

Khushi Kaushik

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Education

California State University, Fullerton

Bachelor of Science in Computer Science (Magna Cum Laude)

- Coursework: Relevant Coursework: ML, Data Science, Big Data, Databases, Algorithms, AI, Frontend, Backend

May 2025

Fullerton, CA

University of California, San Diego

Masters in Science in Computer Science

June 2027 (Estimated)

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 FRACSTRAN programs computing $\sqrt{2}$ 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 FRACSTRAN 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