PERSONAL INFORMATION

Bardh Prenkaj

PERSONAL STATEMENT

As an AI researcher with over 5 years of applied experience in generative AI, computer vision, deep learning, and anomaly detection, I specialize in explainability within critical domains. Holding a PhD in Computer Science, I have led impactful projects across both academic and industrial settings. My current research focuses on multimodal video understanding and action anticipation, aimed at improving how AI systems predict actions in complex scenarios. A core component of my work is the integration of large language models (LLMs) to make black-box decisions more interpretable for end-users. With a strong passion for bridging the gap between AI decision-making and human comprehension, particularly in high-stakes applications, I have developed robust software engineering skills. Proficient in Python, Pytorch, and Git for CI/CD pipelines, I am adept at delivering high quality, maintainable code. I am eager to apply my expertise in deep learning and explainability systems to contribute to groundbreaking research and development efforts.

RESEARCH EXPERIENCE

04/2024 – 03/2026

Postdoctoral Researcher (Visiting)

Chair for Responsible Data Science, Technical University of Munich

- Conducted research on Explainability (ICML'25a, ECML-PKDD'24, XAI'24) and Shortcut Identification (AAAI'25, ICML'25b)
- Coordinated projects in Video Action Anticipation (ECCV'24), to semantically guide video representations through relative language representations.
- Won personal grant on *"Game-Theoretic Counterfactual Explainability for Ethical and Transparent AI in Society"* supported by the Friedrich Schiedel Fellowship. This project tackles the dilemma of human-readability in counterfactual explanations in critical domains such as healthcare.

10/2022 – 01/2026

Postdoctoral Researcher

Computer Science Department, Sapienza University of Rome

- Conducted research on Data Stream Anomaly Detection (TKDE'23, AIM'23) and Explainability on Graph Learning (CSUR'23, AAAI'24, KDD'25).
- Built GRETEL, the first graph counterfactual explainability modular framework, implemented using the Object-Oriented paradigm and the Factory Method design pattern. Demo paper in WSDM'23.
- Co-PI of a regional Italian project in AI for Healthcare (@HOME), specifically in anomaly detection in daily routines of neurodegenerative patients.
- Co-coordinated several projects on Motion Anomaly Detection with Diffusion Models (ICCV'23), LLM-based Visualization Recommender Systems (TVCG'23), Foundation Models for Times Series Anomalies (arXiv'24).

06/2023 – 09/2023

Visiting Researcher

Chair of Responsible Data Science, Technical University of Munich

- Visiting period at the Responsible Data Science research group. Conducted research on explainability in dynamic data landscapes and graph learning. Workshop paper in DynXAI@ECML-PKDD'23.

12/2021 – 09/2022

Senior Research Fellow

Computer Science Department, Sapienza University of Rome

- Coordinated the research and implementation of innovative deep learning models to predict events in patient behavioral time series as a team lead in the regional Italian project E-Linus.
- Deployed bespoke per-patient models on Amazon Lightsail and exposed API end-points to facilitate interaction with other project components.

04/2021 – 06/2021

Visiting PhD Student

George Mason University, Fairfax (VA), USA

- Visiting period at prof. Domeniconi's Data Mining lab and worked alongside Dr Sarvari on boosting-based anomaly detection models (PAKDD'21).

07/2017 – 10/2018

Student Research Assistant

Computer Science Department, 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

12/2021 – 06/2022

Software Engineer

Pricewaterhouse Coopers (PwC) Rome, Digital Innovation Team

- 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 *(freelance)*

E-Software Solutions

- Designed and maintained the CMS for electric vehicle leasing in the UK (https://gridserve.com/).

EDUCATION

11/2018 – 02/2022

PhD in Computer Science

Sapienza University of Rome, Italy

- Thesis: "Latent Deep Sequential Learning of Behavioral Sequences"

01/2017 – 10/2018

MSc in Computer Science

Sapienza University of Rome, Italy

- Thesis: "Time-aware Topic Detection and Anomaly Classification in a Multi-layer Network"
- Graduated at top 1% of the class (110/110 cum laude)

09/2013 – 12/2016

BSc in Computer Science

Sapienza University of Rome, Italy

- Thesis: ""Automatic Detection of Online News Focus"
- Graduated at top 1% of the class (110/110)

PERSONAL SKILLS

Mothertongue: Albanian

Other languages

	UNDERSTANDING		SPEAKING		WRITING
	Ascolto	Lettura	Interazione	Produzione orale	
Italian	C2	C2	C2	C2	C2

	All education done in Italian				
English	C2	C2	C1	C1	C1
	My entire career is based on writing scientific articles in English				

Driver's license B

ADDITIONAL INFORMATION

Funded Projects

Game-Theoretic Counterfactual Explainability for Ethical and Transparent AI in Society (01/04/2025 – 31/03/2026) - This project creates a game-theoretic framework for counterfactual explainability to make AI systems more transparent, fair, and trustworthy in critical areas like healthcare, finance, and law. By combining game theory, machine learning, and causal reasoning, it delivers tools and LLM-based interpreters that generate understandable AI explanations, support ethical deployment, and engage the public through real-world applications and workshops.

- My role: Principal Investigator (**PI**)
- Funds: € 20,000.00

@HOME (01/11/2023 – 31/05/2025) - AI and IoT based solutions for HOme care Monitoring of the Elderly - This work is funded under Riposizionamento Competitivo RSI Programma Regionale – FESR Lazio 2021-2027. CUP: F89J23001050007

- My role: co-Principal Investigator (**co-PI**)
- Funds: € 109, 563.72

E-Linus (01/11/2020 – 30/11/2021) - 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 aims to identify social isolation, improve levels of home care, intervene with human interactions and AI devices, and foster emotional relationships with family members. It is an Active & Independent Living solution that operates through a network of noninvasive IoT devices, identifies symptomatic behaviors, and activates care-giving protocols and services via an App for professional and family caregivers.

PersonalSDP (13/10/2020 – 30/11/2021) - Personalized 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 1, protocol number AR120172A8B35EEA

Selected Publications

- Prenkaj*, Zaradoukas*, Kasneci. Graph Inverse Style Transfer for Counterfactual Explainability. In the International Conference on Machine Learning (ICML’25). 2025. Rank: **A***
- Prenkaj, Villaizán-Vallelado, Leemann, Kasneci. Unifying Evolution, Explanation, and Discernment: A Generative Approach for Dynamic Graph Counterfactuals. In Proceedings of the 30th ACM SIGKDD Conference on Knowledge Discovery and Data Mining 2024 (KDD’24) Aug 25 (pp. 2420-2431). Rank: **A***
- Prado-Romero*, Prenkaj*, Stilo. Robust Stochastic Graph Generator for Counterfactual Explanations. In the 38th Annual AAAI Conference on Artificial Intelligence (AAAI’24). 2024. Rank: **A***
- 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**
- 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**
- Diko A, Avola D*, Prenkaj B*, Fontana F, Cinque L. Semantically Guided Representation Learning For Action Anticipation. arXiv preprint arXiv:2407.02309. 2024 Jul 2. (accepted in ECCV’24). Rank: **A***

Dati personali

Autorizzo il trattamento dei miei dati personali ai sensi del Decreto Legislativo 30 giugno 2003, n. 196 "Codice in materia di protezione dei dati personali”.