

PEDRO H. G. FERREIRA

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EDUCATION

Visiting Student, Computer Science, Dalhousie University, Canada, 2019

Globalink Research Intern

Supervisor: Dr. Nur Zincir-Heywood

B.Sc., Electrical Engineering, Universidade de Brasília, Brazil, 2015-20

Concentrations: Artificial Intelligence, Communication Networks, Signal Processing, Embedded Systems

Thesis: *Nature Inspired JPEG Quantization Optimization*

Thesis Advisor: Eduardo Peixoto da Silva Fernandes, Ph.D.

University Acceptance Rate: 14.1% (Overall), 8.6% (Engineering)

Admission Rank: 1st out of 118

Preparatory High School, Centro Educacional Sigma, Brasília, Brazil, 2012-14

Full-Tuition Merit Scholarship

PROFESSIONAL EXPERIENCE

Chief Operating Officer and Head of AI, Snow Fox AI, 2021-

Supervising day-to-day operations. Dealing with clients and shareholders. Establishing MLOps guidelines and supervising its operation. Managing and optimizing cloud infrastructure. Leading key projects. All usual attributions of the Head of AI.

Head of Artificial Intelligence, Snow Fox AI, 2020-

Defining the strategic vision on Artificial Intelligence of Snow Fox. Proposing new products and solutions. Supervising, hiring and on-boarding employees. Standardizing the Snow Fox's Artificial Intelligence Pipeline.

Training, evaluating and tuning Artificial Intelligence's model in an automatic fashion.

Independent Artificial Intelligence Consultant, Snow Fox AI, 2019-2020

In-depth evaluation of models and solutions, identifying flaws and potential improvements. Proposing enhancements in both data acquisition and recommendation services architectures. Competitors analysis and state-of-the-art reports. Tech stack evaluation.

PROJECT EXPERIENCE

I have led or collaborated in over two dozens of projects, mostly combining administrative/project management duties with hands-on Python development, both in industrial for-profit and research-only environments, in a broad range of topics in artificial intelligence, spanning from computational vision (remote sensing and medical image diagnosing) to time-series analytics (insider treat detection), including recommender systems (targeted campaigns) and casual modeling (unemployment and interest rate predictions from worldwide aggregated micro and microeconomic data). I have also supervised and worked in embedded systems projects occasionally, developing optimizations for cryptographic hardwares (C/Assembly), BLE applications for IOT (C++), embedded applications for kiosks and general purpose applications on MSP430 (C/Assembly).

RESEARCH EXPERIENCE

Undergraduate Researcher, Digital Signal Processing Group, 2019

Incorporating artificial intelligence techniques in data compression algorithms to enhance its performance. Designing new metrics and tools of evaluation for the rate-distortion trade-off. Image and Video Compression.

Technologies: Python, Matlab, C++, C

Supervisor: Eduardo Peixoto da Silva Fernandes, Ph.D., Universidade de Brasília, Brazil

Undergraduate Researcher, Network Information Management and Security Group (NIMS), 2019

Applying Machine Learning in highly unbalanced datasets with temporal data. Data Cleansing, visualization, feature engineering, hyper-parameter tuning and model evaluation for insider treat detection problems.

Technologies: Python

Supervisor: Nur Zincir-Heywood, PhD, Dalhousie University, Canada

Undergraduate Researcher, Digital Television and Communication Networks Laboratory, 2018-19

Assessing the operational limits of state-of-the-art Direction of Arrival methods, such as MUSIC, in real-world environments through computational simulations of physical networks (mostly, Bluetooth and 2.4GHz). Signal Processing and Channel Modeling.

Technologies: C++, Python, Matlab, C

Supervisor: Cláudia Jacy Barrenco Abbas, PhD, Universidade de Brasília, Brazil

Undergraduate Researcher, Smart Grids Laboratory (REILab), 2018

Cost-benefit analysis and Environmental Impact Assessments applied to the adoption of an electrical bus fleet in Brasília, and the replacement of traditional eletricity meters for smart ones.

Supervisor: Anésio de Leles Ferreira Filho, PhD, Universidade de Brasília, Brazil

Undergraduate Researcher, Power System Protection Laboratory (pLab), 2017-2018

Analysis and Comparison of different frequency-domain based fault location methods in power grids. Computational Modeling and Simulation of power systems. Signal Processing.

Supervisor: Felipe Vigolvino Lopes, PhD, Universidade de Brasília, Brazil

TEACHING ASSISTANT EXPERIENCE

Junior Teaching Assistant, Universidade de Brasília, 2015-2019

Courses: Calculus I, Electrical Circuits, Digital Systems 2 (3x), Algorithms and Data Structures

PUBLICATIONS

Ferreira P. H. G, Le C. D., Zincir-Heywood, A. N. (2019). "Exploring Feature Normalization and Temporal Information for Machine Learning Based Insider Threat Detection". (*on 15th International Conference on Network and Service Management*)

Ferreira, P.H.G.; Peixoto, Eduardo; Carvalho, Osmar. (2020). Nature Inspired JPEG Quantization Optimization (2020). (*on Simpósio Brasileiro de Telecomunicações 2020*)

Carvalho, Osmar L.F.d.; de Carvalho Júnior, Osmar A.; Albuquerque, Anesmar O.d.; Bem, Pablo P.d.; Silva, Cristiano R.; **Ferreira, P.H.G.**; Moura, Rebeca d.S.d.; Gomes, Roberto A.T.; Guimarães, Renato F.; Borges, Díbio L. (2021). "Instance Segmentation for Large, Multi-Channel Remote Sensing Imagery Using Mask-RCNN and a Mosaicking Approach". (*on Remote Sensing*)

Novaes, M.; de Carvalho, Osmar Luiz; Tiraboschi, T.; **Ferreira, P.H.G.**; SilvaS, C.; Zambrano, Jean; Ribeiro, A.P.;Gomes, C.;Miranda, Eduardo; Bessa, J. (2021). "A Random Forest Classifier for the Prediction of Testosterone Deficiency in the Community Setting". (*on The Journal of Sexual Medicine*).

Novaes, Monique; de Carvalho, Osmar Luiz; **Ferreira, P.H.G.**; Tiraboschi, Taciana; Silva, Carolina; Zambrano, Jean; Gomes, Cristiano; Miranda, Eduardo; Carvalho, Osmar; De Bessa Junior, Jose. (2021). "Prediction Of Secondary Testosterone Deficiency Using Machine Learning: Comparative Analysis Of Ensemble And Base Classifiers, Probability Calibration, And Sampling Strategies In A Slightly Imbalanced Dataset". (*on Informatics in Medicine Unlocked*)

Novaes, Monique; de Carvalho, Osmar Luiz; **Ferreira, P.H.G.**; Tiraboschi, Taciana; Silva, Carolina; Zambrano, Jean; Gomes, Cristiano; Miranda,

Albuquerque, Anesmar; de Bem, Pablo; Moura, Rebeca; de Carvalho, Osmar Luiz; Ferreira, P.H.G; Silva, Cristiano; Gomes, Roberto; Guimarães, Renato & de Carvalho Júnior, Osmar (2020). "Center Pivot Classification with Deep Residual U-NET". (*on IGARSS 2020*)

Filho, Hugo; Carvalho, Osmar; de Carvalho, Osmar Luiz; de Bem, Pablo; Moura, Rebeca; Albuquerque, Anesmar; Silva, Cristiano; **Ferreira, P.H.G.**; Guimarães, Renato; Gomes, Roberto (2020). "Rice Crop Detection Using LSTM, Bi-LSTM, and Machine Learning Models from Sentinel-1 Time Series". (*on Remote Sensing*)

Albuquerque, Anesmar; de Carvalho Júnior, Osmar; de Carvalho, Osmar Luiz; de Bem, Pablo; **Ferreira, P.H.G.**; Moura, Rebeca; Silva, Cristiano; Gomes, Roberto; Guimarães, Renato (2020). "Deep Semantic Segmentation of Center Pivot Irrigation Systems from Remotely Sensed Data". (*on Remote Sensing*)

Ferreira, H. G. P., Abbas, C. J. B. and Bittencourt, S. A. B. (2019). "On the impact of Operational Conditions on MUSIC-Based Direction of Arrival Detection Systems". *16th Federal District Scientific Initiation Congress*. (in Portuguese)

Ferreira, H. G. P. and Lopes, F. V. (2018). "Analysis of Fault Location Functions Based on High Frequency Components on Transmission Lines." *15th Federal District Scientific Initiation Congress*. (in Portuguese)

Martins, P. H. A, **Ferreira, P.H.G** and Lopes, F. V. (2019). "Fault Location in Single-Ended Traveling Waves-Based Methods". *16th Federal District Scientific Initiation Congress*. (in Portuguese)

Vasconcelos M.V.L, Anésio L.F. Filho, Couto L. Cugula and **Ferreira P. H. G** (2019). "Cost-benefit analysis of the implementation of smart grids in the Brazilian distributors". (***Under Review on Energy for Sustainable Development***)

GRANTS AND FELLOWSHIPS

Mitacs Globalink Research Internship Grant (Mitacs, 2019)

Young Researcher Grant (Fundação Universidade de Brasília, 2017-2018)

Outstanding Student Scholarship (Centro Educacional Sigma, 2012-2014)

AWARDS AND HONORS

IEEE CIS Outstanding Chapter of the Year Award 2020 [as Chair and Founder of IEEE CIS Chapter at Universidade de Brasília]

Honorable Mention in Best Paper in STEM at 16th Federal District Scientific Initiation Congress. [for "*On the impact of Operational Conditions on MUSIC-Based Direction of Arrival Detection Systems*"]

Nominated to Best Paper in STEM at 15th Federal District Scientific Initiation Congress.

Accelerated Graduation, Universidade de Brasília, 2020: Honor conferred by the Dean, in extremely rare basis, to students that have shown both extraordinary academic performance and achievements and have completed all core and credit requirements in their programs.

PROFESSIONAL MEMBERSHIPS

IEEE Computational Intelligence Society

Role: Universidade de Brasília's Student Chapter's Founder (2018)

Role: Student Chapter's Chair (2018-2020)

During my tenure as chairperson of the IEEE CIS at Universidade de Brasília, we were awarded the 2020 IEEE CIS Outstanding Chapter of the Year Award, IEEE CIS's most prestigious award to chapters that are able to trigger social change by spread the knowledge in Artificial Intelligence and developing transformative, real-world applications in collaboration with industry, academy and public sector.

COMMUNITY ACTIVITIES

Student Member of Universidade de Brasília's Council of Teaching, Research and Extension (2018)

Represent the interest of Universidade de Brasília's students in academical matters. Propose, evaluate and decide about the adoption of academic policies.

Director of Academic Affairs of the Electrical Engineering Students' Union (2016-2017)

Represent the interest of Universidade de Brasília's Electrical Engineering students in academical matters. Advise the students about their rights, university policies, regulations and procedures. Mediate discussions between the students and the faculty. Propose, evaluate and decide about the adoption of academic policies.

Full Member, Aliança pela Liberdade (2016-)

I have been a member of Aliança pela Liberdade, a student group and classical liberal think-tank that advocates for increasing student participation in university processes and taking pragmatic actions to improve the student-life, since 2016, first as a student representative and then as part of UnB's Alumni. During my period as a member, Aliança pela Liberdade was elected three times (out of 5 elections) to run the student union. In recognition to my contributions to Universidade de Brasília, I was named a Full Member in 2021.

LANGUAGES

Portuguese: Native

English: Fluent

Spanish: Advanced

RELEVANT SKILLS

Programming ability in Python, Matlab, C++, PHP and Assembly

Experience with Version Control and GitHub

Extensive knowledge of Artificial Intelligence, Deep Learning, Data

Compression, Signal Processing, Bluetooth, TCP/IP and Related Protocols