Luiz Augusto Facury de Souza

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Education

Universidade Federal de Minas Gerais (UFMG), MSc in Computer Sciences — Jan 2025 – Present
- Research in Self-Supervised Learning methods for world models.
- Coursework: Deep Learning, Computer Vision, Project and Analysis of Algorithms.

Télécom Paris (IP Paris), Master of Science in Engineering — Sept 2022 – Sept 2024
- Double Degree Program with Specializations in Data Science, Image Processing and Artificial Intelligence, taught in English and French
- Coursework: Deep Learning, Statistics, Databases, Optimization, Programming Paradigms

Universidade Federal de Minas Gerais (UFMG), BS in Electrical Engineering — August 2018 – Dec 2024
- Specialization in Machine Learning and Computer Engineering
- Coursework: Machine Learning, Software Engineering, Operational Systems, Electronics.

Experience

Researcher I, Petrobrás (Brazilian Oil Company) – Belo Horizonte, Brazil — January 2025 - Present
- Development of segmentation models using classic Machine Learning and Deep Learning for the Brazilian Oil Company (Petrobrás) to find petroleum in specific ragions.
- Created a framework capable of finding and segmenting a region of interest for geologists to find oil, which resulted in 2 papers submitted for relevant journals.

Researcher, SPEED Lab (UFMG) – Belo Horizonte, Brazil — August 2024 - Present
- Development of models for the Hospital of Clinicians of the Federal University of Minas Gerais to support and automate part of the clinical diagnosis of electrocardiograms in the health system, which resulted in a paper selected for oral presentation in a Workshop at ICML 2025.

Research Intern, Philips – Paris, France — Feb 2024 – Aug 2024
- Developed a foundation model for Electrocardiograms (ECGs) using Self-Supervised Learning methods, reducing the need for expensive and time-consuming annotated data.
- Improved the model used in the company's pipeline by pre-training with unannotated data.
- Submitted two patent applications relating to the use of the foundation model in automated clinical diagnosis.

Summer Research Intern, Sorbonne - Paris, France — June 2023 – July 2023
- Computer vision research aimed at tracking a single-celled protozoan and building a network that automatically focuses on the organism using Residual Networks and Vision Transformer encoders.

Research Intern, Computational Intelligence Laboratory (UFMG) - BH , Brazil — July 2021 – Aug 2022
- Research on Natural Language Processing (NLP) using Deep Learning methods to develop Text-to-Speech, Speech-to-Text and Face Synchronization models.
- Developed a model capable of synthesis and transcription in Portuguese, which was challenging due to the lack of annotated data.

Software Engineering Intern, Infosistemas - BH , Brazil — Jan 2021 – July 2021
- Developed, debugged, and optimized the company's API, primarily focusing on the backend, utilizing Node.js and SQL.

Publications

Bridging the Gap in Clinical AI: Zero-Shot Multimodal ECG Analysis with Textual Explanations — 2025

Luiz Facury De Souza, Jose Geraldo Fernandes, Pedro Robles Dutenhefner, Turi Andrade Vasconcelos Rezende, Gisele L. Pappa, Gabriela Miana Paixão, Antonio Luiz Pinho Ribeiro, Wagner Meira Jr.

Dense Self-Supervised Learning for Medical Image Segmentation 2024

Maxime Seince, Loïc Le Folgoc, *Luiz Facury De Souza*, Elsa Angelini

Medical Imaging with Deep Learning (MIDL)

Multiple-Input Multiple-Output Randomized Fuzzy Cognitive Map Method for High-Dimensional Time Series Forecasting 2024

Omid Orang, Hugo Vinicius Bitencourt, *Luiz Augusto Facury Souza*, Patrícia Oliveira Lucas, Petrônio CL Silva, Frederico Gadelha Guimarães

IEEE Transactions on Fuzzy Systems

Combining embeddings and fuzzy time series for high-dimensional time series forecasting in internet of energy applications 2023

Hugo Vinicius Bitencourt, *Luiz Augusto Facury Souza*, Matheus Cascalho Santos, Rodrigo Silva, Petrônio CL Silva, Frederico Gadelha Guimarães

Elsevier Energy

An embedding-based non-stationary fuzzy time series method for multiple output high-dimensional multivariate time series forecasting in IoT applications 2023

Hugo Vinicius Bitencourt, Omid Orang, *Luiz Augusto Facury Souza*, Petrônio CL Silva, Frederico Gadelha Guimarães

Springer Neural Computing and Applications

Projects

Self-Supervised Deep Segmentation: Learning to Segment Anatomies from (mostly) Raw Unlabeled Data August 2023 - Feb 2024

- Researched different approaches of Self-Supervised Learning to improve segmentation models in MRI data by pre-training the model without using labels.
- The end of studies project was awarded a 19/20, the highest grade in the class, and resulted in a paper published at a prestigious medical imaging conference (MIDL).

Time Series Prediction using Fuzzy Systems and Deep Learning Techniques August 2020 - October 2022

- Undergraduate research that produced significant results, which led to the publication of three articles in reputable journals: Elsevier, Springer, and IEEE.
- The methods developed during the project have been contributed to the open source library used (PyFTS).

Volunteering

Mathematics Mentor, Eductus – University of São Paulo May 2020 - August 2020

- Volunteering in a project aimed at teaching students whose schools were temporarily closed due to the COVID-19 pandemic.

Languages

Portuguese - Native Proficiency
English - Advanced C1
French - Advanced C1

Technologies

Languages: Python, C++, C, JavaScript, SQL.

Libraries: PyTorch, Keras, TensorFlow, Sklearn, Numpy.