Nathaniel Dale

Software Development & Deployment | Data Science & AI

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Skills

***Languages*:** Python, Java, C++, SQL, JavaScript
***Frameworks & Libraries*:** React, Node.js, Django, Flask, Express, pandas, NumPy, scikit-learn
***Tools & Platforms*:** Git, Docker, AWS (EC2, S3, RDS), Firebase, PostgreSQL, Jupyter, Unix
Concepts: OOP, REST API Design, Data Science and Analysis, Database Design, Data Structures & Algorithms, Cloud Deployment, CI/CD, Parallel Computing

Projects

TripSync - *Weather-Based Recommendation System* | January 2025 - May 2025 | Github

- Built a full-stack Django + React web app recommending activities based on real-time weather data.
- Integrated OpenWeatherMap, Google Maps, Eventbrite APIs to generate rules-based suggestions for travelers.
- Optimized backend database, improving response latency by ~40% and enhancing user experience.
- Strengthened deployment workflow through AWS configuration and CI/CD pipeline integration.

CUDA Image Processing - *Parallel Blur & Convolution Filters* | August 2024 - November 2024 | Github

- Developed a GPU-accelerated image processing program using NVIDIA CUDA to apply real-time blurring and convolution filters.
- Optimized thread and block configurations for maximum kernel efficiency, achieving up to 50x speedup over CPU implementations.
- Implemented shared memory usage, boundary handling, and dynamic kernel parameters for adjustable filter precision.

Research Experience

Undergraduate Research Assistant August 2024 - May 2025

- ***Eye Tracking Recommendation System***:
  - Designed and implemented Python pipelines for feature extraction and signal processing of gaze data (fixations, saccades, timestamps).
  - Applied NumPy, pandas, and SciPy to clean and analyze multi-dimensional eye-tracking datasets.
  - Engineered feature matrices correlating user gaze patterns with on-screen elements to inform personalized content recommendation models.
  - Conducted exploratory data analysis and visualized gaze distributions using Matplotlib and Seaborn.
  - Experimented with supervised learning algorithms (Random Forest, SVM) to predict user intent and attention states.
  - Collaborated with graduate researchers to structure results into a reproducible, documented pipeline supporting thesis publication.
- ***Truly Cancellable Authentication System***:
  - Researched EEG signal-based biometric authentication approaches.
  - Developed Python scripts for data cleaning, signal processing, and feature extraction from EEG datasets.
  - Evaluated data poisoning and adversarial ML attack resilience, improving security via Message Mapping Algorithm refinements.
  - Implemented and tested machine learning defense models to ensure cancelability and revocability of authentication credentials.
  - Authored comprehensive reports comparing token-based authentication, dynamic fingerprinting, and neural biometrics for IoT systems.

Education

B.S. in Computer Science | California State Polytechnic University Pomona

August 2021 - May 2025 | Magna Cum Laude (GPA 3.74) | President's Honor List

Relevant Courses: *Operating Systems, Data Structures & Algorithms, Parallel Processing & GPU Computing, Data Science, Cybersecurity & Cryptography, Software Engineering, Search Engines*