Gabriel Ayres Bezerra do Nascimento

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Languages: Portuguese, English, Spanish
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RESEARCH EXPERIENCE

Research Student Assistant - UPenn Radiology Lab [Philadelphia, PA - Remote] 05/2024 - Present

Researched and optimized Denoising Diffusion Probabilistic Models to enhance the generation, restoration, and denoising of breast medical images, re-architecting and implementing conditional diffusion guided by patient metadata to generate synthetic datasets. Evaluating performance using quantitative metrics (FID, PSNR, SSIM).

Volunteer Quantitative Researcher Intern - NEW EIC [Boston, MA - Remote] 01/2025 - 03/2025

I conducted research and implemented state-of-the-art Diffusion models and Graph Neural Networks for stock trend prediction. These models were validated through rigorous backtesting methods to ensure feasibility and accuracy. The deployment of these models significantly **enhanced the results for hundreds of investors**, leading to improved financial decision-making and performance across a diverse portfolio

Student Researcher Fellow - TAIL [João Pessoa, PB - On-site] 02/2024 - 02/2025

TAIL (Technology and Artificial Intelligence League) is a non-profit organization. As a student member of its Reinforcement Learning division, I collaborated with four teammates to study key reinforcement learning (RL) concepts such as Markov decision processes, Q-learning, and Deep Q-learning. Following this, we developed a project to simulate a food chain ecosystem in Python, applying the principles we had learned. The goal of this initiative was to compile our findings into an academic article for publication.

EXPERIENCE

Software Engineer ML Intern - CEBRASPE [Brasília, DF - Remote] 06/2024 - 04/2025

Developed a generalist AI agent for the automated grading of national exam essays. The system leverages NLP and RAG to evaluate essays against the exam's predefined criteria. The agent dynamically retrieves authoritative scoring guidelines, exemplar essays, and specific knowledge, ensuring alignment with grading standards. The system increases the efficiency of the grading process by 5x while maintaining **95% accuracy** in evaluations, enabling the assessment of **80,000 essays in less than 24 hours**.

Founding Software Engineer - Promozap [Cambridge, US - Remote] 08/2024 - 02/2025

Architected and deployed Promozap's scalable backend platform in collaboration with US-based teams, achieving high availability and optimized performance for thousands of users by integrating microservices and event-driven design with Kafka and gRPC. Implemented a microservices architecture with Kafka for event-driven flow and gRPC for efficient inter-service communication, **supporting high availability for hundreds of thousands of users**.

Software Engineer - DHART [João Pessoa, BR - On Site] 05/2024 - 01/2025

Led the creation of an AI agent designed to consult accounting data for all cities in the State of Paraíba, implementing ETL pipelines for better automation and summarizing as requested. The system utilized multi-agent structures to ensure accurate and reliable answers, functioning as if it were an accountability specialist. It successfully **reduced state costs by over 1 million reais**.

Software Developer Intern - Workverse [São Paulo, BR - Remote] 12/2023 - 06/2024

Developed an authentication API with my two partners that authenticates 12 different Federal Document images via OCR using several authentication conditions to do it. It **improved significantly in a 60%** the Porto Seguro authentication process in new employers admission. We used Python and Clean Architecture principles.

EXTRACURRICULAR ACTIVITIES

Active Deep Learning Open Source Contributor - Apple

Work on improving and adding new features to Matryoshka Diffusion Model, which is an end-to-end framework for high-resolution image and video synthesis. Implemented new non-linear noise scheduling methods and migrating Neural Network structures based to MLX framework. Contributed to the privacy-preserving federated learning (PFL) framework for secure training on distributed sensitive data, optimizing dataset iteration using Apple's MLX framework.

Tutor & Mentorship Program Member - Trilha

I give lectures in Trilha at UFPB to support first semester students from various tech disciplines. We cover essential programming concepts through interactive sessions, hands-on workshops, and guest talks from industry professionals.

Academic Tutor - Calculus II

As a Calculus II tutor, I help students grasp fundamental concepts like limits, derivatives, and integrals. Through personalized tutoring and exam prep support, we have achieved a class pass rate **exceeding 80%**.

Python and Data Visualization Teacher - IFRN Ceará Mirim

Taught a minicourse on 'Introduction to Mathematical Concepts with Python' to a class of **40 Mathematics students at the Federal Institute of Rio Grande do Norte**. The course introduced fundamental concepts of mathematical functions, representations, and operations using Python, as well as data visualization, exploratory data analysis, and Machine Learning.

EDUCATION

Bachelor of Computer Engineering - UFPB (Federal University of Paraíba)

SKILLS

Tools: Algorithms, Python, PyTorch/TensorflowGolang, Typescript, C++, Eigen, Swift, MLX, Llamma, AWS, Microservices,
Interests: Software Engineering, Geometric Processing, Applications of AI in the medical imaging field, Deep Learning, Physics-Informed Neural Networks, Machine Learning, Time Series Analysis.