Timothy Ng

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EDUCATION

University of California, Irvine	*September 2024 - December 2025*
Master of Data Science	GPA: 3.91/4.00
University of California, Davis	*September 2021 - June 2023*
Bachelor of Science, Mathematics	Dean's List, GPA: 4.00/4.00

SKILLS

- ❖ **Languages:** Python, R, MATLAB, SQL, LaTeX
- ❖ **Packages:** PyTorch, Numpy, Pandas, Scikit-Learn, Scipy, Matplotlib, Requests, Asyncio, Threading
- ❖ **Algorithms and Protocols:** MapReduce, WebSocket, HTTP

EXPERIENCE

Consultant—ADA Forsyth Institute *May 2022 - May 2025*

Previously Process Development Engineer Intern—Gradient Orthodontics

- ❖ Algorithm development - Developed algorithms to convert 3D object inputs into 3D printing instructions, optimizing support for custom dental aligner models with stress reinforcement features.
- ❖ App development (interface designs, backend connections) - Engineered multiple apps in MATLAB that collect and analyze data from a multi-device laboratory setup using computer vision and image processing.
- ❖ Porting MATLAB to Python - Converted original MATLAB code base to Python, manually profiled code to identify bottlenecks, and accelerated a high-frequency routine (over 50% of total runtime) using Numba's JIT compilation; optimized performance with Numpy, asyncio, and threading, and built GUIs with Tkinter.

PROJECTS

Latent Dirichlet Allocation of the BBC News Archive *May 2025 - Present*

- ❖ Replicated the work of Blei, Ng, and Jordan in the creation of a topic model to estimate categories of different news articles with variational inference over a latent Dirichlet distribution on the words and categories.
- ❖ Leveraged Pandas, Scipy, and Numpy to minimize the KL-divergence of the variational distribution relative to the true conditional distribution.
- ❖ Performed model selection by finding the maximum probability on a held-out test set.

AI vs Human Generated Image Classification *February 2025 - March 2025*

- ❖ Wrote an image processor to efficiently convert image data into standardized inputs for neural networks and unsupervised learning tasks. Used PyTorch transforms in asyncio event loops.
- ❖ Used unsupervised learning techniques (Bernoulli Restricted Boltzmann Machine) in combination with random forest classifiers to achieve 73% validation accuracy in classification.
- ❖ Worked with group members to achieve 89% validation accuracy with a custom Convolutional Neural Network and 86% with a modified ResNet50 model, pretrained on the ImageNet dataset. Used PyTorch and scikit-learn.

NOTABLE COURSEWORK

- ❖ **Databases and Data Management**: Relational model, relational algebra, database design, SQL programming, ETL processing
- ❖ **Artificial Intelligence**: Search, games, constraint satisfaction, logic, classical planning, Bayesian networks, linear regression, kNN, decision trees, neural networks, reinforcement learning
- ❖ **Machine Learning and Data Mining**: kNN, neural networks, CNNs, ensemble methods (XGBoost, bootstrap, random forests), unsupervised learning (k-means, agglomerative clustering, GMMs), dimension reduction
- ❖ **Machine Learning with Generative Models**: Bayesian networks, graphical models, generative models, hidden Markov models, mixture models, Expectation-Maximization, Gaussian processes, variational inference
- ❖ **Data Structures with Applications**: Amortized analysis, Cuckoo and tabulation hashing, Fibonacci heaps, Bloom and Cuckoo filters, self-balancing trees, persistent data structures
- ❖ **Statistical Methods**: Simple and general linear regression, model diagnostics and testing, model building, covariate transformations, ANOVA, longitudinal data analysis
- ❖ **Multivariate Statistical Methods**: MANOVA, multivariate regression, discriminant analysis, cluster analysis, factor analysis