Tunai Porto Marques

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Education

Ph.D. in Electrical Engineering — Aug. 2017 – Present (Completion Fall 2021)
University of Victoria, Victoria, BC. Current GPA: 4.0,
Thesis: Computer Vision-based systems for Environmental Monitoring Applications.

M.Sc. in Electrical Engineering — June 2016
California State University, Long Beach, California. Overall GPA: 3.9.
Title: Autonomous robot for mapping using ultrasonic sensors.

B.Sc. in Computer Engineering — February 2014
Universidade Federal de Sergipe (Federal University of Sergipe), Brazil.

Work Experience

University of Victoria, Victoria, BC **–** *Computer Vision/Deep Learning Researcher & Sessional Lecturer*

- Sessional Lecturer of the Computer Vision course (ECE 471/536) in the Spring term of 2021. Topics taught are an approximately equal amount of traditional computer vision and machine learning/deep learning.
- Since January 2021, working with Environment and Climate Change Canada (ECCC) and the Wildlife Conservation Society Canada (WCS) to develop a system for the detection of marine vessels and beluga whales in visual data from the Canadian Arctic. — Sept. 2018 - Present
- Since January 2019, working with Victoria-based ASL Environmental Sciences Inc. and Canada's Department of Fisheries and Oceans (DFO) to develop a deep learning-based autonomous detector of pelagic species in echograms (i.e., visual representation of acoustic backscatter data) via object detection and instance segmentation (see [2], [4]).

University of Victoria, Victoria, BC **–** *Computer Vision/Deep Learning researcher*

- Worked with the Geography Department at UVIc and Environment and Climate Change Canada (ECCC) to build an autonomous visual detection system for marine vessels using transfer learning, end-to-end object detectors and a novel Gaussian Mixture Model-based attention system (see [1]). The data was captured off the coast of Vancouver Island in a critical habitat of SRKWs with a DSLR camera over more than three years. — Sept. 2018 – Aug. 2020

Assistive Technologies Laboratory (UVic), Victoria, BC **–** *Electrical engineering Co-op*

- Development of the mapping and navigation systems of a mobile robot using ROS (robotics operational system) and its SLAM and navigation packages. — May 2018 – Sept. 2018

Ocean Networks Canada, Victoria, BC **–** *Electrical engineering Co-op*

- Repair and upgrade of *Wally*, an ROV (Remote Operated Vehicle) robotic platform to be deployed under profound water columns (i.e., one kilometer). — Jan. 2018 – May 2018

University of Victoria, Victoria, BC **-** *Teaching Assistant (TA) and Research Fellow*

- Awarded teaching assistant of the Design Project I (ECE 399), Microprocessor-Based systems (ECE 355) and Medical Image Processing (ECE 435) courses. — Sept. 2017 - Present

CSULB Foundation, Long Beach, California - *Autonomous Robots Research Internship*

- Designed a mobile robot capable of autonomously creating a map of a previously unknown environment using multiple sensors and an Arduino. — May 2015 – July 2015

Petrobrás, Sergipe, Brazil – *Computer Engineering Internship* — Oct. 2013 – Feb. 2014

- While working at the Research Centre of Petrobrás (CENPES), implemented an algorithm of lossless data compression and decompression (*LabView* software).

Federal University of Sergipe, Sergipe, Brazil – *Sessional Lecturer*

- A 60-hour Robotics course to Computer Science and Computer Engineering students. — Dec. 2016 –Apr. 2017

Federal University of Sergipe, Sergipe, Brazil - *Research Internship*

- Worked in projects involving 1) a rotating platform for a video camera using a stepper motor as a part of a surveillance system (2010); 2) methods to parallelize processes, in particular Computer Vision algorithms, using both CPUs and the GPUs (2012); 3) an autonomous robot capable of locating itself on a known environment, recognizing a specific object and rescuing it.

Aug. 2009 – Aug. 2012

Select Publications

[1] **Marques, T. P.**, *et al.*, "*Size-invariant Detection of Marine Vessels from Visual Time Series*," 2021 IEEE/CVF Winter Conference on Applications of Computer Vision (WACV). Manuscript, Code

[2] **Marques, T. P.**, *et al.*, "*Detecting Marine Species in Echograms via Traditional, Hybrid, and Deep Learning Frameworks*," 2020 25th International Conference on Pattern Recognition (ICPR). Video

[3] **Marques, T. P.**, Brazan-Albu, A., "*L^2UWE: A Framework for the Efficient Enhancement of Low-Light Underwater Images Using Local Contrast and Multi-Scale Fusion*," 2020 IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops: New Trends in Image Restoration and Enhancement (NTIRE). Manuscript, Code

[4] Rezvanifar, A.*, **Marques, T. P.***, *et al*. "*A Deep Learning-based Framework for the Detection of Schools of Herring in Echograms*," Conference on Neural Information Processing Systems (NeurIPS) Workshop: Tackling Climate Change with ML. *: equal contribution authors. Manuscript.

[5] **Marques, T. P.**, Albu, A. B., Hoeberechts, M., "*A Contrast-Guided Approach for the Enhancement of Low-Lighting Underwater Images*," MDPI Journal of Imaging, vol. 5, no. 10: 79, 2019. Manuscript

[6] **Marques, T. P.**, Albu, A. B., Hoeberechts, M., "*Enhancement of Low-Lighting Underwater Images Using Dark Channel Prior and Fast Guided Filters*," Pattern Recognition and Information Forensics. International Conference on Pattern Recognition (ICPR) 2018. Manuscript

[7] **Marques, T. P.**, Hamano, F., "*Autonomous robot for mapping using ultrasonic sensors*," 2017 IEEE Green Energy and Smart Systems Conference (IGESSC). Manuscript

Awards

Research Fellowship at the University of Victoria — Sept. 2017
Awarded with a 2-year Research Fellowship from the Electrical Engineering department of the University of Victoria (based on scholastic standing).

Research Award from the Electrical Engineering Department of CSULB — May 2016
Won the *Research Award* from CSULB's College of Engineering by the end of the M.Sc. program (presented once per semester to a single student of the department).

1^{st} place in the 27^{th} CSULB's Student Research Competition — Feb. 2016
Awarded for the presentation of the project "*Autonomous Robot for Mapping*" (see [7]) in the Computer Science and Electrical Engineering category.

Recipient of the "*Science without borders*" Master's degree scholarship — Feb. 2014
Awarded with a 2-year scholarship from the Brazilian government towards a M.Sc. in Electrical Engineering program at California State University, Long Beach (CSULB).

Computer Skills

- **Computer Languages and Frameworks**: Python, Pytorch, TensorFlow, C, C++, Verilog, Ruby, Java
- **Applications and Platforms**: MATLAB, PyCharm, Eclipse, Arduino IDE, ROS, Windows, Linux

References

Dr. Alexandra Branzan Albu
Professor and Graduate Advisor — aalbu@uvic.ca
Electrical and Computer Engineering Department, University of Victoria

Jan Buermans
Vice president, Board Member — jbuermans@aslenv.com
ASL Environmental Sciences Inc.

Dr. Patrick O'Hara
Senior Staff Scientist — patrick.ohara@canada.ca
Canadian Wildlife Service, Environment and Climate Change Canada

Online resume and Website

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