

# DIOGO HENRIQUE FRAGOSO DE OLIVEIRA

Software Engineer Python/C++ | AI Specialist

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## Professional Summary

C++/Python Software Engineer with 4 years of experience in AI, computer vision, and drone robotics. Worked as a researcher at Labmetro/UFSC (VANT3D Project), responsible for deploying ROS/Gazebo, developing trajectory planning algorithms (Dijkstra, Euclidean distances), and creating vision pipelines with YOLO and OpenCV for industrial inspections with RPAS (Petrobras). Modeled 3D scenarios for simulation and algorithm validation, with proven results in real-world scenarios and embedded hardware (Jetson Nano). Experienced in deep learning (CIFAR-10, CNNs, detection, and 3D photogrammetry) and evolving Python prototypes into real-time C++ solutions. Currently focused on generative AI (LLMs, embeddings, RAG), integrating AI models into robust and scalable products.

## Professional Experience

### Robotics and Computer Vision Researcher

Oct 2018 – Dec 2022

*Labmetro/UFSC – VANT3D Project (On-site)*

- Deployed complete robotic simulation infrastructure with **ROS (Robot Operating System)** and **Gazebo**, enabling autonomous navigation algorithm testing before field validation
- **Modeled 3D scenarios** for industrial environment simulation, enabling development and validation of trajectory planning algorithms in a safe and controlled environment
- Developed **trajectory planning algorithms** (Dijkstra, Euclidean distances) in Python for drone navigation in complex industrial environments, mitigating operational risks
- Created **computer vision pipelines** with **YOLO** and **OpenCV** for anomaly detection in industrial inspections with RPAS (Remotely Piloted Aircraft Systems)
- Implemented industrial inspection project for **Petrobras**, validating solutions in **real-world scenarios** and on **embedded hardware (Jetson Nano)**, a robotics-focused platform
- Worked with **deep learning** applied to computer vision: CNN training on CIFAR-10 dataset, object detection, and **3D photogrammetry applied to Oil & Gas**
- Evolved Python prototypes into **C++** solutions with **CMake** and **YAML** configuration, ensuring real-time performance
- Published **4 scientific papers** documenting research results in conferences and journals
- Accumulated **+2,000h of research** in robotics, computer vision, and 3D photogrammetry

## Technical Skills

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### Programming Languages

**Python** – Advanced (NumPy, Pandas, Matplotlib, scikit-learn, TensorFlow, PyTorch) • **C++** – Advanced (C++11/14/17, STL, CMake, templates) • **SQL** – Advanced (PostgreSQL, SQLite) • **Bash/Shell** – Advanced

### Artificial Intelligence & Machine Learning

**Computer Vision:** YOLO, OpenCV, object detection, segmentation, 3D photogrammetry • **Deep Learning:** CNNs, model training (CIFAR-10), transfer learning • **Generative AI:** LLMs (GPT, Claude), embeddings, RAG • **Classic ML:** SVM, Random Forest, regression, clustering

### Robotics & Autonomous Systems

**ROS** – Node development, topics, services • **Gazebo** – Robotic simulation • **Trajectory Planning:** Dijkstra, A\*, RRT, potential fields • **Drones/RPAS:** Autonomous navigation, industrial inspection

### Tools & Technologies

**Version Control:** Git, GitHub, GitLab • **Build Systems:** CMake, Make • **Configuration:** YAML, JSON, XML • **Containers:** Docker • **CI/CD:** GitHub Actions, GitLab CI • **IDEs:** VS Code, PyCharm, CLion

## Scientific Publications

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- **Object Tracking Control Using a Gimbal Mechanism**  
[ISPRS Archives, Vol. XLIII-B1-2021, 2021](#)
- **Targetless Photogrammetry Network Simulation for Inspection Planning in Oil and Gas Industry**  
[ISPRS Annals, Vol. V-1-2020, 2020](#)
- **3D Photogrammetric Inspection of Risers Using RPAS and Deep Learning in Oil and Gas Offshore Platforms**  
[ISPRS Archives, Vol. XLIII-B2-2020, 2020](#)
- **Development of a ROS/Gazebo Simulation Environment for 3D Photogrammetric Inspection of Risers with RPAS**  
[Academia.edu, 2020](#)