Antonio R. Paiva

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PROFESSIONAL EXPERIENCE	

Principal Data Scientist *March 2022 – present*
Allstate, Chicago, IL (Remote – based in NJ)

- Research new approaches to measure the traffic safety risk of driver-assistance and autonomous driving systems.
- Developed new models for information extraction from aerial images.

Advanced Data Analytics Researcher *Aug. 2015 – March 2022*
ExxonMobil, Annandale, NJ

- Led research projects on deep learning probabilistic models, geophysical uncertainty quantification, and occupational safety data analytics.
- Developed machine learning models for microbial modeling and fault detection.

Technical Team Lead *Jan. 2014 – Jul. 2015*
ExxonMobil Upstream Research Company, Houston, TX

- Managed research deployment and Agile software development and deployment.
- Commercialized two software products and initiated development of 3 new projects.

Pattern Recognition Researcher *Oct. 2010 – Dec. 2013*
ExxonMobil, Houston, TX

- Developed pattern recognition and signal processing methods for analysis of geophysical (i.e., seismic) image volumes. Innovations included in 8 patents.
- Contributions include algorithm that produced 100x speed-up of previous approach, enabling the analysis to be deployed and performed on user's workstations.

Post-Doctoral Fellow, Scientific Computing and Imaging Institute *Aug. 2008 – Sept. 2010*
University of Utah, Salt Lake City, UT

- Developed neural network and image pattern recognition methods, with applications in cell detection, identification, and reconstruction from electron microscope image volumes.

Research Assistant *Aug. 2004 – July 2008*
University of Florida, Gainesville, FL

- Developed new kernel machine learning framework for point processes.
- Applied new kernel methods for neurophysiological signal data analysis.

EDUCATION

Ph.D., Electrical & Computer Engineering *Aug. 2008*
University of Florida, Gainesville, FL, USA

M.S., Electrical & Computer Engineering *Dec. 2005*
University of Florida, Gainesville, FL, USA

Licentiate, Electronics & Telecommunications Engineering *Sept. 2003*
University of Aveiro, Aveiro, Portugal

TECHNICAL SKILLS

Machine Learning: Deep Learning/Neural Networks (e.g., CNNs, RNNs, VAEs, Normalizing Flows), Probabilistic Graphical Models, Adaptive Signal Processing, Image Processing

Programming: Python (incl. Numpy, Scikit-learn, PyTorch, TensorFlow, Keras, Pandas), PyStan, Bash/shell scripting, Matlab, C/C++, web development (HTML, CSS, PHP, SQL)

Professional Activities	**Associate Editor**, IEEE Transactions on Neural Networks and Learning Systems *Jan. 2017 – present*
	Associate Editor, IEEE Signal Processing Journal *July 2016 – June 2020*
	IEEE Senior Member *Jan. 2005 – present*

Patents

10 granted patents and 1 pending patent application.

Publications

Summary:
- 4 book chapters,
- 17 journal articles,
- 28 articles in (refereed) conference proceedings,

Selected publications:
- Zhonghua Zheng, Arlene M. Fiore, Daniel M. Westervelt, George P. Milly, Jeff Goldsmith, Alexandra Karambelas, Gabriele Curci, Cynthia A. Randles, **Antonio R. Paiva**, Chi Wang, Qingyun Wu, and Sagnik Dey. Automated Machine Learning to Evaluate the Information Content of Tropospheric Trace Gas Columns for Fine Particle Estimates Over India: A Modeling Testbed. *Journal of Advances in Modeling Earth Systems*, 15(3), March 2023.

- **Antonio R. Paiva** and Giovanni Pilloni. Inferring Microbial Biomass Yield and Cell Weight using Probabilistic Macrochemical Modeling. *IEEE/ACM Transactions on Computational Biology and Bioinformatics*, 20(1), 2023.

- **Antonio R. Paiva** and Ashutosh Tewari. Methodology for Testing and Evaluation of Safety Analytics Approaches, *Safety Science*, 152, Aug. 2022.

- Weike Sun, **Antonio R. Paiva**, Peng Xu, Anantha Sundaram, and Richard Braatz. Fault detection and identification using Bayesian recurrent neural networks. *Computers & Chemical Engineering*, 141, October 2020.

- **Antonio R. Paiva**. Information-theoretic dataset selection for fast kernel learning. *IEEE International Joint Conference on Neural Networks*, Anchorage, AK, USA, May 2017.

- Elizabeth Jurrus, **Antonio R. Paiva**, Shigeki Watanabe, James Anderson, Bryan Jones, Ross Whitaker, Erik M. Jorgensen, Robert Marc, and Tolga Tasdizen. Detection of neuron membranes in electron microscopy images using a series of neural networks. *Medical Image Analysis*, 14(6):770–783, December 2010.

- **Antonio R. Paiva**, Il Park, and José C. Príncipe. A reproducing kernel Hilbert space framework for spike train signal processing. *Neural Computation*, 21(2):424–449, February 2009.

- Yiwen Wang, **Antonio R. Paiva**, José C. Príncipe, and Justin C. Sanchez. Sequential Monte Carlo point process estimation of kinematics from neural spiking activity for brain machine interfaces. *Neural Computation*, 21(10):2894–2930, October 2009.

- Jian-Wu Xu, **Antonio R. Paiva**, Il Park, and José C. Príncipe. A reproducing kernel Hilbert space framework for information-theoretic learning. *IEEE Transactions on Signal Processing*, 56(12):5891–5902, December 2008.

Languages

English and Portuguese