Samy-Melwan Vilhes

vilhess | samy-melwan-vilhes | vilhess.github.io |
samy-melwan.vilhes@insa-rouen.fr |

Summary

PhD student at the LITIS Lab, INSA Rouen Normandie (France), working on time-series anomaly detection, forecasting, and foundation models for zero-shot forecasting. Strong mathematical background: B.Sc. in Mathematics and M.Sc. in Mathematics & Artificial Intelligence from Université Paris-Saclay.

Work Experience

PhD in Machine Learning, LITIS Lab – INSA Rouen November 2024 - present

Research on deep-learning methods for time series: implementation and benchmarking of state-of-the-art approaches for anomaly detection and forecasting; development of foundation models for zero-shot forecasting.

Teaching Assistant: Signal Processing and Data Analysis for 3rd-year engineering students.

AI Research Intern at Thales April 2024 - September 2024

Researched the Neural Tangent Kernel as a training-free metric for neural architecture search; evaluated and compared search strategies for efficient architecture exploration.

AI Engineer Intern at AZAP March 2023 - August 2023

Implemented and benchmarked machine-learning models (best: gradient boosting) to forecast sales of promoted products; focused on uncertainty analysis to improve forecast reliability.

Publications

Vilhes, Samy-Melwan (2024). "Understanding Neural Tangent Kernel : Key Theories and Experimental Insights". URL: https://normandie-univ.hal.science/hal-04784111.

Vilhes, Samy-Melwan et al. (2025). "PatchTrAD: A Patch-Based Transformer focusing on Patch-Wise Reconstruction Error for Time Series Anomaly Detection". In: *EUSIPCO 2025*. URL: https://arxiv.org/abs/2504.08827.

Vilhes, Samy-Melwan (2026). *PatchFM: A Patch-Based Foundation Model for Zero-Shot Time-Series Forecasting*. Open-source foundation model; model card. URL: https://github.com/vilhess/PatchFM.

Vilhes, Samy-Melwan et al. (2026). "Does Normalization Choice Matter for Causal Large Time-Series Models?" In: *1st ICLR Workshop on Time Series in the Age of Large Models*. Spotlight. URL: https://openreview.net/forum?id=lMNWBnFHxt.

Education

2024 - present PhD in Deep Learning for Time-Series Anomaly Detection & Forecasting at **LITIS Lab, INSA Rouen Normandie**

2022 - 2024 Master's Degree in Mathematics and Artificial Intelligence at **Université Paris-Saclay** *jointly run by Paris-Saclay (Orsay Mathematics) and CentraleSupélec, with support from SaclAI-School.*

2019 - 2022 Bachelor's Degree in Mathematics at **Université Paris-Saclay**

Skills

High-performance computing	familiar with HPC infrastructure (e.g. Jean Zay, CNRS; CRIANN, Normandie).
Mid-scale models	experience training models up to ∼500M parameters.
Mathematics	solid understanding of the mathematical foundations of deep learning.
Python / PyTorch	comfortable implementing a range of deep-learning architectures.

Summer Schools & Conferences

ICLR 2026	Presented my spotlight paper in a 5-minute talk and a poster session at the *Time Series in the Age of Large Models* workshop.
EUSIPCO 2025	Rank B international conference where I presented *PatchTrAD* in a 15-minute talk. Slides
Hi! Paris Summer School 2025	Hosted at École Polytechnique, Paris, with a poster session on *PatchTrAD*. Poster
Deep Learning on Jean Zay 2025	Intensive HPC training (IDRIS / CNRS) on optimising deep-learning models: multi-GPU / multi-node training, mixed precision, large-batch strategies and performance profiling.

Languages

French	native speaker.
English	professional working proficiency.