Anthony Hitchcock Thomas

530-781-3801

ahthomas@eng.ucsd.edu ∼ https://thomas9t.github.io

Research and Publications

- **Anthony Thomas**, Sanjoy Dasgupta, and Tajana Rosing. *Theoretical Foundations of Hyperdimensional Computing.* Journal of Artificial Intelligence Research 72 (2021): 215-249.
- **Anthony Thomas**, Tara Javidi, and Tajana Rosing. *A Kernel Perspective on Hyperdimensional Computing.* Under Submission to IEEE Transactions on Neural Networks and Learning Systems.
- **Anthony Thomas**, Amir Aminifar, and David Atienza. *Noise-resilient and interpretable epileptic seizure detection.* In IEEE International Symposium on Circuits and Systems (ISCAS). 2020.
- **Anthony Thomas**, Yunhui Guo, Yeseong Kim, Baris Aksanli, Arun Kumar, and Tajana S. Rosing. *Hierarchical and Distributed Machine Learning Inference Beyond the Edge.* In 2019 IEEE 16th International Conference on Networking, Sensing and Control (ICNSC), pp. 18-23. IEEE, 2019.
- **Anthony Thomas**, and Arun Kumar. *A Comparative Evaluation of Systems for Scalable Linear Algebra-Based Analytics.* Proceedings of the VLDB Endowment 11, no. 13 (2018): 2168-2182.
- Arman Khachiyan, **Anthony Thomas**, Huye Zhou, Alexander Cloninger, Amit Khandelwal, Gordon Hanson, and Tajana Rosing. *Using Neural Networks to Predict Micro-Spatial Economic Growth.* American Economic Review - Insights (provisionally accepted).
- Behnam Khaleghi, Sahand Salamat, **Anthony Thomas**, Fatemeh Asgarinejad, Yeseong Kim, and Tajana Rosing. *SHEAR er: Highly-Efficient Hyperdimensional Computing by Software-Hardware Enabled Multifold Approximation.* In Proceedings of the ACM/IEEE International Symposium on Low Power Electronics and Design, pp. 241-246. 2020.

Grants

Measuring Local Area Income Using Neural Networks Trained on Satellite Imagery - Arman Khachiyan, **Anthony Thomas**, Luke Sanford, Jennifer Burney, Alexander Clonninger, Gordon Hanson, and Tajana Rosing

- $\$175,000$ - Supported by the Russel Sage Foundation

Education

The University of California, San Diego

PhD - Computer Science and Engineering (Expected Graduation Spring 2023)
Advisors: Sanjoy Dasgupta and Tajana Rosing
3.9/4.0 GPA

- **Relevant Coursework**: Statistical Learning, Information Theory, Universal Probability and Applications, Convex Optimization, Computer Vision I-III (Multiple View Geometry), Analysis of Algorithms, Convex Optimization, Universal Probability and Applications, Advanced Compiler Design.

Brown University

- **Relevant Coursework**: Machine Learning, Mathematical Statistics
- All coursework taken alongside full time employment.

The University of California, Berkeley

BS with High Distinction - Environmental Economics and Policy (2013) 3.9/4.00 GPA

- **Relevant Coursework**: Statistical Computing, Linear Algebra and Differential Equations, Calculus I-III, Probability and Statistics, Econometrics I-II, numerous economic theory courses.
- **Academic honors**: Phi Beta Kappa, High Distinction in the College, High Honors in the University.
- **Other Activities**: California Lightweight Crew - Team Captain (2013).

Mentoring and Teaching

Students Mentored

- **UCSD Undergraduates**: Namiko Matsumoto (PhD, UCSD), Yilun Hao (MS, Stanford), Daryl Nakamoto.
- **UCSD Early Scholar Research Program**: Lucy Lee and Dhanush Nanjunda-reddy.
- **Others**: Fatemeh Asgarinejad (PhD, UCSD/SDSU)

Teaching

- **TA Positions**: CSE 166 (Image Processing), DSE 210 (Probability and Statistics in Python).

Employment

Intel Research *Summer Research Intern* ∼ June 2021 - September 2021

The Swiss Federal Institute of Technology - Lausanne *Visiting PhD Student* ∼ June 2019 - December 2019

- Worked on research related to noise robust signal processing for detection of epileptic seizures.
- Used Information Theory motivated cost function to develop convolutional neural network architectures that were more robust to nuisances and signal artifacts than conventional architectures.

IBM Research - Almaden *Summer Research Intern* ∼ June 2018 - September 2018

- Worked on design and implementation of a novel system for machine learning model serving. Developed a scheduling algorithm to optimize model serving in resource constrained environment.
- Contributed to development of GPU execution framework for Apache SystemML - an open source platform for scalable machine learning.

TuSimple LLC *Systems and Infrastructure Engineer Intern* ∼ June 2017 - September 2017

- Worked with a team of engineers to design and implement a customized distributed storage and querying system for sensor data streams produced by self driving cars.
- Developed a system to improve data access efficiency by load balancing across a pool of cache servers. Implemented a custom HTTP based data access and authentication/logging scheme with a transparent cache management system.
- Developed a tool to robustly transfer large data files over unstable network connections.

Brown University
Research Analyst: Professors Nathaniel Baum-Snow and Justine Hastings ∼ July 2013 - July 2015
Senior Research Analyst: Professors Justine Hastings and Jesse Shapiro ∼ July 2015 - July 2016

- Worked with Brown faculty members to conduct research in theoretical and applied economics for academic publication. Primarily responsible for the design and implementation of code to store, analyze and visualize research data.
- Designed and implemented a database to store approximately 1.5TB of data from a large nationwide retailer for use in quantitative research projects. The database implementation significantly reduced run-time compared to a previous file based implementation using Python and HDF5.
- Improved the efficiency of analysis code by implementing statistical models in Numpy using low-level linear algebra routines. The Python implementation enabled estimation of models that were computationally infeasible using Stata.

Inyo National Forest
Conservation Intern ∼ May 2011 - September 2011

- Worked independently and in small crews doing backcountry trail maintenance and surveying. Tours lasted 5-10 days in wilderness and all maintenance was performed using only hand operated tools.