Willian Tessaro Lunardi

AI Lead Researcher at TII

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Education

- **University of Luxembourg** — Luxembourg, Luxembourg
  Doctor of Philosophy in Computer Science — 2016 – 2020
- **PUC of Rio Grande do Sul** — RS, Brazil
  Master of Science in Computer Science — 2014 – 2016
- **University of Passo Fundo** — RS, Brazil
  Bachelor of Science in Computer Science — 2010 – 2014

Experience

- **Technology Innovation Institute**, *Lead Researcher* — Abu Dhabi, UAE, Jan 2022 - Present
  - Developed contrastive learning methods for out-of-distribution detection, aiding unsupervised classifiers like OCSVM and KDE.
  - Developed adversarial training enhancing autoencoder performance for network anomaly detection on embedded devices.
  - Formulated voice recognition solutions using contrastive learning and spectrograms, improving accuracy on audio datasets.
  - Engaged in DL research applying one-class classification to images, audio, and time series.
- **University of Luxembourg**, *Research Associate* — Luxembourg, Luxembourg, Jun 2020 - Jan 2022
  - Developed Neural Combinatorial Optimization strategies using graph networks and reinforcement learning.
  - Developed metaheuristics for vehicle routing, optimizing routing and scheduling with coverage and energy constraints.
  - Deployed scheduling and routing algorithms in C++ for a European company, boosting operational efficiency.
  - Developed an out-of-distribution detection methods for predictive maintenance using autoencoders.
- **University of Luxembourg**, *Doctoral Researcher* — Luxembourg, Luxembourg, Jun 2016 - Jun 2020
  - Developed MILP and CP models for industrial scheduling, addressing complex availability, overlapping, and setup constraints.
  - Developed novel hybrid neighborhood functions and global metaheuristics, achieving SOTA results in the FJSP problem.
  - Developed SOTA optimization algorithms, validated by publications in 10+ international conferences and journals.
  - Collaborated IBM Paris implementing models in real-world settings, enhancing production and revenue.

Latest Publications

- W. T. Lunardi, M. A. Lopez, and J.-P. Giacalone, "ARCADE: Adversarially Regularized Convolutional Autoencoder for Network Anomaly Detection," *IEEE Transactions on Network and Service Management*, 2022, [Link]
- W. T. Lunardi, E. G. Birgin, D. P. Ronconi, *et al.*, "Metaheuristics for the Online Printing Shop Scheduling Problem," *European Journal of Operational Research*, vol. 293, no. 2, pp. 419–441, 2021, [Link]
- W. T. Lunardi, E. G. Birgin, P. Laborie, *et al.*, "Mixed Integer Linear Programming and Constraint Programming Models for the Online Printing Shop Scheduling Problem," *Computers & Operations Research*, vol. 123, p. 105 020, 2020, [Link]

Research Interests

Machine Learning, Deep Learning, Out-of-Distribution Detection, Optimization, Operations Research, Representation Learning, Generative AI, Self-supervised Learning, Unsupervised Learning, Reinforcement Learning

Skills

- **Languages:** Python, C++, Javascript, C#, and Java.
- **Frameworks:** PyTorch, Scikit-learn, SciPy, Numpy, Pandas, among others.
- **Others:** OpenMP, Boost (C++), Unity 3D (C#), p5js (JS), processing (Java).

Additional Information

- **Dual Citizenship:** Brazil and Italy.
- **Languages:** Portuguese (native), English (fluent), Spanish (basic), and Italian (basic).