DIEGO PATIÑO

Post-Doctoral Researcher

EDUCATION

2014 - 2020

Ph.D. Computer Engineering
National University of Colombia
Medellin, Colombia
The title of my Ph.D. dissertation was "Shape Analysis and Description Based on the Isometric Invariances of Topological Skeletonization". I designed an equivariant feature descriptor to classify shapes based on the properties of their Medial Axis.

2010 - 2012

M.Sc. Computer Engineering
National University of Colombia
Medellin, Colombia
The topic of my master's thesis was "Automatic landform classification using texture analysis on satellite images."

2005 - 2010

B.S.E. Computer Engineering
National University of Colombia
Medellin, Colombia

CONTACT

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RESEARCH INTEREST

My research interests include machine learning, physics-informed neural networks, and geometric approaches to computer vision, focusing on 3D vision, shape analysis, symmetry detection, and single-image to 3D Reconstruction.

RESEARCH EXPERIENCE

Post-Doctoral Researcher — Apr. 2020 - Present
University of Pennsylvania
General Robotics, Automation, Sensing & Perception Lab

My current work includes conducting and leading independent research on machine learning and geometric computer vision, shape reconstruction, video prediction, and physics-informed machine learning. I work under the supervision of Prof. Kostas Daniilidis.

Visiting Researcher — Feb. 2018 - Apr. 2020
University of Pennsylvania
General Robotics, Automation, Sensing & Perception Lab

I worked on deep learning and geometric computer vision research under the supervision of Prof. Kostas Daniilidis.

Research Assistant — Jul. 2014 - Jul. 2015
University of Wisconsin-Madison
Laboratory for Molecular and Computational Genomics

I conducted research on the development of new computer vision approaches for detection, sequencing, and alignment of single DNA molecules under confinement. I worked under the supervision of Prof. David C. Schwartz.

Research Assistant — Jan. 2012 - Jul. 2012
Pontifical Catholic University of Chile
Department of Computer Science

I conducted research on computer vision techniques applied to geo-spatial information, and automatic classification of landforms. I worked under the supervision of Prof. Domingo Mery.

INDUSTRY EXPERIENCE

Software Developer — Mar. 2016 - Feb. 2018
Gotta Ingenieria
https://gottaingenieria.com

In this position I designed and developed several python-based hydromorphology simulation plug-ins for ArcGIS.

SKILLS

Python/Numpy/SciPy 8+ yrs

Pytorch/tensorflow 3+ yrs

GIT 7+ yrs

Linux 15+ yrs

Matlab 4+ yrs

Java 2+ yrs

C++/CUDA 2+ yrs

LANGUAGES

Spanish native

English fluent

Portuguese good

Software Developer Jun. 2016 - Dec. 2016
Launchpad
https://www.launchpadapps.com.au

Primary responsibilities included developing client/server mobile apps for the iOS platform in Objective C and Swift programming languages.

Software Engineer Aug. 2012 - Jun. 2014
Early Warning System of the City of Medellín
https://siata.gov.co

In this role, I developed software tools for weather forecasting and created software to support geospatial data visualization. Additionally, I developed computer vision tools to process images generated from Doppler microwave weather radars.

TEACHING EXPERIENCE

- **Algorithms** (Teaching assistant). Fall 2010 - Fall 2011.
- **Databases**. Spring 2011.
- **Introduction to Programming**. Spring 2013.
- **Web Development**. Spring 2013.
- **Physics Simulations and Software Engineering for Instrumentation**. Fall 2013.
- **Algorithms**. Fall 2016.
- **Computer Vision**. Fall 2017.

ACADEMIC HONORS AND AWARDS

- Enlazamundos Scholarship, Medellín - Colombia, 2012.
- MinCiencias Doctoral Scholarship - 727-2015, Colombia.

SERVICE

- **Reviewer for the Elsevier's Pattern Recognition Journal.**
- **ICPR'22 Reviewer.** 26th International Conference on Pattern Recognition.
- **MICCAI'22 Reviewer.** 25th International Conference on Medical Image Computing and Computer Assisted Intervention.
- **Reviewer for the Canadian Journal of Forest Research.**
- **MICCAI'21 Reviewer.** 24th International Conference on Medical Image Computing and Computer Assisted Intervention.
- **Reviewer for Revista DYNA.** Engineering journal edited by the National University of Colombia.

PUBLICATIONS

2022 **Patiño, D., Mayya, S., Calderon, J., Daniilidis, K., and Saldaña, D.**, "Learning to Compensate Wind Turbulence with a Team of Robots: A Reinforcement Learning Approach", Robotics and Automation Letters , Under revision.

2022 **Patiño, D., Schmeckpeper, K., Gupta, H., Georgakis, G., and Daniilidis, K.**, "Self-supervised implicit shape reconstruction and pose estimation for video prediction", ICRA Workshop on Motion Planning with Implicit Neural Representations of Geometry - 2022 .

2022 **Patiño, D., Esteves, C., and Daniilidis, K.**, "Level Set Mesher: Single-image to 3D reconstruction by following the level sets of the signed distance function", ICPR 2022 .

2021 **Patiño, D., and Branch, J.W.**, "Cosine-Pruned Medial Axis: A New Method for Isometric Equivariant and Noise-Free Medial Axis Extraction", IEEE Access , https://doi.org/10.1109/ACCESS.2021.3072933.

2020 **Patiño, D., Ceballos-Arroyo, A. M., Rodriguez-Rodriguez, J. A., Sanchez-Torres, G., and Branch-Bedoya, J. W.**, "Melanoma detection on dermoscopic images using superpixels segmentation and shape-based features", 15th International Symposium on Medical Information Processing and Analysis , https://doi.org/10.1117/12.2545300.

2018 **Patiño, D., Avendaño, J., and Branch, J.W.**, "Automatic skin lesion segmentation on dermoscopic images by the means of superpixel merging", International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI) , https://doi.org/10.1007/978-3-030-00937-3_83.

2018 **Goez-Mora, J. E., Londoño-Lopera, J. C., and Patiño, D.**, "Automatic Visual Classification of Parking Lot Spaces: A Comparison Between BoF and CNN Approaches", Workshop on Engineering Applications , https://link.springer.com/chapter/10.1007/978-3-030-00350-0_14.

2017 **de León, J.C.B., Patiño, D., Restrepo, A., and Branch, J.W.**, "Computational Detection of Salient Information to Identify High Stress and Ambiguity Regions in Digital Photoelasticity Images", Image Processing and Applications (IM4E) , https://doi.org/10.1364/ISA.2017.IM4E.2.

2015 **Zhou, S., Goldstein, S., Place, M., Bechner, M., Patiño, D., Potamousis, K., Ravindran, P., Pape, L., Rincon, G., Hernandez-Ortiz, J., Medrano, J. F. and Schwartz, D. C.**, "A clone-free, single molecule map of the domestic cow (Bos taurus) genome", BMC Genomics , https://doi.org/10.1186/s12864-015-1823-7.

2012 **Patiño, D., Mery, D., Fernandez, B.V., Branch, J.W.**, "Automatic Landform Classification of Uplands Based on Haralick's Texture", CLEI XXXVIII - Latin-American Informatics Conference, IEEE , DOI:10.1109/CLEI.2012.6427164.