/2017 e A.D. n. 43 del 10/04/2017, tipologia “Knowledge Community”).

Department/Institution: Department of Computer Science, University of Bari Aldo Moro, Italy.

06.12.2021 Position held: Research contract.

05.12.2022 Name of collaborators: Michelangelo Ceci, Donato Malerba.

Topic: Social media data acquisition and analysis - CounteR (European Project)- Privacy-First Situational Awareness Platform for Violent Terrorism and Crime Prediction, Counter

Radicalisation and Citizen Protection, (Grant ID:101021607), European Union's Horizon 2020.

Department/Institution: CINI Consorzio Interuniversitario Nazionale per l'Informatica, Italy.

- **FELLOWSHIPS AND AWARDS**

07.12.2018 PhD XXXIV cycle in Computer Science and Mathematics

07.12.2021 Scholarship of University of Bari Aldo Moro - PON RI 2014-2020

2019 Vision and Imaging Technology Award: Call for Demos - 9th International Conference on Imaging for Crime Detection and Prevention – ICDP 2019 16-18 December, London UK

2022 BPM 2022 Best Dissertation Award, Doctoral Consortium, and Demonstration & Resources Track – PhD thesis shortlist: <https://ceur-ws.org/Vol-3216/>

- **TEACHING ACTIVITIES (if applicable)**

- ***Data-centric AI: transforming raw data into smart data (31 hours) course period: November-December 2023) - PhD course***

link:http://dottorato.di.uniba.it/?XXXIX_Cycle%2C_starting_2023-2024___Study_Plan_and_Courses_2023-2025

- ***Analisi dei dati per la gestione dei processi (30 hours) course period: January February 2024) - Competenze Trasversali***

link:<https://www.uniba.it/it/didattica/competenze-trasversali/studenti-soggetti-esterni-e-tirocinanti/studenti-e-soggetti-esterni-schede/analisi-dei-dati-per-la-gestione-di-processi-2.pdf>

- ***Intelligenza artificiale basata sui dati (30 hours) course period: April-May 2024) - Competenze Trasversali - PhD course***

link:<https://www.uniba.it/it/didattica/competenze-trasversali/dottorandi-e-specializzandi/dottorandi-e-specializzandi-schede/intelligenza-artificiale-basata-sui-dati.pdf>

- **ORGANISATION OF SCIENTIFIC MEETINGS (if applicable)**

13.11.2023 Local organizer of 3rd International Joint Conference on

15.11.2023 Learning & Reasoning (IJCLR), Bari – Italy

<https://ijclr2023.di.uniba.it/~ijclr2023/organisers/index.html>

- **INSTITUTIONAL RESPONSIBILITIES (if applicable)**

Co-supervisor of n. 10 bachelor thesis in Computer Science at Department of Computer Science, University of Bari Aldo Moro.

Topics: Predictive Process Monitoring, Computational Intelligence, Computer Vision.

- **REVIEWING ACTIVITIES (if applicable)**

Vincenzo Pasquadibisceglie has been a reviewer for several international journals, such as Expert System with Applications, IEEE Transactions on Services Computing, Journal of Grid Computing, etc. and is a member of the program committee of international conferences. Below are the most recent activities:

2023 Program Committee Member: ICDE 2024 (core rank A*): 40th IEEE International Conference on Data Engineering, 2024, Netherlands

- 2023 Program Committee Member: ECML PKDD 2023 (core rank A) - European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases 2023, Turin, Italy
- 2022 Program Committee Member: ECML PKDD 2022 (core rank A) - European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases 2022, Grenoble, France

- **MEMBERSHIPS OF SCIENTIFIC SOCIETIES (if applicable)**

Member, IEEE TFPM - Task Force On Process Mining

- **MAJOR COLLABORATIONS (if applicable)**

07.11.2020 Name of collaborators: Prof. Wil van der Aalst - RWTH Aachen University.

06.05.2021 Topics: Process Discovery, Predictive Process Monitoring

Department/Institution: RWTH Aachen University - PADS Laboratory

(<https://www.pads.rwth-aachen.de/cms/~pnbx/PADS/lidx/1/>)

2019-2021 Name of collaborators: Eng. Giuseppe Modugno – MTM Project srl.

Topics: Predictive Process Monitoring

Department/Institution/Company: MTM Project srl, Monopoli (BA), Italy

(<https://www.mtmproject.com/>)

Teacher(s) Main Publications

List 10 main publications in the last 15 years for each teacher.

- DARWIN: An online deep learning approach to handle concept drifts in predictive process monitoring Pasquadibisceglie, V., Appice, A., Castellano, G., Malerba, D. *Engineering Applications of Artificial Intelligence*, 2023, 123, 106461
- STARDUST: A Novel Process Mining Approach to Discover Evolving Models From Trace Streams Pasquadibisceglie, V., Appice, A., Castellano, G., Fiorentino, N., Malerba, D. *IEEE Transactions on Services Computing*, 2023, 16(4), pp. 2970–2984
- TSUNAMI - an explainable PPM approach for customer churn prediction in evolving retail data environments Pasquadibisceglie, V., Appice, A., Ieva, G., Malerba, D. *Journal of Intelligent Information Systems*, 2023
- JARVIS: Joining Adversarial Training With Vision Transformers in Next-Activity Prediction Pasquadibisceglie, V., Appice, A., Castellano, G., Malerba, D. *IEEE Transactions on Services Computing*, 2023
- PROMISE: Coupling predictive process mining to process discovery Pasquadibisceglie, V., Appice, A., Castellano, G., van der Aalst, W. *Information Sciences*, 2022, 606, pp. 250–271
- A Multi-View Deep Learning Approach for Predictive Business Process Monitoring Pasquadibisceglie, V., Appice, A., Castellano, G., Malerba, D. *IEEE Transactions on Services Computing*, 2022, 15(4), pp. 2382–2395
- FOX: a neuro-Fuzzy model for process Outcome prediction and eXplanation
- Pasquadibisceglie, V., Castellano, G., Appice, A., Malerba, D. *Proceedings - 2021 3rd International Conference on Process Mining, ICPM 2021*, 2021, pp. 112–119
- Orange: Outcome-oriented predictive process monitoring based on image encoding and CNNs Pasquadibisceglie, V., Appice, A., Castellano, G., Malerba, D., Modugno, G. *IEEE Access*, 2020, 8, pp. 184073–184086, 9216173

- Using convolutional neural networks for predictive process analytics Pasquadibisceglie, V., Appice, A., Castellano, G., Malerba. *Proceedings - 2019 International Conference on Process Mining, ICPM 2019*, 2019, pp. 129–136, 8786066
- FISDeT: Fuzzy inference system development tool Castellano, G., Castiello, C., Pasquadibisceglie, V., Zaza, G. *International Journal of Computational Intelligence Systems*, 2017, 10(1), pp. 13–22