JOÃO GASPAR CUNHA

PhD researcher · Robotics Software Engineer · C++ & ROS

Contact Information

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Technical Skills

Domains: autonomous systems, human–robot collaboration, real-time simulation, evolutionary algorithms, artificial intelligence
Languages: C++ 17/20 (primary), C, Python, Lua, MATLAB, SQL
Build & packaging: CMake, vcpkg, multi-config builds, cross-platform Win/Linux/macOS
CI/CD & tooling: GitHub Actions (build matrices, release automation), Doxygen, Git
Quality & verification: unit testing (Catch2, GTest), static analysis (clang-tidy), code coverage (codecov)
Robotics: ROS/ROS2, CoppeliaSim, Gazebo, Universal Robots, MiR, KUKA
UI/Graphics: Dear ImGui

Spoken Languages

English (C2), Portuguese (native)

Summary

Doctoral researcher in Robotics and Artificial Intelligence. Over the course of my PhD, I've come to realise the days I enjoy most are the ones I spend solving problems through code. My engineering background gave me a lasting interest with making things run faster on fewer resources, and a conviction that code should be readable and easy to understand. Now I'm eager to keep growing as a robotics engineer and bring that mindset to a team building robotic systems that matter, wherever in the world it happens to be.

Experience

Doctoral Researcher
University of Minho + TU Eindhoven
Guimarães, PT & Eindhoven, NL (Jan 2023 – *present*)
• Architect and maintainer of multiple open-source C++ libraries.
• Built a Dynamic Field Theory simulation engine.
• Developed a neuroevolutionary algorithm that optimizes continuous-time neural-field architectures for robotic deployment.
• Best Innovation in HRI NeuroDesign Award - Winner IEEE RO-MAN 2025

R&D Robotics Engineer
DTx Digital Transformation CoLab
Guimarães, PT (Sep 2019 – Jan 2023)
• Involved across the full development cycle of two production robotic cells.
• Certified UR10e cobot cell that cut ergonomic risk and raised assembly-line throughput.
• Autonomous mobile manipulator (UR10e + MiR200) system that self-navigates between workstations, palletizes parts, and sorts defects via computer vision (HALCON).

Education

PhD, Electrical & Computer Engineering
University of Minho + TU Eindhoven, *ongoing* (FCT doctoral scholarship). Robotics and AI.

MSc, Industrial Electronics & Computer Engineering
University of Minho. Avg. 16/20; Dissertation 20/20; Awarded the Ministry Academic Merit Scholarship as top student of the final year (19.7/20 average).

Selected Open-Source Projects

★`dynamic-neural-field-composer`: C++20 real-time simulation library + interactive app. Benchmarked 15-41% faster than the next fastest framework.
★`neat-dnfs`: C++20 framework evolving continuous-time neural-field architectures.
CMake/vcpkg, CI + static analysis + release workflows, clang-tidy, codecov, Doxygen, cross-platform (Windows, Linux, macOS)