Eder Santana

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Experience

Applied Scientist, Twitch an Amazon.com subsidiary
San Francisco, CA — April 2019 - present

Recommendation systems applied scientist. Using machine learning to discover, rank and recommend live streams on twitch.tv. Developing tools based Deep Learning, decision trees, statistics and information theory. Main languages and frameworks used are Python, Tensorflow, Keras and XGBoost.

Deep Learning Researcher and Engineer, comma.ai research
San Francisco, CA — October 2018 - February 2019

Developing full stack driving intelligence focused on perception, planning and mapping. Built depth estimation networks from images, developed networks for autonomous lane keeping assist, co-authored the comma 2k19 dataset and paper.

Research Scientist, Toyota Research Institute
Los Altos, CA — September 2017 - October 2018

Research focused on end-to-end lateral planning and control, semantic segmentation, and object detection with neural networks for self driving cars. I was also the main machine learning developer for the autonomous iRoad project. Finally I also worked on generatives models of driving data. ICCV paper on Exploring the Limitation of Behavior Cloning for Autonomous Driving.

Deep Learning, Apple
Cupertino, CA — 2017 (Spring internship)

Internship working on Apple FaceID. I worked on advanced Deep Learning techniques for the Video Engineering team. I was investigating Generative Adversarial Networks for data augmentation. Mostly focused on age related characteristics change for face recognition as part of FaceID.

Advanced Machine Learning Lead, comma.ai
San Francisco, CA — 2016 (Summer internship)

I joined comma.ai as an intern but had to play the role of ML lead, since the previous lead had just left. I helped to build Machine Learning systems for self driving cars. Specifically: 1) Wrote deep learning infrastructure using scalable off core message passing data pipeline.

2) Designed a spatio-temporal (CNN+RNN) model that improved the self-driving car AI and modeled the path prediction uncertainty.
3) Designed and trained an image segmentation system.
4) I wrote "Learning a Driving Simulator" research paper and released a driving dataset with over 100 citations.

Open source developer
I contribute Tensorflow and Theano code to Keras: a deep learning library (Python). I published a Keras video course called Deep Learning with Python. I used to maintain Seya a library with advanced architectures for Keras such as the Deep Recurrent Attentive Writer (DRAW) and Neural Turing Machines. I also help maintain Pymerkletools for Tierion a Blockchain technology company.

Machine Learning, Paracosm.io
Gainesville, FL — 2014 (Summer internship)

I built deep learning based 3D object recognition models for a research project with Paracosm.io and Nielsen Corp.

PhD Research (University of Florida)
Gainesville, FL — 2014 - 2017

First I built neural networks for decoding brain waves from EEG for Brain Machine Interfaces. Afterwards, my research was focused on unsupervised video representation and prediction. My thesis title is "Long term temporal pattern consolidation for Cognitive Architectures" i.e. I want my neural networks to learn to snapshot relevant events in video to help them predict future frames.

Undergrad and Masters Research (University of Maranhao)
Sao Luis, MA, Brazil — before 2013

I worked in the Biological Information Processing Lab developing algorithms for cardiac signal filtering. My focus was on pregnant women signals and separating the signal of the fetus from the signal of the mother.

EDUCATION

PhD Electrical and Computer Engineering
University of Florida, Gainesville, FL — 2013-2017

MSc Electrical Engineering
Federal University of Maranhao, Sao Luis, Brazil — 2011-2012

BSc Electrical Engineering
Federal University of Maranhao, Sao Luis, Brazil — 2007-2011

PUBLICATIONS

SELECTED
[1] **Eder Santana**, George Hotz, "Learning a Driving Simulator". NIPS 2016 Deep Reinforcement Learning workshop. arXiv: https://arxiv.org/abs/1608.01230

[2] Felipe Codevilla, **Eder Santana**, Antonio Lopes, Adrien Gaidon, "Exploring the Limitations of Behavior Cloning for Autonomous Driving". The IEEE International Conference on Computer Vision (ICCV), 2019, pp. 9329-9338

JOURNALS

[3] **Eder Santana**, Matthew Emigh, Pablo Zegers, Jose Principe, "Exploiting Spatio-Temporal Structure with Winner-Take-All Networks", IEEE Trans. on Neural Networks (submitted).

[4] Mihael Cudic, Ryan Burt, **Eder Santana**, Jose Principe, "A flexible testing environment for visual question answering with performance evaluation", Neurocomputing (submitted).

[5] **Eder Santana**, Jose Principe, Ewaldo Santana, Allan K Barros, "Extraction of signals with higher order temporal structure using Correntropy", Signal Processing vol 92, 2012.

[6] **Eder Santana**, Jose Principe, Ewaldo Santana, RCS Freire, Allan K Barros, "Extraction of signals with specific temporal structure using kernel methods", IEEE Trans. on Signal Processing vol 58, 2010.

CONFERENCES

[7] **Eder Santana**, Jose Principe, "Perception Updating Networks: On Architectural Constraints for Video Generative Models". ICLR 2017 Workshop Track.

[8] **Eder Santana**, Jose Principe, "Perception Updating Networks: On Architectural Constraints for Video Generative Models". ICLR 2017 Workshop Track.

[9] Shujian Yu, Matthew Emigh, **Eder Santana**, Jose C. Principe, "AUTOENCODERS TRAINED WITH RELEVANT INFORMATION: BLENDING SHANNON AND WIENER'S PERSPECTIVES," Intl. Conf. on Acoustics, Speech, and Signal Processing, 2017.

[10] **Eder Santana**, Matt Emigh, Jose Principe, "Information Theoretic Learning Auto-encoders". Intl. Joint Conf. on Neural Networks 2016.

[11] **Eder Santana**, K Dockendorf, JC Principe, "Learning joint features for color and depth images with Convolutional Neural Networks for object classification," Intl. Conf. on Acoustics, Speech, and Signal Processing, 2015.

[12] **Eder Santana**, Brockmeier AJ, Principe JC., "Joint optimization of algorithmic suites for EEG analysis.", IEEE EMBS Neural Engineering Conference, Aug. 2014.

[13] **Eder Santana**, Goktug T. Cinar and Jose C. Principe, "Parallel flow in Deep Predictive Coding Networks," Intl. Joint Conf. on Neural Networks 2015.

[14] **Eder Santana**, JC Principe, EE Santana, AK Barros, "Mixed Generative and Supervised Learning Modes in Deep Predictive Coding Networks," Intl. Joint Conf. on Neural Networks, 2015.

[15] Ryan Burt, **Eder Santana**, Jose Principe, Nina Thigpen, Andreas Keil, "Predicting Visual Attention using Gamma Kernels", Intl. Conf. on Acoustics, Speech, and Signal Processing, pp. -, Mar. 2016

[16] Austin J. Brockmeier, Eder Santana, Luis G. Sanchez Giraldo, and Jose C. Principe, "Projentropy: Using entropy to optimize spatial projections", Intl. Conf. on Acoustics, Speech, and Signal Processing, pp. 4538-4542, May 2014.

[16] A Commute in Data: The comma 2k19 Dataset. Harald Schafer, **Eder Santana**, Andrew Haden, Riccardo Baisini. arXiv: https://arxiv.org/abs/1812.05752

TEACHING

Deep Learning with Python (video course and book)
Packt Publishing — 2016 (https://goo.gl/pExbnP)

EEL 5525 Fundamentals of Digital Signal Processing (TA)
University of Florida, Gainesville, FL — 2013

Stochastic Processes (substitute professor)
Federal University of Maranhao, Sao Luis, Brazil — 2012