

Bardh Prenkaj
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Research experience

- 10/2022 – ongoing **Postdoctoral Researcher, Sapienza University of Rome**
Researching on Anomaly Detection and Counterfactual Explainability. I actively participate in e-health and anomaly detection interdisciplinary projects.
- 06/2023 – 09/2023 **Visiting Researcher, Technical University of Munich**
Visiting period at the [Responsible Data Science](#) research group with head prof. Kasneci, School of Social Sciences and Technology. Research on explainability in dynamic data landscapes and graph learning.
- 12/2021 – 09/2022 **Senior Research Fellow, Sapienza University of Rome (part-time)**
Coordinated research and implementation of innovative deep learning models to predict events in patient behavioral time series.
- 04/2021 – 06/2021 **Visiting PhD Student, George Mason University**
Visiting period at prof. Domeniconi's [Data Mining lab](#). I worked on deep learning applications in e-learning and learning analytics.
- 03/2020 – 12/2020 **Junior Researcher, George Mason University (remote)**
Worked alongside Dr Sarvari and prof. Domeniconi on boosting-based anomaly detection models.
- 07/2017 – 10/2018 **Student Research Assistant, Sapienza University of Rome**
Extended the [UCrawler](#) framework to cope with crawling and scraping content of research articles and citation graphs on DBLP and SemanticScholar. During this period, I also completed my master's thesis.

Other experience

- 07/2022 – ongoing **External Lecturer, Heimerer College (remote)**
I teach the [Bioinformatics](#) course. I designed the master's degree in Digital Healthcare addressed to students with engineering, healthcare, and social science backgrounds.
- 12/2021 – 06/2022 **Software Engineer, PwC Rome, (Digital Innovation Team)**
I focused on software prototyping and development activities. In particular, I optimized back-end services and developed highly-maintainable and efficient API services.
- 09/2020 – 03/2021 **Senior Software Consultant, E Software Solutions (remote)**
I designed and maintained the CMS for electric vehicle leasing in the UK (<https://gridserve.com/>).

Honors and awards

- 03/2023 **Subject Expert** ("Cultore della Materia" Art. 42 del R.D. 04/06/1938, n.1269)
Award for highly-skilled researcher and technician on *Deep Neural Networks* course in MS Computer Science, Department of Information Engineering, Computer Science, and Mathematics at University of L'Aquila.
- 11/2021 **Scholarship in AI & Computer Science**
Winner of the BS-S 6/2021 Open Competition published on September 15th 2021 (num: 1207, rep: 326, class: VII/1) on research project "000090 19 RS VELA RDI - RICERCA ATENEO 2019 - MEDI PROGETTI-VELARDI (Responsabile Scientifico, VELARDI P)".
- 05/2020 **Scholarship in AI**
Winner of the Avvio alla Ricerca 2020 – Tipo I, prot. Num: AR120172A8B35EEA on the research project "*Personalized e-Learning Solutions to Improve the Efficacy of Learning Outcomes in Computer Science e-Courses*". I devised an autonomous model to detect students prone to drop out of university in online computer science courses, and provide them with personalized feedback and learning pathways to support their academic journey.
- 03/2017 **Graduation Prize**
[Winner](#) of the Premio di Laurea distributed from LazioDiSU, Ente per il Diritto agli Studi Universitari nel Lazio

num: 899, grade: 110/110. Sum: € 2,559.18

09/2013 – 10/2018

Merit Scholarship in Computer Science

Winner of the LazioDiSU Study Scholarship for B.Sc. (3 years) and M.Sc. (2 years). Yearly sum: € 5,118.36

Schooling

11/2018 – 02/2022

PhD in Computer Science, Sapienza University of Rome (*Graduated very good/excellent*)

01/2017 – 10/2018

M.Sc. in Computer Science, Sapienza University of Rome (*Graduated 110/110 cum laude*)

09/2013 – 12/2016

B.Sc. in Computer Science, Sapienza University of Rome (*Graduated 110/110*)

Invited talks & tutorials

21/02/2024

Digging into the Landscape of Graphs Counterfactual Explainability ([Website](#))

Quarter-day (105 min) Lab session at the 38th Annual AAAI Conference on Artificial Intelligence (AAAI'24), February 20-27, 2024, Vancouver, Canada.

21/02/2024

Graphs Counterfactual Explainability: A Comprehensive Landscape ([Website](#))

Quarter-day (105 min) Tutorial at the 38th Annual AAAI Conference on Artificial Intelligence (AAAI'24), February 20-27, 2024, Vancouver, Canada.

25/05/2023

Hands-on: Building Convolutional Neural Networks and Optimizing them to Recognize Handwritten Digits

Practical session in the course *Deep Neural Networks* in M.Sc. in Computer Science
University of L'Aquila, L'Aquila, Italy.

12/06/2022

Explaining Anomalies in Patient Daily Behavior Profiles ([Slides](#))

PhD Internal Colloquium, Martin-Luther University of Halle-Wittenberg,
Universitätsklinikum Halle (Saale), Germany.

19/10/2020

Challenges and Solutions to the Student Dropout Prediction Problem in Online Courses ([Slides](#), [Teaser](#))

Half-day (4h) Tutorial at the 29th ACM International Conference on Information and Knowledge Management (CIKM'20), October 19-23, 2020, Galway, Ireland.

Presentations in conferences

04/10/2023

Multimodal Motion Conditioned Diffusion Model for Skeleton-based Video Anomaly Detection

ICCV'23, Paris, France, [Video Presentation](#)

18/10/2022

Plotly.plus, an Improved Dataset for Visualization Recommendation

CIKM'22, Atlanta, Georgia, USA, [Video Presentation](#)

23/03/2021

CoRoNNa: a deep sequential framework to predict epidemic spread

SAC'21, Seoul, South Korea, [Video Presentation](#), [Slides](#)

20/10/2020

A reproducibility study of deep and surface machine learning methods for human-related trajectory

prediction, CIKM'20, Galway, Ireland, [Video Presentation](#), [Slides](#)

12/09/2017

A smart peephole on the cloud

ICIAP'17, Catania, Italy, [Slides](#)

Courses taught

2022/23 – current

Bioinformatics (6 ECTS, Main Lecturer)

M.Sc. in Medical Laboratory Sciences
Faculty of Health Sciences and Nursing
Heimerer College, Pristina, Kosovo

2022/23 – current

Machine Learning (6 ECTS, Teaching Assistant)

M.Sc. in Computer Science,
Faculty of Information Engineering, Computer Science and Statistics
Sapienza University of Rome, Rome, Italy

2022/23

Algorithms (8 ECTS, Teaching Assistant)

B.Sc. in Management and Computer Science

Department of Business and Management
Luiss Guido Carli, Rome, Italy

2018/19, 2019/20 *Web and Social Information Extraction* (6 ECTS, co-teaching with prof. Stilo)
M.Sc. in Computer Science
Faculty of Information Engineering, Computer Science and Statistics
Sapienza University of Rome, Rome, Italy

2018/19 *Social and Behavioural Networks* (6 ECTS, co-teaching with prof. Stilo)
M.Sc. in Data Science
Faculty of Information Engineering, Computer Science and Statistics
Sapienza University of Rome, Rome, Italy

Funded projects

- 2022 – ongoing **E-DAI**: Digital ecosystem for integrated analysis of heterogeneous health data relating to high-impact Pathologies: an innovative model of assistance and research. This work is funded under Piano Operativo Salute (POS) 2014-2020. CUP: B83C22004150001.
Funds: € 2,380,000.00
My role: Component
- 2021 – 2022 **SI4SI**: Smart Intervention for Senior Isolation. This work is funded under AAL Programme 2020
Funds: € 1,745,125.00
My role: Component
Description: The project aims to combat social isolation in elderly individuals by developing an integrated care model with technological solutions. Two pilots involving 40 users in Italy and Romania are being conducted to validate the impact of these solutions.
- 2020 – 2021 **E-Linus**: This work is supported by POR FESR Lazio 2014-2020, Avviso Pubblico “Emergenza Coronavirus e oltre”.
Funds: € 504,523.00
My role: Component (Team Lead)
Description: The project focuses on addressing social isolation in seniors by using IoT devices to detect symptomatic behaviors, providing home care, and facilitating emotional connections with family members.
- 2020 – 2021 **PersonalSDP**: Personalised e-Learning Solutions to improve the Efficacy of Learning Outcomes in Computer Science e-Courses
Funds: € 1,000.00
My role: Principal Investigator (PI)
Description: The main aim of this project is to predict dropout students from online computer science courses, and provide them with personalised feedback and learning pathways to support their academic journey. *This work was supported by Avvio alla Ricerca 2020 – Tipo I, protocol number AR120172A8B35EEA*

Relevant publications for the Digital Health & Medical interdisciplinary area

- [1] [Prenkaj](#), Velardi. *Unsupervised Detection of Behavioural Drifts with Dynamic Clustering and Trajectory Analysis*. IEEE Transactions of Knowledge and Data Engineering, 2023. doi: 10.1109/TKDE.2023.3320184. Rank: **Q1**
- [2] Prado-Romero, [Prenkaj](#), Stilo, Giannotti. *A Survey on Graph Counterfactual Explanations: Definitions, Methods, Evaluation*. In ACM Computing Surveys (CSUR), Special Issue on Trustworthy AI, 2023. Rank: **Q1**
- [3] Prado-Romero, [Prenkaj](#), Stilo. *Developing and Evaluating Graph Counterfactual Explanation with GRETEL*. In Proceedings of the 16th ACM International Conference on Web Search and Data Mining (WSDM’23). 2023. Rank: **A***
- [4] [Prenkaj](#), Aragona, Flaborea, Galasso, Gravina, Podo, Reda, Velardi. *A Self-Supervised Algorithm to Detect Signs of Social Isolation in the Elderly from Daily Activity Sequences*. In Artificial Intelligence in Medicine 135: 102454 (2023). Rank: **Q1**
- [5] Flaborea, [Prenkaj](#), Munjal, Sterpa, Aragona, Podo, Galasso. *Are we certain it’s anomalous?*. In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (CVPR’23), pp. 2896-2906. Rank: **A***

Other publications

- [6] Flaborea, Collorone, D'Amely, D'Arrigo, Prenkaj, Galasso. *Multimodal Motion Conditioned Diffusion Model for Skeleton-based Video Anomaly Detection*. In Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV'23). Rank: **A***
- [7] Prenkaj, Villaizan-Vallelado, Leemann, Kasneci. *Adapting to Change: Robust Counterfactual Explanations in Dynamic Data Landscapes*. arXiv preprint arXiv:2308.02353. 2023 Aug 4. Accepted at DynXAI Workshop at the European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML-PKDD'24). Rank: **A**
- [8] Prado-Romero, Prenkaj, Stilo. *Revisiting CounteRGAN for Counterfactual Explainability of Graphs*. The First Tiny Paper Track at ICLR 2023, 2023. Rank: **A***
- [9] Prenkaj, Velardi, Stilo, Distanto, Faralli. *A Survey of Machine Learning Approaches for Student Dropout Prediction in Online Courses*. In ACM Computing Surveys (CSUR), 53(3): 57:1-57:34, 2021. Rank: **Q1**
- [10] Prado-Romero, Prenkaj, Stilo, Celi, Estevanell-Valladares, Pérez. *Ensemble Approaches for Graph Counterfactual Explanations*. In International Conference of the Italian Association for Artificial Intelligence (AI* IA) Workshop 2022 (pp. 88-97).
- [11] Prenkaj, Distanto, Faralli, Velardi. *Hidden space deep sequential risk prediction on student trajectories*. Future Generation Computer Systems. 2021 Dec 1;125:532-43. Rank: **Q1**
- [12] Sarvari, Domeniconi, Prenkaj, Stilo. *Unsupervised boosting-based autoencoder ensembles for outlier detection*. In Pacific-Asia Conference on Knowledge Discovery and Data Mining 2021 May 9 (pp. 91-103). Rank: **A**
- [13] Aragona, Podo, Prenkaj, Velardi. *CoRoNNA: a deep sequential framework to predict epidemic spread*. In Proceedings of the 36th Annual ACM Symposium on Applied Computing 2021 Mar 22 (pp. 10-17). Rank: **B**
- [14] Prenkaj, Stilo, Madeddu. *Challenges and solutions to the student dropout prediction problem in online courses*. In Proceedings of the 29th ACM International Conference on Information & Knowledge Management 2020 (CIKM'20) Oct 19 (pp. 3513-3514). Rank: **A**
- [15] Prenkaj, Velardi, Distanto, Faralli. *A reproducibility study of deep and surface machine learning methods for human-related trajectory prediction*. In Proceedings of the 29th ACM International Conference on Information & Knowledge Management (CIKM'20) 2020 Oct 19 (pp. 2169-2172). Rank: **A**
- [16] Prenkaj, Velardi, Stilo, Distanto, Faralli. *A survey of machine learning approaches for student dropout prediction in online courses*. ACM Computing Surveys (CSUR). 2020 May 28;53(3):1-34. Rank: **Q1**
- [17] Coletta, De Marsico, Panizzi, Prenkaj, Silvestri. *MIMOSE: multimodal interaction for music orchestration sheet editors: An integrable multimodal music editor interaction system*. Multimedia Tools and Applications. 2019 Dec;78:33041-68. Rank: **Q1**
- [18] De Marsico, Nemmi, Prenkaj, Saturni. *House in the (biometric) cloud: a possible application*. IEEE Cloud Computing. 2018 Aug 14;5(4):58-69. Rank: **Q1**
- [19] De Marsico, Nemmi, Prenkaj, Saturni. *A smart peephole on the cloud*. In New Trends in Image Analysis and Processing—ICIAP 2017: ICIAP International Workshops, WBICV, SSPandBE, 3AS, RGBD, NIVAR, IWBAAS, and MADiMa 2017, Catania, Italy, September 11-15, 2017 (pp. 364-374). Rank: **B**