Joseph Antognini

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Education

Ph.D., Astronomy, The Ohio State University, 2016

B.S. *cum laude*, Astrophysics, California Institute of Technology, 2010

Employment

June 2018 – Whisper AI, Member of the Technical Staff

- Employee № 6 at a startup developing a hearing aid that uses deep learning to perform real-time denoising.
- Since October 2021, manager of the machine learning team. Responsible for setting quarterly goals for the team, coordinating with other teams for resources, onboarding new hires, and mentoring direct reports.
- Designed and trained convolutional neural networks to perform low latency denoising on a hearing aid. Collected and cleaned training and evaluation data. Developed the pipeline to convert the trained Tensorflow model into a quantized model that runs on embedded hardware. Built a CI test suite that compares the on-device model performance against the trained Tensorflow model.
- Responsible for chip selection for the ML accelerator on the 2nd generation product. Researched candidate chips, conducted calls with vendors to assess the availability and feature set of candidate chips, and built proof-of-concept denoising models to validate power and latency constraints before finalizing chip selection.
- Designed and implemented an escalation system to determine when the hearing aid should run the denoising model. Coordinated the escalation system across 7 microcontrollers and 2 RF links.
- Implemented and tested a feedback cancellation system in C on bare metal hardware.
- Migrated the neural network training pipeline from GPUs to TPUs to achieve an 8x speedup in training.

July 2017 – June 2018 Google Inc., Google AI Resident

- Performed large-scale experiments to understand the relationship between minibatch size and training time in neural networks. Implemented Resnet-50-v2 in Tensorflow and performed $\sim 10^4$ Imagenet experiments on TPUs. Published results in JMLR.
- Demonstrated that neural network training trajectories projected onto PCA components resemble high dimensional random walks and proved that these trajectories are sinusoidal and dominated by the lowest components. Published results at NeurIPS 2018.
- Developed a technique to extend neural texture synthesis to audio data. Implemented Tensorflow code to take a "textural" audio clip and extend it arbitrarily. Published results at ICASSP 2019.

January 2016 – July 2017 Persyst, Lead Computational Scientist

- Developed a deep convolutional neural network that robustly detects QRS complexes (i.e., heartbeats) in noisy EKG data using Tensorflow. Oversaw the assembly and labeling of the dataset and deployed the model to production. Achieved an error rate 9x lower than the benchmark Pan-Tompkins algorithm.
- Implemented backprop in C++ for a novel NN architecture called a "preferred NN" along with an implementation of the Adam optimizer.

Summary of publications

13 publications; 8 1st author publications; 900+ total citations; 300+ citations to 1st author papers; h-index: 12

Please see my website for a complete list of my publications.