Leonardo Peroni

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I focus on video streaming systems, aiming to integrate machine learning methodologies to improve *networking performance* and enhance the *quality of experience*, with a particular emphasis on data analysis, statistical methods, and human-centered insights.

Professional Experience

Research assistant Mar. 2020 – Sep. 2024
IMDEA Networks Institute *Madrid Spain*

- Worked extensively in video streaming by (1) developing a framework for personalized QoE models, (2) implementing a mechanism for communicating stall duration from users to ISPs, (3) analyzing and implementing QoE models, (4) conducting crowdsourced subjective assessments, (5) generating and analyzing QoE datasets, (6) implementing and comparing ABR algorithms in simulation and emulation, and (7) experimenting with various codecs.
- Worked extensively with machine learning by implementing, evaluating, and comparing off-the-shelf algorithms, such as SVM, RF, XGBoost, CNN, and LSTM as well as custom algorithms, across different learning paradigms including supervised, active, and reinforcement learning.
- Assisted in drafting a European project proposal on immersive multimedia.

Technology consultant Sep. 2018 – Feb. 2020
Hesplora s.r.l. *Florence Italy*

- Contributed to the Acqua4.0 project, enhancing pipeline loss risk prediction in Tuscany by (1) creating custom risk metrics through expert insights and historical data, (2) processing diverse unstructured data (DEM, lithology, SAR interferometry), and (3) applying unsupervised learning techniques like k-means, DBSCAN, and PCA.
- Contributed to the Apollon project on environmental pollution monitoring in Apulia, assisting in (1) implementing a cloud-based IoT platform for indoor pollution tracking with AWS IoT Core, and (2) processing and storing device data in JSON format via HTTP, using AWS Lambda and DynamoDB.
- Contributed to process mining projects by analyzing, modeling, and identifying bottlenecks in business processes across various sectors, using process discovery tools and statistical analysis.
- Supported the IT department of the Italian Postal Service by conducting quantitative analysis, visualizing, and managing physical asset data, using spreadsheets and VB macros for task automation.

Education

University Carlos III of Madrid Nov. 2020 – Feb. 2025 (expected)
Ph.D., Telematic Engineering *Madrid Spain*
Provisional thesis title: User Empowerment in Adaptive Video Streaming over Best-Effort Networks

Polytechnic University of Turin Oct. 2015 – Apr. 2018
M.Sc., Mechatronic Engineering *Turin Italy - 110L/110*
Thesis: Machine learning framework for classification of mild cognitive impairment and high resolution multispectral-multitemporal satellite images

The Sapienza University of Rome Sep. 2011 – May. 2015
B.Sc., Informatic and Automatic Engineering *Rome Italy - 110L/110*
Thesis: Lab-on-chip integrated systems for thermal control in biomolecular analysis

Journal Publications

[2] **L. Peroni** and, S. Gorinsky **"An End-to-End Pipeline Perspective on Video Streaming in Best-Effort Networks: A Survey and Tutorial"**, *arXiv*, preprint arXiv:2403.05192, September 2024 *(Under submission to a journal)*

[1] **L. Peroni**, S. Gorinsky, F. Tashtarian, and C. Timmerer, **"Empowerment of Atypical Viewers via Low-Effort Personalized Modeling of Video Streaming Quality"**, *Proceedings of the ACM on Networking*, 1(CoNEXT3), pp. 1-27, December 2023

Conference Publications

[4] **L. Peroni**, S. Gorinsky, and F. Tashtarian, **"In-Band Quality Notification from Users to ISPs"**, *IEEE CloudNet 2024*, pp. 332-338, Rio de Janeiro, Brazil, November 2024

[3] **L. Peroni** and S. Gorinsky, **"Quality of Experience in Video Streaming: Status Quo, Pitfalls, and Guidelines"**, *COMSNETS 2024*, pp. 1-10, Bengaluru, India, January 2024

[2] **L. Peroni**, S. Gorinsky, F. Tashtarian, and C. Timmerer, **"Empowerment of Atypical Viewers via Low-Effort Personalized Modeling of Video Streaming Quality"**, *ACM CoNEXT 2023* (published as journal article [1] in the Proceedings of the ACM on Networking), pp. 1-27, Paris, France, December 2023

[1] A. Khaliq, **L. Peroni**, and M. Chiaberge, **"Land cover and crop classification using multi-temporal sentinel-2 images based on crops phenological cycle"**, *IEEE EESMS 2018*, pp. 1–5, Salerno, Italy, June 2018

International Experiences

Visiting Research Student Mar. 2023 – Aug. 2023
Korea Advanced Institute of Science & Technology (KAIST) *Daejeon, South Korea*

Erasmus Extra UE Sep. 2016 – Feb. 2017
Beihang University *Beijing, China*

English 4 U PET certification Jul. 2010 – Jul. 2010
Sprachcaffe Languages Plus *Brighton, United Kingdom*

Awards & Honors

Available, Functional, and Reproduced ACM Artifact Badges Dec. 2023
for paper "Empowerment of Atypical Viewers via Low-Effort Personalized Modeling of Video Streaming Quality", among three papers selected for presentation in the artifacts session, *ACM CoNEXT 2023*

Talks

Empowerment of Atypical Viewers via Low-Effort Personalized Modeling of Video Streaming Quality Dec. 2023
Paris, France
ACM CoNext *Madrid, Spain*
IMDEA-UC3M Research Seminar Series

Video-streaming research: an end-to-end pipeline perspective Dec. 2021
IMDEA-UC3M Research Seminar Series *Madrid, Spain*

Grants

SIGCOMM Travel Grant Aug. 2022
SIGCOMM *Amsterdam, Netherlands*

Professional Activities

ACM MM Oct. 2024
Reviewer, Melbourne Convention and Exhibition Centre *Melbourne, Australia*
IEEE SECON Sep. 2023
Volunteer, University Carlos III of Madrid *Madrid, Spain*
IEEE ICNP Oct. 2020
Volunteer, IMDEA Networks Institute *Madrid, Spain*

Language Skills

Italian: mother tongue, **English:** fluent, **Spanish:** fluent, **Chinese:** very basic

Computer Skills

Programming languages: Python, JavaScript, Matlab & Simulink, Java, SQL
Video tools: FFmpeg, GPAC, dash.js
Video compression standards: AVC, HEVC, LCEVC
Protocols: MPEG-DASH, WebRTC, QUIC, RTMP, HTTP, TCP
Python ML/DL libraries: Tensorflow, Keras, Scikit-learn, Pytorch
AWS Platform: EC2, IoT Core, Lambda, Dynamo db, MTurk, DeepLens, Rekognition
Geospatial data analysis tools: Qgis, Snap
Process mining tools: Disco, Apromore, Prom
Others: Git, Wireshark, Gurobi