

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

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|-----------------|---|
| 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

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| 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

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- 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