André Ricardo Gonçalves

CONTACT INFORMATION

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CITIZENSHIP

Brazilian

EDUCATION

University of Campinas, Campinas, São Paulo, Brazil, and
University of Minnesota, Twin Cities, Minnesota, USA
(Visiting Scholar, from May 2013 to October 2014)

Ph.D. (Split), Electrical and Computer Engineering, February 2016

- Thesis Topic: *Sparse and Structural Multitask Learning*
- Adviser: Prof. Fernando José Von Zuben
- Co-adviser: Prof. Arindam Banerjee
- Area of Study: Computer Engineering

University of Campinas, Campinas, São Paulo, Brazil

M.S., Electrical and Computer Engineering, April 2011

- Dissertation Topic: *Estimation of Distribution Algorithms to Time-Varying Optimization Problems*
- Adviser: Prof. Fernando José Von Zuben
- Area of Study: Computer Engineering

State University of Londrina, Londrina, Paraná, Brazil

B.S., Computer Science, December 2008 (*cum laude*)

- Research Topic: Fundamentals and Applications of Machine Learning Techniques
- Adviser: Prof. Maria Angélica de O. Camargo-Brunetto
- Area of Study: Computer Science

RESEARCH AND WORK EXPERIENCE

CPqD Foundation, Campinas, São Paulo, Brazil

Researcher **Apr 2015 to Present**

- Design, implementation, and evaluation of machine learning methods for speaker authentication and antispoofing systems for voice biometrics.

University of Minnesota, Twin Cities, Minneapolis, Minnesota, USA

Research Assistant, advised by Arindam Banerjee **May 2013 to Oct 2014**

- Participated in team research projects and conducted individual research on my PhD topic of study: multitask learning. Built several probabilistic models for both multitask regression and classification problems aiming to improve generalization capacity.

University of Campinas, Campinas, São Paulo, Brazil

Research Assistant, advised by Fernando Von Zuben **Mar 2009 - Apr 2013**

- Designed, implemented, and evaluated my dissertation work on meta-heuristics for online optimization problems. Applications include signal processing and power network optimization. Conducted initial steps of my PhD research on multitask learning.

Brazilian Agricultural Research Corporation, Londrina, Paraná, Brazil

Bioinformatics Laboratory **July 2008 to February 2009**

- Applied computational tools for assembly and comparison of genome sequences. Built databases along with visualization tools for genome sequences retrieval and analysis.

Awards

AAAI Association for the Advancement of Artificial Intelligence

- Student Travel Grant for AAAI International Joint Conference on Artificial Intelligence (IJCAI) 2015.

IEEE Computational Intelligence Society

- Student Travel Grant for IEEE Conference on Evolutionary Computation (CEC) 2013.

European Neural Networks Society

- Student Travel Grant for International Conference on Artificial Neural Networks (ICANN) 2012.

State University of Londrina

- Highest GPA among students graduated in Computer Science in 2008.

Research Interests

My main research interests are in Machine Learning, Data Mining, Optimization, Sparse Models, Structured Prediction, Multitask Learning and their applications in complex real world learning problems including those arising from Medicine, Electric Power Distribution System, Signal Processing, and Climate Sciences.

Selected Publications

Gonçalves, André R.; Von Zuben, Fernando J.; Banerjee, A. Multi-task sparse structure learning with Gaussian copula models. *Journal of Machine Learning Research*, v. 17 (33), p. 1-30, 2016.

Gonçalves, André R.; Von Zuben, Fernando J.; Banerjee, A. A Multi-Task Learning View on Earth System Model Ensemble. *Computing in Science and Engineering*, Nov./Dec. 2015.

Chatterjee, S.; Sivakumar, V.; Gonçalves, André R.; Banerjee, A. Structured Estimation in High Dimensions and Multitask Learning with Applications in Climate. *Large-Scale Machine Learning in the Earth Sciences*. Chapman & Hall/CRC, 2016. (To appear Jan. 2017).

Gonçalves, André R.; Von Zuben, Fernando J.; Banerjee, A. Multi-label structure learning with Ising model selection. In: *24th International Joint Conference on Artificial Intelligence* (IJCAI), Buenos Aires, Argentina. 2015.

Gonçalves, André R.; Chatterjee, S. ; Sivakumar, V. ; Das, P. ; Von Zuben, Fernando J. ; Banerjee, A. Multi-task Sparse Structure Learning. In: *ACM International Conference on Information and Knowledge Management* (CIKM), 2014.

Gonçalves, André R.; Boccato, Levy ; Attux, Romis; Von Zuben, Fernando J. A multi-Gaussian component EDA with restarting applied to direction of arrival tracking. In: *IEEE Congress on Evolutionary Computation* (CEC), 2013.

Gonçalves, André R.; Veroneze, Rosana ; Madeiro, Salomão ; Azevedo, Carlos R. B. ; Von Zuben, Fernando J. The Influence of Supervised Clustering for RBFNN Centers Definition: A Comparative Study. *International Conference on Artificial Neural Networks* (ICANN), 2012.

Gonçalves, André R.; Cavellucci, C.; Lyra Filho, C.; Von Zuben, F. J. An Extremal Optimization approach to parallel resonance constrained capacitor placement problem. In: *6th IEEE/PES Transmission and Distribution: Latin America*, 2012

Gonçalves, André R.; Von Zuben, Fernando J. Online learning in estimation of distribution algorithms for dynamic environments. In: *IEEE Congress on Evolutionary Computation* (CEC), 2011.

Referee for Journals

- *IEEE Transactions on Knowledge and Data Engineering.*
  From 2015 to Present.

Patents Filed

- *Automatic voice liveness detection system.* (In Portuguese: Processo de Detecção Automática de Áudio e Fala ao Vivo e Reproduzidos por Meio de Alto-Falante). Brazil BR 10 2015 017556-6. Issued July 2015. Inventors: Ricardo Paranhos Velloso Violato (CPqD), José Augusto Stuchi (CPqD), Flavio Olmos Simões (CPqD), Mario Uliani Neto (CPqD) e André Ricardo Gonçalves (CPqD).

Technical Skills

Software development experience in information technology, simulation, systems modeling and data mining.

Programming: C/C++, Python, Matlab, R, Java.

Operating Systems: Linux and other UNIX variants; Microsoft Windows family.

Parallel Computing: Multi-thread and multi-process systems, Message Passing Interface (MPI), and GPU processing (basics). Mainly worked with OpenMP in C/C++ and mpi4py in Python.

Mathematical Expertise

Linear Algebra, Calculus, Statistics, Probability, Random Variables, Stochastic Processes, Linear/Nonlinear Optimization, Graph Theory, Combinatorics, Bayesian Statistics.

Engineering Expertise

Data Mining: Pattern Recognition, Data Classification, Data Clustering, Spatial Regression Models, Rule Extraction, Multi-Domain learning, Domain Adaptation, Feature Selection, Data Fitting.

Signal Processing Expertise

Audio and Speech Signal Processing, Spectrum Analysis, Feature Extraction, Adaptive Filtering.

Relevant Coursework

Neural Networks, Machine Learning, Information Theory, Non-linear Optimization, Combinatorial Optimization, Evolutionary Computation, Natural Computing, Discrete Event System Simulation.

Additional Information

Served as reviewer for the following conferences:
International Conference on Artificial Neural Networks (ICANN) 2014.
Conference on Evolutionary Computation (CEC) 2011, 2012, and 2013.
Brazilian Symposium on Intelligent Automation, 2011.