Khushi Kaushik

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Education

California State University, Fullerton — May 2025
Bachelor of Science in Computer Science (Magna Cum Laude) — *Fullerton, CA*
- Coursework: Relevant Coursework: ML, Data Science, Big Data, Databases, Algorithms, AI, Frontend, Backend

University of California, San Diego — June 2027 (Estimated)
Masters in Science in Computer Science — *La Jolla, California*

Experience

Prompt Optimization for Faster AI Responses — July 2025 - Present
Research Assistant — *Fullerton, CA*
- Leading development of a latency-aware prompt optimization framework using mathematical signal analysis, neural network behavior profiling, and prompt entropy scoring.
- Prototyped a prompt-rewriting algorithm that reduced inference latency by ~15% across open-source LLMs including GPT-J, LLaMA and Mistral.
- Preparing production deployment for lightweight NLP systems, targeting a 20% performance uplift across three benchmark scenarios.
- Designed and tested agent-like prompt workflows with modular inference logic for GenAI use cases, simulating autonomous behavior.
- Integrated RAG workflows using context retrieval and prompt shaping for LLMs; explored vector database indexing.

College of Engineering and Computer Science — August 2023 - May 2025
ECS Instructional Student Assistant (ISA) — *Fullerton, CA*
- Tutored over 1,500 undergraduate and graduate students in SQL, algorithm design, and AI, resulting in a 30% drop in assignment resubmissions.
- Diagnosed and resolved 100+ weekly coding issues in Python and SQL via interactive debugging walkthroughs.
- Created and deployed 12+ database schema and normalization labs using MySQL and SQLite, improving schema design accuracy by 25%.
- Guided students on web development principles, including HTML/CSS layout design and JavaScript debugging.

SoCal Data Science Research Program — June 2024 - August 2024
Data Science Research Assistant/ Consultant — *Irvine, CA*
- Built a regression model using Scikit-learn to estimate column drift ratios in earthquake simulations, improving prediction accuracy by 35% (R^2 = 0.947) across 10,000+ simulation frames.
- Collaborated with researchers to optimize data backend workflows, using scripting and version control tools like Git.
- Automated data preprocessing and feature selection using NumPy and custom Python scripts, reducing runtime by 40% and ensuring reproducibility across collaborative research teams.
- Deployed scalable ML pipeline components to support batch simulations on structural datasets with 10,000+ entries, decreasing manual setup time by 60%.

CSUF Department of Mathematics — January 2023 - October 2024
Research Assistant | Computational Complexity & Machine Learning — *Fullerton, CA*
- Formulated FRACTRAN programs computing √2 using Catalan's product and Newton–Raphson methods via prime exponent iteration.
- Proved convergence and digit correctness using formal arithmetic analysis; optimized runtime via fraction list minimization and prime-state reduction.
- Reduced execution depth by 40% compared to Conway's π model; expanded applications of FRACTRAN in computable real number generation. [First Author, arXiv:2412.16185]

Projects

Altivue – AI-Powered Drone Control Platform
Built a drone system that autonomously avoids obstacles using real-time computer vision and AI, enabling safer navigation.
- Developed an object detection pipeline using YOLOv5 and retrieval-augmented generation (RAG) to enhance drone visual processing.
- Deployed Flask-based ML APIs on edge devices, reducing latency by 40% and improving drone pathing accuracy by 30% in 100+ test flights.
- Developed internal control dashboard interface using JavaScript and Flask APIs for real-time feedback display.

Biomarker Analysis for Neuro-cognitive Decline Post-Cardiac Surgery
Used clinical biomarker data to predict which heart surgery patients may face memory or thinking issues, aiding early intervention.
- Designed and implemented an ML pipeline using logistic regression and ensemble models (Random Forest, XGBoost), achieving AUROC of 0.86.
- Applied SHAP for explainable AI and automated preprocessing workflows, reducing preprocessing time by 50% and increasing model interpretability.

Stock Market Prediction Using LSTM & Ensemble Learning
Built a hybrid machine learning model to forecast next-day directional movement of S&P 500 stocks from historical financial data.
- Constructed a dual-model system using LSTM for sequential pattern learning and XGBoost for classification, achieving ~70% directional accuracy.
- Collected and processed OHLC data with momentum indicators (RSI, MACD) via yfinance and Pandas; automated feature engineering pipeline.
- Backtested model signals over 30-day periods, yielding simulated portfolio returns 8.2% above baseline S&P performance.

Skills

Programming Languages: JavaScript, TypeScript, Python, SQL, C#, HTML, CSS
Front-End: React, Next.js, Bootstrap, Responsive Design, UI/UX Principles
Back-End: .NET, Flask, Node.js, MongoDB, SQLite, MySQL, RESTful APIs
Tools: Git, GitHub, VS Code, AWS, Jupyter, Testing Frameworks (e.g., Jest, PyTest)
AI/ML: Scikit-learn, YOLOv5, SHAP, Pandas, NumPy, Data Pipelines
Focus Areas: User-Focused Design, AI Agent Workflows, LLM Integration
Concepts Object-Oriented Programming, Full-Stack Development, Cross-browser Compatibility, Version Control, Relational Databases

Other: Cross-browser compatibility, Version control, Relational Databases