Héber Hwang Arcolezi

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Postdoctoral researcher with expertise in data privacy and privacy-preserving machine learning. I am passionate about research and committed to the creation and development of high-quality solutions.

Education

2019 – 2022	**Ph.D. in Computer Science:** University Bourgogne Franche-Comté (UBFC), France. **Research:** Production of Categorical Data Verifying Differential Privacy: Conception and Applications to Machine Learning [link]. **Funding:** CADRAN project, Region Bourgogne Franche-Comté.
2017 – 2019	**M.Eng. in Electrical Engineering:** São Paulo State University (UNESP), Brazil. **Research:** A Novel Robust and Intelligent Control Based Approach for Human Lower Limb Rehabilitation via Neuromuscular Electrical Stimulation [link]. **Funding:** Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES).
2012 – 2017	**B.Eng. in Electrical Engineering:** Mato Grosso State University (UNEMAT), Brazil. **Research:** Um Estudo Complementar ao Projeto de Controle PID no Caso do Pêndulo Invertido (in Portuguese) [link]. **Funding:** UNEMAT Grant.

Work Experience

2022-02 - **Present**	**Postdoctoral Researcher at Comète team - Inria, LIX:** Research on local differential privacy, machine learning privacy, and machine learning fairness, hosted by DR1 C. Palamidessi.
2022-10 - 2022-12	**Visiting Researcher at The University of British Columbia (UBC):** Research on local differential privacy auditing, hosted by Pr. M. Lecuyer and Pr. S. Gambs.
2022-04 - 2022-06	**Teaching Assistant on Introduction to Computer Science with Java at École Polytechnique:** Assist students enrolled in the discipline and evaluate students' tests.
2022-01 - 2022/01	**Visiting Ph.D. Student at Universidade Federal de Minas Gerais (UFMG):** Investigation of machine learning solutions for applications in medicine, hosted by Pr. L.L. Cisneros.
2021-11 - 2021-12	**Visiting Ph.D. Student at Université du Québec à Montréal (UQAM):** Research on privacy-preserving data analytics with local differential privacy, hosted by Pr. S. Gambs.
2021-03 - 2021-05	**Teacher at Workshop on Privacy for IoT at Master IoT UBFC:** Theory and practical methods of anonymization for students of Master 1.
2020-11 - 2020-12	**Teacher at Workshop on Privacy for IoT at Master IoT UBFC:** Theory and practical methods of anonymization for students of Master 2.

Selected Publications

2023	On the Risks of Collecting Multidimensional Data Under Local Differential Privacy. International Conference on Very Large Data Bases (**rank A***).
2023	Frequency Estimation of Evolving Data Under Local Differential Privacy. International Conference on Extending Database Technology (**rank A**).
2022	Multi-Freq-LDPy: Multiple Frequency Estimation Under Local Differential Privacy in Python. European Symposium on Research in Computer Security (**rank A**).

2022	[Privacy-Preserving Prediction of Victim's Mortality and Their Need for Transportation to Health Facilities](). IEEE Transactions on Industrial Informatics (**impact factor 11.64**).
2022	[Improving the Utility of Locally Differentially Private Protocols for Longitudinal and Multidimensional Frequency Estimates](). Dig. Communications & Networks (**impact factor 6.34**).
2022	[Differentially private multivariate time series forecasting of aggregated human mobility with deep learning: Input or gradient perturbation?]() Neural Comput & Applic (**impact factor 5.10**).
2021	[Random Sampling Plus Fake Data: Multidimensional Frequency Estimates With Local Differential Privacy](). Int. Conference on Information and Knowledge Management (**rank A**).
2021	[Machine learning-based forecasting of firemen ambulances' turnaround time in hospitals, considering the COVID-19 impact](). Applied Soft Computing (**impact factor 8.26**).

Software

Python	Multiple Frequency Estimation Under Local Differential Privacy in Python: [multi-freq-ldpy](). MIT License, [GitHub]().

Expertise

Privacy-Preserving	- Conception and application of global, shuffle, and local differential privacy protocols for statistical learning. - Application of syntactic anonymization methods for privacy-preserving data publishing. - Development of machine learning models with differential privacy guarantees.
Machine Learning	- Development of machine learning and deep learning methods for regression and time series forecasting tasks. - Development of machine learning and deep learning methods for classification (binary, multiclass, and multi-output) tasks.
Control System	- Design and implementation of closed-loop linear and nonlinear control methods. - Identification of linear and nonlinear systems with mathematical and black-box methods.
Optimization	Development and utilization of linear and metaheuristic optimization methods.
Biomedical	Conducting practical rehabilitation experiments on people with spinal cord injury through automatized methods.

Tools

Programming languages:	Python, Java, Matlab & Simulink, Visual Basic.
Libraries:	Keras, TensorFlow, TensorFlow Privacy, PyTorch, Scikit-Learn, Matplotlib, Pandas, Numpy, GEKKO, Scipy, Sympy, Ray, Numba, Scikit-fuzzy.
Operating Systems:	Linux (Debian and Ubuntu) and Windows 7/10/11.
Others:	MySQL, ARX anonymization tool, Labview, Sun Grid Engine (SGE), Latex, MS Office, AutoCAD, AltoQI Lumine, Multisim.

Languages

Portuguese	Mother Tongue
English	Advanced - C1
French	Intermediate - B2
Spanish	Intermediate - B2