Valter Piedade

Valter André Ribeiro dos Santos Piedade

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> *PhD candidate specializing in SLAM and robust estimation. Dedicated to designing and implementing high-performance algorithms that enable reliable, real-time perception and localization for real-world applications.*

Experience

Técnico Lisboa, University of Lisbon

PhD Student | Lisbon, Portugal — *Feb 2022 – Present*

» Proposed **robust estimation** algorithms, including a novel **probabilistic sampling** approach for RANSAC [C.1] and a GNC-based **online search strategy** [C.3]; formulated a specialized **pixel sampler** for Neural Implicit Rendering [C.2]; and implemented a comprehensive **visual SLAM** framework, proposing a new camera localization strategy and pipeline architecture [C.4].

Research Grant | Lisbon, Portugal — *Jan 2025 – Jun 2026*

» Provided **technical oversight** for the design of a factory-scale **digital twin**; guided the development of industrial **process simulations** and **data acquisition strategies** to facilitate **data-driven optimization** of manufacturing workflows.

Research Grant | Lisbon, Portugal — *Sep 2020 – Jan 2025*

» Designed and implemented a **real-time visual SLAM** system from scratch in **C++** using **ROS2** and **g2o** for backend optimization; enabled robust localization in **repetitive retail environments** by processing **high-distortion fisheye stereo** data from an autonomous mobile robot.

Mitsubishi Electric Research Laboratories

Intern | Cambridge, MA, USA — *Dec 2025 – Mar 2026*

» Scaled the **visual SLAM** pipeline of [C.4] to ensure **reliability** and **efficiency**; optimized data structures and **multithreading** for **real-time performance**; refactored the codebase from a research prototype to an **open-source**, distribution-ready **C++** framework.

Consultant | Remote — *Jul 2024 – Nov 2025*

» Designed and implemented a **real-time visual SLAM** system from scratch in **C++**, supporting **calibration-agnostic monocular/RGB-D** inputs; integrated ONNXRuntime for **feed-forward depth inference** and **visual place recognition**, and **GTSAM** for robust optimization; developed a novel **spatio-temporal camera localization** approach that improves trajectory accuracy and prevents redundant keyframes; published in [C.4].

» Developed a **robust geometric estimation** method based on **Graduated Non-Convexity** for point cloud registration and pose graph optimization; implemented in **C++** with **Python wrappers**, leveraging **low-level optimization**; published in [C.3].

Skills

- **Specialized Area:** Real-Time Computer Vision, 3D Reconstruction, SLAM, Robust Estimation
- **Programming Languages:** C++, Python
- **Software & Tools:** OpenCV, Open3D, ROS/ROS2, g2o, Ceres, GTSAM, Git, CMake, Linux
- **Core Competencies:** Data Structures, Multi-threading, Parallel Computing (OpenMP)

Education

Ph.D. in Electrical and Computer Engineering (ECE) — *2022 – 2026*

Técnico Lisboa, University of Lisbon — Lisbon, Portugal

» Improving Visual Simultaneous Localization and Mapping Through Spatio-Temporal Modeling and Robust Solver Design. *Dissertation*, 2026.

» **Status:** Dissertation submitted; defense pending schedule.

M.Sc. in Electrical and Computer Engineering (ECE) — *2019 – 2021*

Técnico Lisboa, University of Lisbon — Lisbon, Portugal

» Retail Store Visual Structure-from-Motion. *Thesis*, 2021. — Thesis

B.Sc. in Electrical and Computer Engineering (ECE) — *2015 – 2019*

Técnico Lisboa, University of Lisbon — Lisbon, Portugal

PUBLICATIONS

C=Conference

[C.4] Revisiting Monocular SLAM with Spatio-Temporal Scene Modeling. Project Paper
Valter Piedade, Lalit Manam, Masashi Yamazaki, Pedro Miraldo.
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2026.

[C.3] SAC-GNC: SAmple Consensus for adaptive Graduated Non-Convexity. Project Paper Code
Valter Piedade, Chitturi Sidhartha, José António Gaspar, Venu Madhav Govindu, Pedro Miraldo.
IEEE/CVF International Conference on Computer Vision (ICCV), 2025. **Highlight paper (2.3%)**

[C.2] A Probability-guided Sampler for Neural Implicit Surface Rendering. Project Paper
Gonçalo Pais, **Valter Piedade**, Moitreya Chatterjee, Marcus Greiff, Pedro Miraldo.
European Conference on Computer Vision (ECCV), 2024.

[C.1] BANSAC: A dynamic BAyesian Network for adaptive SAmple Consensus. Project Paper Code
Valter Piedade, Pedro Miraldo.
IEEE/CVF International Conference on Computer Vision (ICCV), 2023.

PATENTS

P=Patent

[P.2] System and Method for Monocular Localization and Mapping Using Temporal and Spatial Support Retrieval.
Valter Piedade, Lalit Manam, Pedro Miraldo.
Patent filled.

[P.1] Enhanced Computation of Robust Loss Functions using Adaptive Annealing Factors.
Valter Piedade, Pedro Miraldo.
Patent filled.

HONORS AND AWARDS

› **Academic Merit Diploma** *2016*
Técnico Lisboa, University of Lisbon
» Awarded for outstanding academic performance in the academic year 2015/2016 during the BSc Degree in ECE.

ADDITIONAL INFORMATION

› **Reviewer:** IEEE T-PAMI (2026), IEEE/CVF CVPR (2025), IEEE ICRA (2025, 2026)
› **Teaching:** Teaching Assistant for Object-Oriented Programming (Java) *2023*
› **Languages:** Portuguese (Native), English (Professional working proficiency)
› **Professional Membership:** IEEE Graduate Student Member