Tyler Venner

530-902-6407 | tylervenner2@gmail.com | GitHub | linkedin

Education

University of California - Davis; GPA: 3.888 — Davis, CA

B.S. in Statistics (Data Science Focus); Minor in Mathematics — *Sept. 2023 – Dec. 2025*

Experience

Data Scientist — July 2024 – Present

Davis Sensory Institute — *Davis, CA*

- Sole authored a 50+ page technical report on Probabilistic Unfolding of Latent Space (PULS) from first principles, revealing preference market structures, provided key technological advantage directly leading to client acquisition.
- Derived the model's core probabilistic framework, from a closed-form MGF objective function to a heteroscedastic, Bayesian (MAP) estimator with a principled l_2 regularization penalty on noise.
- Architected a multi-stage optimization pipeline in JAX/Optax, leveraging JIT compilation and automatic differentiation to solve the non-convex problem and achieve a 80x reduction in compute time.
- Solved a fully coupled, non-convex product optimization problem by deriving the analytical gradient; implemented the solver to identify optimal, non-cannibalizing market positions for new products.
- Engineered a complete validation framework: created a synthetic data pipeline for power analysis of permutation tests; built custom metrics; and developed a method for uncertainty estimation, quantifying misspecification.

Assistant Pool Manager — Feb. 2023 – Sep. 2023

City of Davis — *Davis, CA*

- Managed daily pool operations, overseeing swim lessons, water aerobics, lap swim, and general recreation while ensuring a safe and welcoming environment for all patrons.
- Supervised and trained a diverse team of lifeguards, swim instructors, cashiers, and snack bar attendants, fostering collaboration and maintaining high performance standards.

Projects

Cloud-Native Flight Scraper & ML forecasting | *AWS (Lambda, S3, ECR, Athena), Docker, Selenium, Parquet*

- Architected a serverless ETL pipeline on AWS to scrape, transform, and store daily flight price data in S3.
- Engineered a high-performance data loader for Amazon Athena, pushing aggregation and time-series logic into SQL queries to build ML training sets efficiently from S3.
- Developed a dual-model system: (1) a regression model to forecast route-level market prices and (2) a classification model to generate a "Buy/Wait" recommendation for individual flights.
- Designed a resilient MLOps inference pipeline by packaging models with feature lists and category maps, preventing production errors by automatically handling data drift and unseen categorical values.

Causal Inference Educational App | Link to App | *Python, Streamlit, NetworkX*

- Motivated only by curiosity, spent 2 months self studying Causality Inference and developing a Streamlit App to interactively showcase concepts, including Structural Causal Models (SCMs), interventions, and counterfactuals.
- Implemented the PC causal discovery algorithm from scratch; Created simulations to visually explain d-separation, Berkson's Paradox (colliders), and limitations of the PC algorithm in the presence of hidden confounders.

Real-Time Computer Vision Exercise Counter | *Python, OpenCV, MediaPipe*

- Built a real-time computer vision application to count exercise repetitions from a live webcam feed, using OpenCV for video stream processing.
- Engineered and evaluated two distinct methods: a baseline proof-of-concept using simple frame differencing and a final model using deep learning for human pose estimation, tracking body parts with MediaPipe.

Technical Skills

Languages & Databases: Python, R, SQL (PostgreSQL, Athena)
Data Science & ML Libraries: Pandas, NumPy, Scikit-learn, PyTorch, JAX, Optax, Streamlit, OpenCV, MediaPipe, Matplotlib, Seaborn, NLTK
Cloud & DevOps: AWS (Lambda, S3, ECR, Athena, EventBridge), Docker, Git/Github, Selenium, Parquet
ML/AI: Supervised Learning (Regression, Classification), Unsupervised Learning (Clustering, PCA), Time Series (ARIMA), Probabilistic Modeling (MLE, MAP), Bayesian Methods (Priors, Regularization)
Mathematics & Statistics: Real Analysis, Applied Linear Algebra, Probability Theory, Numerical Analysis, Thurstonian Models, Non-convex Optimization, Linear Optimization, Hypothesis Testing, Estimation, Limit Theorems