Guilherme Augusto Potje

Personal Data

Place and Year of Birth:	Presidente Prudente, SP, Brazil | 1991
Citizenship:	Brazilian
Current Location:	Pampulha Area, Belo Horizonte – MG, Brazil
Email:	guipotje@gmail.com
Webpage:	https://guipotje.github.io

Work Experience

2022 – Current | **Computer Vision Engineer, Invent Vision**

Dynamic Computer Vision Engineer with more than a year's expertise at Invent Vision, specializing in developing custom solutions for agricultural and manufacturing sectors. Proficient in classical and 3D Machine Vision techniques, leveraging a range of technologies including LiDAR, stereo vision, and multispectral imaging. Skilled in image processing, 3D reconstruction and multi-modal sensor calibration. Building on this expertise, I am adept at integrating and deploying robust solutions using modern tools like Docker and REST APIs, with a strong emphasis on embedded systems.

2017 – 2018 | **Research Engineer, VeRLab and Instituto Tecnológico Vale (ITV)**

I worked as a Computer Vision research engineer on an R&D project founded by the Instituto Tecnológico Vale (ITV) called "EspeleoRobô". The purpose of the research was to develop an autonomous robot for cavity exploration and tools for immersive visualization and interaction with 3D-mapped cavities. In this project, my activities were focused on 3D data processing by creating a fully automatic mesh reconstruction and texturing pipeline (C++ and CGAL library). The reconstruction pipeline was validated by integrating the method into a semi-autonomous framework for robot navigation and was tested in both real and simulated scenarios. The generated 3D models were also deployed to the Microsoft HoloLens device for immersive visualization using the Unity engine. | Link to video

2014 – 2016 | **Graduate Research Intern, VeRLab and Instituto Tecnológico Vale (ITV)**

As a Computer Vision researcher, I worked on a R&D project from Vale, the largest mining company from Brazil, that aimed to perform cooperative mapping using small autonomous aerial robots. The project involved several other researchers focused on robotics and mapping. My activities consisted of coupling 3D reconstruction from images, remote sensing, and geophysics. My contributions to the project were designing a complete structure-from-motion pipeline for 3D reconstruction from photos and a tool for magnetic data processing and data fusion that generates colored 3D magnetic maps. The project was implemented in C++ and Python using the following open-source libraries: OpenCV, Ceres Solver, OpenMVG, PCL, and SciPy.

| Link to video

Education

2018 – *Current*	Ph.D. in Computer Science *Federal University of Minas Gerais (UFMG), Belo Horizonte – MG. Brazil.* Fields: Computer Vision and Deep Learning Research Title: "Towards Deformation-Invariant Image Descriptors" Advisor: Prof. Erickson R. Nascimento (UFMG) Co-Advisor: Prof. Renato Martins (UBFC) | Link to project page
2014 – 2016	M.Sc. in Computer Science *Federal University of Minas Gerais (UFMG), Belo Horizonte – MG. Brazil.* Field: Computer Vision Thesis: "On the Improvement of Three-Dimensional Reconstruction from Large Datasets" Advisor: Prof. Erickson R. Nascimento (UFMG) Co-Advisor: Prof. Mario F. M. Campos (UFMG) | Link to thesis
2010 – 2013	Bachelor's Degree in Computer Science *Unoeste – FIPP, Presidente Prudente – SP. Brazil.* Field: Image Processing Thesis: "Building's Roof Contour Extraction Using LiDAR and Aerial Images" Advisor: Prof. Mario A. Pazoti (FIPP) | Link to thesis

Awards

2022 Awarded Silver Medal in the 'Image Matching Challenge 2022 (CVPR Workshop)' Kaggle Competition, ranking 18th out of 642 teams.

2021 Google Latin America Research Awards (Google LARA). "Learning to Match Images of Deformable Objects".

Languages

Brazilian Portuguese: Native

English: Fluent

Computational Tools Knowledge

Languages:	C, C++, Python, Java, C#, LaTeX, SQL, Javascript, HTML.
Software & Libraries:	OpenCV, PyTorch, Tensorflow, Open3D, Ceres Solver, Scikit-learn, Git, Docker, Linux, Unity 3D, ROS.

Topics of Interest

General:	Computer Vision, Deep Learning, Photogrammetry, Robotics, Computer Graphics, Artificial Intelligence
Specific:	3D Reconstruction, 3D Vision, Machine Vision, SLAM.

Publications

2023 Cadar, F., Melo, W., Kanagasabapathi, V., **Potje, G.**, Martins, R., Nascimento, E. R. "Improving the Matching of Deformable Objects by Learning to Detect Keypoints". Pattern Recognition Letters.

2023 **Potje, G.**, Cadar, F., Araujo, A., Martins, R., Nascimento, E. R. "Enhancing Deformable Local Features by Jointly Learning to Detect and Describe Keypoints". IEEE/CVF Conference on Computer Vision and Pattern Recognitiong (CVPR).

2022 Melo, W., **Potje, G.**, Cadar, F., Martins, R., Nascimento, E. R. "Learning to Detect Good Keypoints to Match Non-rigid Objects in RGB Images". Conference on Graphics, Patterns and Images (SIBGRAPI).

2022 **Potje, G.**, Martins, R., Cadar, F., Nascimento, E. R. "Learning Geodesic-Aware Local Features from RGB-D Images". Computer Vision and Image Understanding (CVIU).

2021 **Potje, G.**, Martins, R., Cadar, F., Nascimento, E. R. "Extracting Deformation-Aware Local Features by Learning to Deform". Thirty-fifth Conference on Neural Information Processing Systems (NeurIPS).

2021 Azpúrua, H., Rezende, A., **Potje, G.**, da Cruz Júnior, G. P., Fernandes, R., Miranda, V., ... & Freitas, G. M. "Towards Semi-autonomous Robotic Inspection and Mapping in Confined Spaces with the EspeleoRobô". Journal of Intelligent & Robotic Systems.

2019 Nascimento, E. R., **Potje, G.**, Martins, R., Cadar, F., Campos, M. F., & Bajcsy, R. "GEOBIT: A Geodesic-Based Binary Descriptor Invariant to Non-Rigid Deformations for RGB-D Images". International Conference on Computer Vision (ICCV).

2019 Azpúrua, H., **Potje, G. A.**, Rezeck, P. A., Freitas, G. M., Uzeda Garcia, L. G., Nascimento, E. R., ... & Campos, M. F. "Cooperative Digital Magnetic-elevation Maps by Small Autonomous Aerial Robots". Journal of Field Robotics.

2017 **Potje, G.**, Resende, G., Campos, M. & Nascimento, E. R. "Towards an Efficient 3D Model Estimation Methodology for Aerial and Ground Images". Machine Vision and Applications (MVA).

2016 Macharet, D. G., Perez-Imaz, H. I., Rezeck, P. A., **Potje, G. A.**, Benyosef, L. C., Wiermann, A., ... & Campos, M. F. "Autonomous Aeromagnetic Surveys using a Fluxgate Magnetometer". Sensors.