Héber Hwang Arcolezi

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Research Interests

Currently, I research Differential Privacy (DP) with a focus on the distributed setting also known as local DP (LDP). Besides, I am also enthusiastic about privacy-preserving machine learning, more specifically on collecting privatized data while still being able to learn from it. In summary, my current research interests are: machine learning, deep learning, data science, data privacy, privacy-preserving machine learning, and (non)linear system identification.

Education

2019 – present*	**Ph.D. in Computer Science:** University Bourgogne Franche-Comte (UBFC), France. **Funding:** CADRAN project, Region Bourgogne Franche-Comte. **Supervisor:** Jean-François Couchot. ***Defense:** planned for early 2022.
2017 – 2019	**M.Eng. in Electrical Engineering:** São Paulo State University (UNESP), Brazil. **Funding:** Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES). **Master Thesis:** A Novel Robust and Intelligent Control Based Approach for Human Lower Limb Rehabilitation via Neuromuscular Electrical Stimulation **Supervisor:** Aparecido Augusto de Carvalho.
2012 – 2017	**B.Eng. in Electrical Engineering:** Mato Grosso State University (UNEMAT), Brazil. **Funding:** UNEMAT Grant. **Final work:** Um Estudo Complementar ao Projeto de Controle PID no Caso do Pêndulo Invertido **Supervisor:** Rogério B. Quirino.

Experience

Researching	**Graduate Research (Ph.D.)** - Research on privacy-preserving data analytics. **Graduate Research (Master)** - Presented an automatized approach through machine learning techniques for a control-based system that stimulates lower limbs of individuals with spinal cord injury. My master thesis dissertation can be downloaded here. **Undergraduate Research** - Researched linear control theory for a benchmarking system "inverted pendulum" during the last year of undergrad (2016-2017). My bachelor final report (in Portuguese) can be downloaded here.
Presentations / communications	**Invited talk:** Introduction to Privacy Preservation and Machine Learning Techniques in Healthcare (in Portuguese). In: Universidade Federal de Minas Gerais. Online. Jul., 2021.

	Oral presentation: Privacy-Preserving Human Mobility Analytics Through Mobile Phone Data. In: APVP 2021 - 11e Atelier sur la Protection de la Vie Privée. Online. Jun., 2021.
	Press journal: Mesure Informatique de Ruptures de Service. In: En Direct (Université de Franche-Comté).
Teaching	**Workshop on Privacy for IoT:** 40 hours, 33 students. Master in Internet of Things (IoT), Université de Franche-Comté, France.
Reviewing	**External reviewer:** 2020 Security and Communication Networks Journal (Hindawi)
Working	**Electrical Engineering Internship at "Losan Engineering" (2017/03 - 2017/06):** Developing low and high-tension electrical projects.
	Co-Founder and Voluntary Member at "Energy Electrical Projects and Consulting Junior Enterprise" (2017/01 - 2017/12): Low and high tension electrical projects; optical fibers and telecommunications projects; and consulting.
	Voluntary Tutor - Differential and Integral Calculus at UNEMAT (2014/01 - 2014/06): Assist students enrolled in the discipline, dedicate and plan activities to develop student learning.

Skills

Programming languages:	Python, Matlab & Simulink, Visual Basic.
Libraries:	Keras, TensorFlow, PyTorch, Scikit-Learn, Matplotlib, Pandas, Numpy, GEKKO, Scipy, Sympy, Ray, Numba, Scikit-fuzzy.
Operating Systems:	Windows 7/10, Linux (Debian and Ubuntu).
Other tools:	Labview, Sun Grid Engine (SGE), Latex, MS Office, AutoCAD, AltoQI Lumine, Multisim.
Theoretical:	**Data privacy:** Differential privacy, local differential privacy, geo-indistinguishability, k-anonymity and its variants (l-diversity, t-closeness, …), privacy-preserving machine learning;
	Machine learning: Classification tasks (binary, multiclass), regression tasks, time series forecasting, clustering, decision tree-based algorithms, deep learning (feedforward and recurrent neural networks); **Others:** Linear system optimization, heuristics, metaheuristics, (non)linear control, (non)linear system identification, evolutionary algorithms, electric circuits, numerical methods, fuzzy logic, programmable logic controller, digital circuits.

Publications

2021

Arcolezi, H. H.; Couchot, J.-F.; Al Bouna, B.; Xiao, X. *Random Sampling Plus Fake Data: Multidimensional Frequency Estimates With Local Differential Privacy*. In: ACM International Conference on Information and Knowledge Management. Queensland, Australia. Nov., 2021 (to appear).

Arcolezi, H. H.; Cerna, S.; Guyeux, C.; Couchot, J.-F. *Preserving Geo-Indistinguishability of the Emergency Scene to Predict Ambulance Response Time*. Mathematical and Computational Applications, vol **26(3)**, p.56 (2021).

Cerna, S.; **Arcolezi, H. H**.; Guyeux, C.; Royer-Fey, G.; Chevallier, C. *Machine learning-based forecasting of firemen ambulances' turnaround time in hospitals, considering the COVID-19 impact*. Applied Soft Computing, vol **109**, p.107561 (2021).

Arcolezi, H. H. *et al*. *RISE Controller Tuning and System Identification Through Machine Learning for Human Lower Limb Rehabilitation via Neuromuscular Electrical Stimulation*. Engineering Applications of Artificial Intelligence, vol **102**, p.104294 (2021).

Arcolezi, H. H.; Couchot, J.-F.; Al Bouna, B.; Xiao, X. *Longitudinal Collection and Analysis of Mobile Phone Data with Local Differential Privacy*. In: IFIP International Summer School on Privacy and Identity Management. Maribor, Slovenia. Sep., 2020.

2020

Arcolezi, H. H. *et al*. *Identifying the knee joint angular position under neuromuscular electrical stimulation via long short-term memory neural networks*. Research on Biomedical Engineering 2020, vol **36(4)**, p.511-526 (2020).

Arcolezi, H. H.; Couchot, J.-F.; Cerna, S.; Guyeux, C.; Royer, G.; Al Bouna, B.; Xiao, X. *Forecasting the Number of Firefighter Interventions per Region with Local-Differential-Privacy-Based Data*. Computers & Security, vol **96**, p.101888 (2020).

Arcolezi, H. H.; Couchot, J.-F.; Baala, O.; Contet, J.-M.; Al Bouna, B.; Xiao, X. *Mobility modeling through mobile data: generating an optimized and open dataset respecting privacy*. In: International Wireless Communications and Mobile Computing (IWCMC). Limassol, Cyprus. Jun., 2020.

Cerna, S.; Guyeux, C.; **Arcolezi, H. H**.; Couturier, R.; Royer, G. *Boosting Methods for Predicting Firemen Interventions*. In: International Conference on Information and Communication Systems (ICICS). Irbid, Jordan. Apr., 2020.

Cerna, S.; Guyeux, C.; **Arcolezi, H. H**.; Couturier, R.; Royer, G. *A Comparison of LSTM and XGBoost for Predicting Firemen Interventions*. In: World Conference on Information Systems and Technologies (WorldCIST). Budva, Montenegro. Apr., 2020.

2019

Ñahuis, S. L. C.; Guyeux, C.; **Arcolezi, H. H**.; Couturier, R.; Royer, G.; Lotufo, A. D. P. *Long Short-Term Memory for Predicting Firemen Interventions*. In: International Conference on Control, Decision and Information Technologies (CODIT). Paris, France. Apr., 2019.

Arcolezi, H. H. *et al*. *A RISE-based Controller Fine-tuned by an Improved Genetic Algorithm for Human Lower Limb Rehabilitation via Neuromuscular Electrical Stimulation*. In: International Conference on Control, Decision and Information Technologies (CODIT). Paris, France. Apr., 2019.

Languages

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