Elizabeth Vargas

CONTACT INFORMATION

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PROFESSIONAL EXPERIENCE

ORCA Hub Jan. 2019 - Present
Research Associate Edinburgh, United Kingdom

- Deployed a real-time computer vision system 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 underwater environments, based on data fusion from acoustic and optical sensors.
- Employed stereo cameras for 3D reconstruction of submerged structures, enabling the offshore industry to inspect and certify their integrity.
- Designed, set-up, and executed practical experiments and prototype systems relating to the demonstration of solution capabilities to industry representatives.

Toshiba Medical Visualization Systems Jun. 2015 - Sep. 2015
Research Intern Edinburgh, United Kingdom

- Characterised Alzheimer disease using Magnetic Resonance Imaging (MRI), performing texture analysis in the hippocampus tissue enabling the diagnose the disease at various stages.
- Combined brain gyrus segmentation with regional texture metrics (Pandas).
- Applied machine learning to image texture, including feature selection, classification and regression techniques (Python, Scikit-Learn).

Philips Research Aachen Mar. 2011 - Jul. 2011
Research Intern Aachen, Germany

- Magnetic Resonance Imaging (MRI) applied to characterisation of liver diseases, by extraction of features relevant for disease diagnosis (MATLAB).
- Performed statistical analysis using linear regression on volume data sets to obtain parametric maps of apparent diffusion coefficients from diffusion-weighted MRI.
- Implemented image processing algorithms, including a gray level-based iterative segmentation that applies a threshold derived from histogram analysis.

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 by training a Convolutional Neural Network (CNN) using data augmentation from a Generative Adversarial Network (GAN) (Ptyhon, Keras, TensorFlow).

M.Sc. Computer Vision and Robotics with Distinction Sep. 2013 - Jun. 2015
University of Burgundy, France

- 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

- 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, J. R. Hopgood, K. Brown, K. Subr, *A Compressed Encoding Scheme for Approximate TDOA Estimation*, in European Signal Processing Conference **(EUSIPCO)**, Rome, Italy, September 2018.

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

James Watt Scholarship, *Heriot-Watt University* Oct. 2015
Granted to 5 applicants for a Ph.D. position at the School of Engineering and Physical Sciences (EPS), awarding tuition fees and annual stipend to support studies for 3 years.

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, C/C++
Robotics: Robotics Operating System (ROS)
Computer Vision: OpenCV
Machine Learning: Scikit-Learn, NumPy, SciPy
Software Tools: MATLAB
Version Control: Git/Github

Volunteer Experience

Edinburgh International Science Festival, *Student Helper* 2017 - 2018
Helper at the *"Marty: Activate!"* workshop that taught children (11+ years) to program a robot to interact with its surroundings using the programming language *Scratch*.

Cracking the Code, *Student Helper* Jun. 2017
Introduce girls (9-11 years) to programming a robot using LEGO MINDSTORMS, as part of a Equality Challenge Units (ECU) project aimed at attracting underrepresented groups into subjects they don't traditionally apply for.