Elizabeth Vargas

CONTACT
INFORMATION

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PROFESSIONAL
EXPERIENCE

Leap AI   Jan. 2023 - Present
Senior Machine Learning Engineer   Edinburgh, United Kingdom
- Computer vision and machine learning in a robotic system for product packing.
- Develop and deploy novel computer vision formulations, models, and algorithms for object segmentation, classification, and tracking (PyTorch/OpenCV).
- Design experiments for methodical data collection and analysis for vision pipelines.
- Work closely with cross-functional teams, ensuring the vision system's seamless integration and performance in the broader robot system (ROS).

Ouster Automotive   Dec. 2020 - Oct. 2022
Software Engineer   Edinburgh, United Kingdom
- Ouster acquired *Sense Photonics* in 2021 and established *Ouster Automotive*.
- Performed statistical modelling and data analysis to support the design of 3D Flash LiDAR to be deployed within self-driving vehicles.
- Developed a simulation software that matches real world measurements employed to guide LiDAR design specifications (Python, Scipy, C++).
- Defined and perform experiments to test the performance boundaries of signal processing algorithms used to process data from the LiDAR system.

ORCA Hub   Jan. 2019 - Nov. 2020
Research Associate   Edinburgh, United Kingdom
- Developed a real-time computer vision system, deployed on a remotely operated underwater vehicle for the surveying and inspection of offshore assets (ROS, C++).
- Implemented Visual Simultaneous Localisation And Mapping (SLAM) solution for limited visibility environments, fusing data from acoustic and optical sensors.
- Employed stereo cameras for 3D reconstruction of submerged structures, enabling the offshore industry to inspect and certify their integrity.

Toshiba Medical Visualization Systems   Jun. 2015 - Sep. 2015
Research Intern   Edinburgh, United Kingdom
- Characterised Alzheimer using Magnetic Resonance Imaging (MRI), performing texture analysis in brain tissue enabling the early diagnose of the disease.
- Combined brain gyrus segmentation with regional texture metrics (Pandas).
- Applied supervised machine learning techniques to image texture, including feature selection, classification and regression (Python, Scikit-Learn).

EDUCATION

Ph.D. Signal Processing   Oct. 2015 - Sep. 2019
Heriot-Watt University, United Kingdom
- Advanced the state-of-the-art in acoustic source localisation in constrained environments through three major contributions (detailed below).
- Reduced computation six fold while maintaining localisation accuracy at state-of-the-art levels (Python, NumPy, SciPy).

- Implemented a signal sampling algorithm to achieve accurate localisation for a signal transmitted at a compression ratio of 40 : 1 (MATLAB).
- Applied deep learning techniques to achieve a 20% improvement in localisation accuracy using data augmentation from a GAN (Ptyhon, Keras, TensorFlow).

M.Sc. Computer Vision and Robotics with Distinction Sep. 2013 - Jun. 2015
University of Burgundy, France GPA: 15.3/20
- Joint Erasmus Mundus Master Program with *University of Burgundy* (France), *University of Girona* (Spain) and *Heriot-Watt University* (United Kingdom).
- Basis of signal and image processing, medical image analysis (MATLAB).
- Segmentation, multi-view geometry, object recognition and tracking (OpenCV).
- Robot autonomy and intelligence, including SLAM and motion planning (ROS).

B.Sc. Computer Science Aug. 2006 - Aug. 2012
Universidad del Valle, Colombia GPA: 4.67/5.0
- Courses in algorithms, data structures, compilers and software engineering.
- Projects including image processing (C/C++), search algorithms, optimisation, evolutionary algorithms, software development (Java) and databases (MySQL).

SELECTED PUBLICATIONS

E. Vargas, R. Scona, J. Scharff Wilners, T. Luczynski, Y. Cao, S. Wang, Y. Petillot, *Robust Underwater Visual SLAM Fusing Acoustic Sensing*, in International Conference on Robotics and Automation **(ICRA)**, Xina, China, June 2021.

E. Vargas, J. R. Hopgood, K. Brown, K. Subr, *On Improved Training of CNN for Acoustic Source Localisation*, in Transactions on Audio, Speech, and Language Processing **(TASLP)**, 2021.

E. Vargas, K. Brown, K. Subr, *Impact of Microphone Array Configurations on Robust Indirect 3D Acoustic Source Localization*, in International Conference on Acoustics, Speech and Signal Processing **(ICASSP)**, Calgary, Canada, April 2018.

DISTINCTIONS

Erasmus Mundus Scholarship, *European Commission* Sep. 2013
Granted to 4 European students for academic and professional achievement to study a Master in Computer Vision and Robotics (ViBot) during the academic year 2013-2015.

TRAINING

International Summer School on Deep Learning Jul. 2018
Research training event aiming at updating participants about the most recent advances in the critical and fast developing area of deep learning.

International Computer Vision Summer School (ICVSS) Jul. 2016
Provided an objective, clear, and in-depth summary of the state-of-the-art research in the areas of Computer Vision, Machine Learning and Artificial Intelligence.

TECHNICAL SKILLS

Operating Systems: Windows, Linux (Ubuntu)
Programming Languages: Python, MATLAB, C/C++
Robotics: Robotics Operating System (ROS), Gazebo, Rviz
Computer Vision: OpenCV, Scikit-image
Machine Learning: Numpy, Scipy, Scikit-learn, Pandas, PyTorch
DevOps: Git, Docker
Agile Tools: Jira, Confluence