Guilherme S. G. Brotto

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Professional Objective

Computer Science student with a strong focus on Deep Learning and Artificial Intelligence. Experienced in developing deep learning models, optimizing algorithms, and analyzing big data. Seeking opportunities to contribute expertise in AI development and research to solve innovative challenges.

Education

- **Federal University of Espírito Santo** – Vitória, Brazil
  B.S., Computer Science – 2021 - Present
  Undergraduate Program in Computer Science
- **Università di Torino** – Turin, Italy
  Visiting Undergraduate Research Student – Apr 2025 - July 2025
  Research internship abroad scholarship funded by FAPESP

Professional and Research Experience

Independent Contractor – Nicchio Café S.A. Exportação e Importação
July 2024 – April 2025..

- Designed and implemented a web server for managing sales operations and currency exchange contracts for Nicchio Café;
- Technologies used: SQL, Python (Flask), JavaScript, LDAP.

Scientific Initiation Scholarship - Laboratório de Pesquisa em Redes e Multimídia (lprm), CT 13, Ufes. Nov 2023 - Present.

- **Study and Implementation**: Focused on the study and practical implementation of generative models for synthetic data monitoring time series generation, with a primary emphasis on **Generative Adversarial Networks (GANs)**;
- **Domain: Internet of Things**;
- **Testing and Comparison**: Conducted testing and comparisons to evaluate the **utility and fidelity** of various generative models, assessing their ability to replicate real-world data;
- **Metric Development**: Developed and implemented specific **metrics** to evaluate the quality and reliability of the synthetic data generated, ensuring they met the required standards.
- **Publications**: Articles were written to disseminate the results of the study, discussing the methodologies, findings, and contributions of the work in the field of synthetic data generation.

Teaching Assistant – Advanced Structured Programming
2022 – 2023

- Teaching Assistant for the Programming II course at Ufes.
- Grading assignments and projects developed in the C programming language.
- Available to assist students with questions and provide clarifications as needed.

Relevant Projects

Episodic Memory for Generative Pre-Trained Transformers

- **Description**: Enhanced Generative Pre-Trained Transformers (GPTs) with episodic memory to improve recall of past interactions;
- **Technologies**: PyTorch, Scikit-learn, Sentence-Transformers, NumPy, Pandas.
- **Outcome**: Both quantitative and qualitative analysis showed that the memory-enabled model outperforms the memoryless version in all evaluated aspects;
- **Code available at**: Github LLM Episodic Memory.

AI Chrome Dino Game

- **Description**: Developed an intelligent agent to play the Google Chrome Dino game;
- **Technologies**: PyGame, Multilayer Perceptron (MLP), Genetic Algorithm;
- **Outcome**: Achieved the best score of 1697.82 as the average over 30 executions;
- **Code available at**: Github AI Chrome Dino Game.

Hackathon SBRC 2024

- **Description**: Developed blockchain-based applications for smart cities using Cartesi Rollups;
- **Idea**: Decentralized marketplace for solar energy credit trading, leveraging blockchain for transparency and security;
- **Outcome**: Our team placed 2nd in the Hackathon SBRC 2024;
- **Code available at**: Github Hackathon.

Brain Tumor Segmentation in MRI Scans

- **Description**: Implemented and trained a neural network to classify and segment brain tumors from MRI scans;
- **Technologies**: Convolutional Neural Network (CNN), TensorBoard, PyTorch;
- **Outcome**: The model accurately localized tumor regions and successfully classified them with high precision;
- **Code available at**: Github Brain Tumor Segmentation.

Technical Skills

- **Programming Languages**: Python, C, C++, Java;
- **AI/Deep Learning Frameworks**: PyTorch;

- **Libraries and Tools**: NumPy, Pandas, OpenCV, scikit-learn, Matplotlib, Jupyter Notebooks;
- **Database Systems**: MySQL;

- **Key Concepts & Techniques**: Time Series Analysis, Generative Adversarial Networks (GAN), Convolutional Neural Networks (CNN), Recurrent Neural Networks (RNN), Long Short-Term Memory (LSTM), Supervised and Unsupervised Learning Algorithms, Transformers.

Publications and Conferences

- **Geração de Dados de Ataque em Internet das Coisas utilizando Redes Generativas Adversárias**
  Authors: Iran Ribeiro, Guilherme Brotto, Giovani Comarela, Vinícius Mota;
  In: VIII Workshop de Computação Urbana, 2024.

- **IoTTraffic: Assessing Generative Models for Internet of Things Attack Data Flows**
  Authors: Iran Ribeiro, Guilherme Brotto, Giovani Comarela, Rodolfo Villaça, Vinícius Mota;
  In: 2024 IEEE 10th World Forum on Internet of Things (WF-IoT).

- **Measuring Fidelity and Utility of Time Series Generative Adversarial Networks**
  Authors: Iran Ribeiro, Guilherme Brotto, Antonio Rocha, Vinícius Mota;
  In: 2024 IEEE Symposium on Computers and Communications (ISCC).

Languages

- **Portuguese**: Native;
- **English**: Fluent;
- **Spanish**: Basic;
- **Italian**: Basic.