# Gabriel F P Araújo

*Robotics Engineer*

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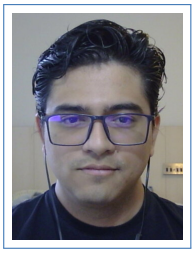

*Nothing in life is to be feared, it is only to be understood*
*Marie Curie*

## Skills

### Expert skills

| | |
|---|---|
| Hardware | Robotic Sensors (Perception, Localization), Hardware Debugging |
| Algorithms | Autonomous System Testing, Kalman Filters, Vehicle Control, Obstacle Avoidance |
| Systems | Development Models, Field Experiments, Control Systems |

### Development

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|---|---|---|---|
| Languages | C/C++, Python, JavaScript | Frameworks | ROS1, ROS2, Autoware, GoogleTest |
| DevOps | Git, Docker, Unit Testing, CI/CD | Tools | CMake, Docker, GDB, Jenkins |
| Libraries | ROS Navigation, BehaviorTree.CPP, PyTrees, PCL, OpenCV, Eigen | | |
| Applications | MATLAB, SolidWorks, Fusion 360, Blender, Eagle, Inkscape, Altium | | |

## Education

2022 – 2023 **MSc in Informatics**, *University of Brasília*, Brasília, Brazil
Coursework: Digital Signal Processing, Computing Fundamentals, Artificial Intelligence, Software Engineering

2012 – 2021 **BSc in Mechatronics Engineering**, *University of Brasília*, Brasília, Brazil
Coursework: Control Theory, Robot Control Principles, Computational Fundamentals of Robotics, Real-Time Processing, Object-Oriented Programming, Image Processing

## Experience

April 2022 – Today **Robotics Engineer (remote)**, *Smoob BV*, Leeuwarden, Full-time
*Outline*
Working as the main robotics engineer for a self-driving car start-up in the Netherlands. Responsible for leading the development of a software stack for an Autonomous Vehicle. In charge of planning and prototyping possible solutions for the final product. Communication with stakeholders and requirement analysis.

*Key Achievements*
- Curating libraries and tools for self-driving cars.
- Development and integration of Perception and Planning modules using Autoware and ROS.
- Developing proprietary Simultaneous Localization and Mapping (SLAM) algorithm.

Jan. 2022 – March 2022 **Robotics Consultant (remote)**, *Smoob BV*, Leeuwarden, Contract
*Outline*
Worked as a Consultant for an early-stage start-up based in the Netherlands. Responsible for setting up demonstrations for investors and solving technical issues.

*Key Achievements*
- Remotely checks and sensor set up for a self-driving car prototype.
- Set up Autoware.AI stack to run demonstrations for stakeholders.
- Solving errors and installation issues regarding ROS and other libraries.
- Advisement about technical solutions.

Dec. 2021 – March 2022 **Jr Robotics Software Engineer**, *Automni*, São Paulo, Full-time

*Outline*

Worked on a leading Brazilian start-up in the logistics business. Promoted from intern to full-time employee. Scheduled to test and validate the robots and troubleshoot on the client's site.

*Key Achievements*

- Development and integration of object detection module using 2D Laser and PCL.
- Robot calibration, configuration, testing, and validation on-site.
- Log issues and faults during test and validation steps and documentation of testing results.
- Suggestion of corrections and bug fixes to both hardware and software.
- Hardware maintenance of the deployed robots.

May 2020 – Dec. 2021 **Robotics Developer (*remote*)**, *Automni*, São Paulo, Internship

*Outline*

Worked as a robotics intern at a leading Brazilian start-up in logistics. Responsible for maintaining and documenting the code base and helping the engineering team add new project features.

*Key Achievements*

- Development of the order management system for multi-robots.
- Addition of new behaviors into the robot's Behavior Tree using BehaviorTree.CPP library.
- Integration of the client's system to send orders to the robots.
- Development of User Interface in ReactJS for interacting with the robots using Roslibjs.
- Feature addition and bug fixing in the company's multi-robot route planner.
- Integration of 2D Laser security areas into ROS using OpenCV.
- Documentation and testing of the developed code.

April 2019 – June 2019 **Embedded Developer**, *LandSense Soluções Tecnológicas*, Brasília, Internship

*Outline*

Worked on a new product at a Brazilian technology start-up while an undergraduate student. Responsible for prototyping a new product and its validation.

*Key Achievements*

- Design and implementation of a Bluetooth mesh protocol using Bluetooth® 4.0.
- Field testing of the mesh communication.
- Embedded software development using Nordic nRF52832 SoC.
- Main technology: C/C++.

July 2015 – April 2019 **Undergraduate Researcher**, *LARA (Automation and Robotics Laboratory)*, Brasília

*Outline*

Worked in a robotics research laboratory at the University of Brasília as an undergraduate student. Responsible for maintaining the robots and helping the researchers to do experiments.

*Key Achievements*

- Creation of a chatbot system for controlling a mobile robot using speech recognition.
- Implement an indoor localization system using EKF, OpenCV, and AR (Augmented Reality) tags.
- Development of an environment explorer using SMACH ROS and ROS Navigation stack.
- Implementation of ROS drivers for GPS and IMU sensors.
- Firmware development for an Inertial Navigation System (INS) using STM32F103C8 development board.
- Configuring and setting up robots for experiments.
- Maintenance and documentation of ROS packages and robot hardware.
- Also engaged in other research projects in robotics, specifically on perception and navigation.

## Projects

Jan. 2021 – Oct. 2021 **MissionControl: An architecture for mission coordination of heterogeneous robots**

The work is divided into three parts: (i) Implementation of a simulation environment for multi-robot systems using *Blender*, *Fusion360*, *ROS Navigation* and Morse simulator in *Python* and *ROS1*. (ii) Implementation of a robotics action sequencer using *Behavior Trees* in *Python* and *ROS2*. (iii) Design and implement a test orchestration architecture based on *Docker* to run several experiments autonomously. Paper published in a major journal, online available at 10.1016/j.jss.2022.111363.

May 2017 – Aug. 2017 **Expansion of the GNSS-SDR software to GLONASS system**, *Google Summer of Code 2017 participant with GNSS-SDR*

Implementation of Acquisition and Tracking blocks in a GPS receiver for the GLONASS satellites. The Acquisition aims to find all the satellites visible to the antenna and discover which Doppler frequency they are. The Tracking tracks the satellites' signal so the navigation data can be retrieved from them. Addition of unit and system tests of the developed code. Further details in the report, online available at *click here*. Project implemented in *C++14*. Inside GNSS magazine published an article about the work, available at *click here*.

July 2014 – June 2015 **Need4SS: Autonomous Driver using Evolutionary Algorithm**

Development of an autonomous driver for the TORCS simulator to compete in the Simulated Car Racing Championship (SCRC), a former GECCO Competition. The implementation used *Finite State Machine* in *C++11*. Later, we evolved the state machine using a *Genetic Algorithm*. The driver got 5th place in the SCRC 2015. We published and presented the development and results as a conference paper, online available at 10.1109/SBGames.2015.19.

## Languages

| | | |
|---|---|---|
| Portuguese | Mother tongue | |
| English | C1 Advanced | *Written and spoken fluent* |
| Spanish | A2 Elementary | *Can read well, but low speaking and listening skills* |
| Dutch | Beginner | *Basic words and phrases only* |
| Japanese | Beginner | *Basic words and phrases only* |