Sarah Almeida Carneiro

Computer Scientist
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Experience

Prediction Research 2020 - 2024
PhD fellowship at IFPEN - French company focused on energy, transportation, and the environment. *France*

- Developed four innovative methods for predicting vehicle speeds by leveraging neural network and deep learning strategies for mobility data reconstruction and prediction, integrating multiple input sources. These methods are slated for integration into IFPEN's diverse research endeavors, enhancing their analytical capabilities across multiple fields.

Multimedia Classification Research 2017 - 2019
Master's fellowship at Semantix - Brazilian company, specializing in Big Data and Data Science *Brazil*

- Enhanced video analysis capabilities through the development of deep neural network multi-stream ensembles for identifying fighting and falling actions. Improved accuracy in video action classification, expanding Semantix's potential for safety-focused AI product applications.

Image Processing Research 2017
IMScience (PUC MG) scholarship - Image and Video processing Lab *Brazil*

- Elevated an image inpainting framework with a hierarchical segmentation approach, enabling precise identification of optimal image regions for information retrieval for image filled areas. Resulted in winning the university's third place for Best Bachelor in Computer Science Research Award.

HCI Research 2015
Summer research Intern at Stony Brook University NY *USA*

- Contributed to the collaborative development of and HCI educational software for teaching alphabet writing to children while interning at Stony Brook University's Multimedia Lab, where I also gained experience in integrating software with hardwares like Kinect and other motion-capturing sensors.

Temporary Research and Teaching Associate 2021 - 2024
ESIEE - Temporary teaching and research fellow in French higher education *France*

- **IA for Images -** Taught students the analytical approach to problem-solving in Image Analysis using Deep Learning techniques, emphasizing critical thinking beyond mere code implementation. Achieved a 100% approval rating. Deepened my expertise in the subject matter.
- **IA & Deep learning -** I acquired proficiency in communicating complex deep learning concepts to individuals unfamiliar with the topic, effectively demonstrating the practical application of deep learning techniques through hands-on programming projects. Strengthened my grasp of the topic.
- **3° year Project Orientation -** Initiated and led projects, gaining experience in guiding student groups towards achieving both product and research objectives. Enhanced outcomes through effective supervision and mentoring.
- **Optimization and Introduction to IA -** Guided students in applying analytical approaches to problem-solving, enhancing their understanding of optimization principles and techniques. Broadened my insight into the subject area.
- **Optimization Algorithms -** Enhanced the ability to convey mathematical optimization concepts in a clearer and more comprehensible manner, thereby fostering deeper understanding and engagement among students.
- **Algorithms -** Introduced data structures and complexity augmenting my proficiency in the subject matter.

Teaching assistant
Brazil

- Algorithms and Computer Programming (UNICAMP) - Introduction to programming with Python
- Graph Algorithms (PUC MG) - Introduction to graph algorithms

Education

PhD in Computer Science Paris, France
Université Gustave Eiffel (UGE) *2020 - 2024*

Master in Computer Science Campinas, Brazil
University of Campinas (UNICAMP) *2018 - 2020*

Skills

Programming Languages: Python, Java, MATLAB, C++, C
Machine Learning/Frameworks: Pytorch, TensorFlow, Scikit-learn
Deep Learning: Neural networks, convolutional neural networks, graph neural networks, supervised and unsupervised learning, classification, regression, feature engineering
Image Processing: Segmentation, filtering, image restoration
Research Methodologies: Experimental design, data analysis, statistical inference
Problem Solving: Critical thinking, logical reasoning, creative problem-solving
Tools/Libraries: NumPy, Pandas, OpenCV, Matplotlib, Seaborn
Development Environments: Anaconda, Spyder, Visual Studio, Vim, Jupyter Notebook
Version Control: Git
Documentation: LaTeX, Doc

Publications - Primary Author

- **Clustering Dynamics for Improved Speed Prediction Deriving from Topographical GPS Registrations** – Submitted to: Transactions on Intelligent Transportation Systems (T-ITS), 2023.
- **SWMLP: Shared Weight Multilayer Perceptron for Car Trajectory Speed Prediction using Road Topographical Features** – In: Models & Technologies for Intelligent Transportation Systems (MT-ITS), 2023.
- **Multi-Stream Deep Convolutional Network Using High-Level Features Applied to Fall Detection in Video Sequences** – In: International Conference on Systems, Signals and Image Processing, 2019, Osijek. 26th International Conference on Systems, Signals and Image Processing (IWSSIP), 2019. v. 2019. p. 293-298.
- **Deep Convolutional Multi-Stream Network Detection System Applied to Fall Identification in Video Sequences** – In: 15th International Conference on Machine Learning and Data Mining (MLDM 2019), 2019, New York. 15th International Conference on Machine Learning and Data Mining MLDM 2019, 2019. v. 2019. p. 1-12.
- **Fight Detection in Video Sequences Based on Multi-Stream Convolutional Neural Networks** – In: 32nd Conference on Graphics, Patterns and Images (SIBGRAPI 2019), 2019, Rio de Janeiro. 32nd Conference on Graphics, Patterns and Images (SIBGRAPI 2019), 2019.
- **Inpainting Based on Local Patch Search Supported by Image Segmentation** – In: The 23rd Iberoamerican Congress on Pattern Recognition, 2018, Madrid. v. 2018. p. 1-8.

Other Publications

- **Graph-Based Supervoxel Computation from Iterative Spanning Forest** – JERONIMO, C. et al - In: International Conference on Discrete Geometry and Mathematical Morphology. Springer, Cham, 2021.

Event Participation

Oxford Machine Learning Summer School - Advanced AI bootcamp, offering courses in ML/DL 2022. I gained knowledge of algorithms that form the foundation of numerous widely-used machine learning methods.

Awards and Grants

- **Third place for best undergraduate thesis award** (2017)
- **CAPES undergrad Scholar for the program science without borders (CSF)** (2014–2015): 1 year exchange scholarship program of the Brazilian government - Studied at Stony Brook University NY USA

Languages

Portuguese - Native; English - Fluent; French - Advanced; Spanish - Beginner