

Lourenço Matos

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Summary

Curious, focused, and determined student aspiring to pursue a research career. Interested in applications of Deep Learning to Scientific Discovery, with particular interests in Medicine, Biology, and Chemistry. Solid computer science foundations, with considerable research experience in machine learning and computational biology. Committed to use adaptability, critical thinking, and problem-solving skills to positively impact the world through research.

Education

MPhil in Advanced Computer Science

UNIVERSITY OF CAMBRIDGE

Cambridge, UK

Oct. 2024 - Jun. 2025

- Neural Algorithmic Reasoning for RNA velocity:** Research on Geometric Deep Learning and Neural Algorithmic Reasoning and its applications for RNA splicing and cell differentiation analysis. Designing Graph Neural Network architectures for emulation of classical algorithms.
- Mechanistic Interpretability of LLMs through Geometric Deep Learning:** Designed a new framework for analysing LLMs through the lens of network science, the Autoregressive Attention Graph. Under this framework, analysed how emergent properties and reasoning in LLMs correlate with graph-theoretic features such as clustering coefficients.
- ML in the Physical World:** Research Project on the usage of classical ML methods such as bayesian optimization, gaussian processes, emulation and multifidelity analysis, simulation and sensitivity analysis, for prediction of Avalanche Severity based on a 3D terrain topology. Prediction using Bayesian Optimization, Mechanistic Interpretability of LLMs using network science, and quantization of ML models.
- ML Systems and Quantization:** Implemented, trained and deployed a quantized speech-recognition model onto a micro-controller for real-time keyword recognition. Explored the efficiency of layer-wise quantization on TinyML and the different trade-offs depending on the hardware accelerators.
- Federated Learning:** Research project on the scaling laws of Federated Learning relative to various system parameters, such as cohort size. Designed and implemented a method to estimate critical global batch sizes through gradient noise scales in Federated Learning.
- Areas of Research:** Geometric Deep Learning, Neural Algorithmic Reasoning, Mechanistic Interpretability, Machine Learning Systems.
- Supervisors:** Pietro Liò, Petar Veličković

BSc in Computer Science and Engineering

INSTITUTO SUPERIOR TÉCNICO - UNIVERSITY OF LISBON

Lisbon, Portugal

Oct. 2021 - Jun. 2024

- University of Lisbon Best Student Award,** Best Computer Science Student out of 360+
- Academic Excellence:** Final Grade 18/20
- Invited for Teaching Assistant:** Invited to be a Teaching Assistant for the introductory modules in Computer Architecture, Algorithms and Data Structures, as well as Operating Systems, Distributed Systems during the BSc.
- Exemplary Final Project:** My final project for the BSc, an open-source contribution, was used as an exemplary project on subsequent years of the course. For its significant open-source impact, I also won the Linux Scholarship to attend the PyTorch conference in San Francisco.
- Extracurricular Involvement:** Engaged in academic competitions, mentoring programs, and extracurricular research in parallel to the regular curriculum.

Double Secondary Education - Science and Technology, Music

LICEU DE OEIRAS, CONSERVATÓRIO DE MÚSICA DE CASCAIS

Lisbon, Portugal

Oct. 2013 - Jun. 2021

- Completed secondary education in Music Theory and Guitar, in parallel with the regular curriculum of Science and Technology.

Experience

PyTorch Open-Source Contributor

META/LINUX FOUNDATION

Lisbon, Portugal

Mar. 2024 - Jun. 2024

- Improved the performance of the Average Pooling 3D operation by 100%, through the implementation of a lowering, and rewriting such that its intermediate representation can be further optimized by torch.compile.
- Fixed bugs in the PyTorch C++ API.

Research Assistant

INESC-ID/INSTITUTO SUPERIOR TÉCNICO

Lisbon, Portugal

Jan. 2023 - Jun. 2024

- Research in computational biology, on the use of computational tools for the logical modelling of biological regulatory networks.
- Developed software using Python and Java to integrate and deploy a model revision tool into the CoLoMoTo Notebook.

Projects

ML FINANCIAL TRADING MODEL

- Designed and implemented an end-to-end ML pipeline for financial market prediction, predicting future asset prices on the 1h scale time-chart.
- Built the model from scratch based on the LSTM architecture, as well as the entire pipeline for data collection, processing, and visualization, and infrastructure for handling incoming real-time market data.
- Achieved a top prediction accuracy of 62% through data processing, feature engineering, and model optimization techniques.

AI PSYCHOLOGIST STARTUP

- Developed a production-ready ML pipeline for NLP and audio synthesis through multiple APIs, allowing for interactive vocal conversations with an AI generated psychologist, whose objective would be to act as a mental-health counsellor.
- Integrated this ML pipeline into a full-stack application and created a startup based on the idea.
- Led a team of 3 colleagues to develop and deploy our product as a web application using AWS and Docker for scalability.

FAS WEEKLY TRACKER

- Developed a web application to help students track and manage their weekly efforts and study efficacy.
- By allowing students to visualize how their study time is distributed, this application would help them give feedback to curricular units and comment on their workload.
- Designed to be deployed university-wide and used by over 10.000 students upon integration into FenixEdu, the university information platform.
- Collaborative work initiated by the Academic Development Office at IST, and developed with other scholarship-funded students.

RESUMOS LEIC

- Contributed to the development of an open-source website educating on Computer Science fundamentals, focused on the BSc curriculum.
- Wrote explanations on content for Artificial Intelligence, Algorithms, Theory of Computation, Software Engineering, and Computer Networks.

Volunteering

Volunteer Instructor

Lisbon, Portugal

TREE2

Jun. 2023 - Jun. 2024

- Taught science and technology topics in an after-school program to stimulate the intellectual and creative potential of young students.

Volunteer Student Mentor

Lisbon, Portugal

INSTITUTO SUPERIOR TÉCNICO

Sep. 2022 - Jun. 2024

- Mentored BSc students and organized study sessions to enhance academic success and integration.
- Mentored MSc Erasmus students helping them settle down during their exchange programs.

Honors & Awards

2025	Finalist , Portuguese League of Bioinformatics	Braga
2025	Best Finetuned LLM , ETH Oxford blockchain hackathon	Oxford
2024	Linux Foundation Scholarship , PyTorch Conference 2024, for outstanding contributions	San Francisco
2024	”LaCaixa” Foundation Postgraduate Fellowship , Fully-Funded Postgraduate Studies at Cambridge	Spain
2024	University of Lisbon Best Student Award , Best Student of Computer Science and Engineering (out of 360+)	Lisbon
2023	Santander Excellence Scholarship , Valedictorian in the BSc at IST	Lisbon
2023	1st Place , Google Hashcode, in Portugal’s leaderboard	Lisbon
2023	2nd Place , BEST Europe Engineering Challenge	Lisbon
2024	Academic Excellence Diploma , Valedictorian in the BSc at IST	Lisbon
2023	Oeiras Merit Scholarship , Valedictorian in the BSc at IST	Lisbon
2023	Academic Excellence Diploma , Valedictorian in the BSc at IST	Lisbon
2022	Oeiras Merit Scholarship , Valedictorian in the BSc at IST	Lisbon
2022	Academic Merit Diploma , Valedictorian in the BSc at IST	Lisbon
2021	Oeiras Merit Scholarship , Valedictorian in the BSc at IST	Lisbon

Skills

Programming	Python, C, C++, Bash, Java, LaTeX, Numpy, Pandas, PyTorch, Tensorflow, Jax, React, Node.js, Flask
DevOps	Git, AWS, Docker, Kubernetes, Jenkins
Unix & Shell	Extremely experienced in Linux environments, including command-line interfaces and shell scripting.
Personal Traits	Adaptable, resilient, innovative in problem-solving, creative, ingenious.
Languages	Fluent in English and Portuguese. Proficient in Spanish. Elementary-level German, French, and Japanese

Online Courses

2024	Deep Learning Specialization , DeepLearning.ai
2024	ML Engineering for Production - MLOps , DeepLearning.ai
2023	ML Ethics & Data Science Online Courses , Extracurricular units worth 120 workload hours.
2022	CS50x Harvard Online Course , edX, 100% Final Grade
2022	Fundamentals of Neuroscience Harvard Online Course , edX
2022	Blockchain Fundamentals Online Course , Saylor Academy