Gonçalo Pascoal

Software Developer Trainee
Vestas

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About

I hold a Master's degree in Informatics and Computing Engineering conferred by FEUP. My Master's dissertation leveraged deep reinforcement learning to compile quantum algorithms more efficiently for realistic architectures. I was distinguished with several awards for merit during my Bachelor's degree. My main areas of interest include algorithms and data structures, low-level / systems programming, distributed systems and performance-critical software. I consider myself to be rigorous, organized, and hard-working. I am also a hobbyist game developer and keenly interested in game design.

Languages

Portuguese Native
English Professional proficiency (C1/C2)
French Elementary proficiency (A1)

Hobbies

Drawing
Music (Guitar, Mandolin)
Game Development

Professional Experience

Feb. 2024 – Present — **Software Developer Trainee** — Vestas
Python • **Django** • **Microsoft Azure** • **C#** • **Angular** • **Git** • **REST APIs** • **Scrum**
Simulation Development – Tower Structural Design Tool

- Developed new features, improvements, and bug fixes for a complex web application used for structural analysis, modeling, and design of wind turbine towers.
- Contributed to the development & maintenance of CI/CD pipelines featuring build, near zero downtime cloud deployment, testing, static analysis, and automatic versioning tasks.
- Worked fully in Scrum with two-week sprints.

Education

Faculty of Engineering, University of Porto (FEUP)
Porto, Portugal

Sep. 2021 – Oct. 2023 — **Master's Degree, Informatics and Computing Engineering**
Final Grade: 19.23 / 20
Thesis: *Noise-Adaptive Reinforcement Learning Strategies for Qubit Routing* (graded 20 / 20)

Sep. 2018 – Jul. 2021 — **Bachelor's Degree, Informatics and Computing Engineering**
Final Grade: 19.03 / 20

Awards / Grants / Scholarships

2023 — **STSM Grant** — COST (European Cooperation in Science and Technology)
Granted under COST Action CA191935 – CERCIRAS to visit the SIMULA research laboratory (Oslo, Norway) in the context of my M.Sc. thesis and discuss our methodology with other quantum computing researchers

2022 — **Bondalti / Fundação Amália de Melo Award** — Bondalti
For concluding the Bachelor's in Informatics and Computing Engineering at FEUP with the highest final grade

2021 — **Merit Scholarship** — DGES
For the average grade obtained during the 2019/2020 academic year

2020 — **Merit Scholarship** — DGES
For the average grade obtained during the 2018/2019 academic year

2020 — **Prémio Incentivo / Incentive Award** — University of Porto
For concluding the first year of the Bachelor's in Informatics and Computing Engineering at FEUP with the highest grade

Skills

Programming Languages

- **Most Experience:** C++, Python, Java
- **Experience:** C, Rust, SQL, Dart, HTML, CSS, C#
- **Some Experience:** JavaScript, TypeScript, PHP, Bash, Prolog

Technologies

Git, Linux, LaTeX, Flutter, Azure DevOps, PyTorch, Qiskit, Godot Engine

Knowledge Areas

Deep Reinforcement Learning, Algorithms and Data Structures, REST APIs

Other

Problem Solving, Resourcefulness, Autonomy, Time Management, Project Management, Leadership, Technical Writing (English)

Publications

Jul. 2024 — **Deep Reinforcement Learning Strategies for Noise-Adaptive Qubit Routing**
Gonçalo Pascoal, João Paulo Fernandes, Rui Abreu
2024 IEEE International Conference on Quantum Software (IEEE QSW 2024)

Projects

Master's Thesis Oct. 2023
Python • **PyTorch** • **Qiskit** • **Ray RLlib** • **NumPy** • **Pandas** • **LaTeX**
Deep Reinforcement Learning • **Quantum Compiling**

- Leveraged deep RL (PPO) to compile quantum algorithms more efficiently for realistic architetures, helping to mitigate the adverse effects of noise on the outcome of computations.
- Tackled the NP-complete qubit routing problem, which consists of inserting auxiliary operations to ensure that programs adhere to the connectivity constraints between qubits in a specific quantum architecture.

Interactive Satellite Megaconstellation Simulation Jan. 2023
Rust • **Python** • **Godot Engine** • **Modeling and Simulation**

- Analyzed effectiveness of different satellite connection strategies and orbital configurations for maintaining connectivity in the event of failures.

Solver for Capacitated Vehicle Routing Problem Jul. 2022
C++ • **Data Structures** • **Map Matching** • **Search Algorithms** • **Metaheuristics**

- Algorithms for solving large-scale CVRP instances (finding routes for a fleet of vehicles with multiple deliveries and a limited carrying capacity). Implemented variants of popular metaheuristics found in the literature for CVRP (ant colony optimization, tabu search).
- Uses real-world OpenStreetMap data from Brazilian cities and performs map-matching of GPS coordinates from test instances to graph vertices (using quadtrees / k-d trees).

Unified Search System for Steam Games Jan. 2022
Apache Solr • **Python** • **Pandas** • **Data Processing & Analysis** • **Information Retrieval**

- Aggregates Steam game data from multiple sources (public datasets, APIs, website scraping).

Peer-to-Peer Distributed Backup Service Jun. 2021
Java • **Distributed Systems** • **Threads & Non-Blocking I/O** • **TCP Sockets w/ SSL**

- Implements the Chord distributed hash table protocol. Files are divided into chunks stored across multiple peers.
- Tackled scalability and fault tolerance concerns (thread pools, periodic tasks to manage peer failures).

Extra-Curricular Groups

Oct. 2019 – Oct. 2023 **Tuna de Engenharia da Universidade do Porto**
Traditional academic group with over thirty years of history, bound by the values of music and friendship. Participating in the organization of events such as our festival (*PortusCalle*) has helped me develop and strengthen a diverse set of skills, such as multimedia, communication, teamwork, leadership, and working under time / resource pressure.