Roshan Raj

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Education

- **University of California, Irvine**
  Bachelor of Science in Computer Science *Expected December 2026*
  - GPA: 3.732, Dean's Honor List
  - Research Assistant on the TIPPERS project led by Dr. Sharad Mehrotra.
  - Technology Intern at Venture Capital Society @ UCI - developed and maintained the club's website
  - Core Member at Google Developer Student Club (GDSC) @ UCI — contributed to dev projects and hosted technical workshops.
  - **Relevant Coursework**: *Data Structures & Algorithms, Object-Oriented Programming, Computer Architecture, Software Engineering, Software Testing & Quality Assurance, Machine Learning, Artificial Intelligence, Distributed Systems, Information Retrieval, Formal Languages & Automata, Discrete Mathematics*

Experience

- **The CoderSchool**
  Code Coach *December 2024 - March 2025*
  - **Curriculum Engineering**: Designed and implemented computer science–focused curriculum modules covering **data structures, object-oriented programming, and algorithm design** to simulate real-world SWE tasks.
  - **Software Development Integration**: Built reusable project templates, boilerplate codebases, and debug environments across Python and C++ to streamline instruction and simulate professional engineering workflows.
  - **Skills**: Python, C++, HTML/CSS, Java, JavaScript, Algorithms
- **Dreams for Schools**
  STEAM Intern *August 2024 - December 2024*
  - **Technical Curriculum Development**: Designed and implemented interactive computer science programs for K–12 students using **Python, C++, HTML/CSS, and Java** to teach foundational concepts such as control flow, loops, and data structures.
  - **Project Based CS Implementation**: Created hands-on coding projects that emphasized real-world problem-solving, debugging techniques, and software logic, mirroring SWE development practices in a simplified educational setting.
  - **Skills**: Python, C++, Git, OOP, Algorithms, Software Design
- **TIPPERS (T-Board) @ UCI**
  Research Assistant *September 2023 - December 2024*
  - **IoT Data Platform Optimization**: Enhanced IoT data visualization platform using **PL/pgSQL** and **JavaScript**, improving sensor data processing speed by 40% through database query optimization and efficient middleware design.
  - **Scalable System Deployment**: Integrated **Docker** to enable scalable and reproducible deployment of smart-space systems, supporting privacy-preserving analytics across campus environments.
  - **Tool Development**: Built smart-space builder tools for real-time occupancy and energy monitoring at UCI's Donald Bren Hall, leveraging sensor middleware to model spatial contexts and optimize privacy-utility tradeoffs.
  - **Skills**: PL/pgSQL, JavaScript, Docker, PostgreSQL, IoT Middleware, Data Visualization, Systems Optimization

Projects

- **Sentinance** : Developed a real-time stock sentiment analysis platform using **Python (FastAPI)**, **FinBERT**, and **PRAW**, implementing modular data pipelines and REST APIs for ingesting Reddit data and serving financial NLP insights. Built interactive dashboards in **React**, **Vite**, and **Recharts** with live sentiment timelines, leveraging real-time API integration and scalable backend architecture designed for multi-source data ingestion.
- **SkillSync** : Engineered an AI-driven career platform using **FastAPI**, **spaCy**, and **Groq LLMs** for resume parsing, role prediction, and mock interview generation, integrating OAuth-based **GitHub/LinkedIn** sync and ML-powered career pathing. Built full-stack dashboards with **React**, **Next.js**, and **Recharts** to visualize skill progression via **LeetCode/GitHub** APIs, implementing containerized ML microservices and CI/CD pipelines with **Docker** and **GitHub Actions**.
- **InsightIQ** : Built an AI-powered analytics dashboard using **FastAPI**, **Groq**, and **LangChain** for NL-to-SQL query generation and result explanations, integrating **PostgreSQL/DuckDB** with dynamic schema creation from CSV uploads. Engineered multi-user dashboards with **Next.js**, **Chakra UI**, and **Recharts**, featuring drag-and-drop widgets, fine-grained access control, and Dockerized deployments with **Supabase** and **AWS S3**.
- **Resume Analyzer** : Developed an AI-driven resume analysis platform using **FastAPI**, **Uvicorn**, **PyPDF2**, and **Groq LLMs**, applying NLP techniques to extract key insights and boost analysis accuracy by 30%. Built an interactive frontend with **JavaScript** and modern frameworks, integrating dynamic feedback loops to identify skill gaps and optimize resumes for ATS compatibility and job targeting.
- **Simulated Distributed Systems** : Engineered a discrete-event simulator in **Python** to model information propagation and coordination in distributed IoT networks, applying advanced scheduling, state management, and event-driven algorithms for high scalability. Implemented efficient time-advancing logic and dynamic graph-based device propagation with millisecond precision; developed automated unit tests with high code coverage and modular design across multiple Python modules.
- **Search Engine** : Engineered a modular search engine from scratch in **Python, leveraging NLTK, BeautifulSoup**, and custom-built PageRank and TF-IDF algorithms to process 10,000+ documents with efficient inverted indexing and SHA-256–based deduplication, achieving query response times under 50ms. Designed end-to-end ranking and retrieval pipelines, including advanced text normalization, stemming, and link graph analysis, enabling **95%+ query coverage** on benchmark datasets and supporting scalable extensions for complex search features like phrase queries and synonym expansion.
- **Fashion MNIST Classifier** : Trained and evaluated four machine learning models—**k-NN**, **Logistic Regression**, **Random Forest**, and a **PyTorch Neural Network**—on the Fashion-MNIST dataset. Implemented standardized training pipelines, data preprocessing, and model evaluation using **scikit-learn** and **PyTorch**, generating classification reports and confusion matrices. Conducted hyperparameter tuning and error-pattern analysis to optimize accuracy and assess classifier robustness.

Skills Summary

- **Languages**: Python, C++, C, Java, C#, JavaScript, HTML, CSS, SQL, R, Bash, XML, JSON
- **Frameworks**: React, Next.js, Node.js, Blazor, FastAPI, LangChain, Flask, Chakra UI, Recharts, spaCy, PL/pgSQL, .NET
- **Tools**: Git, Docker, PostgreSQL, MySQL, GitHub Actions, Xcode, API Integration, Uvicorn, PyPDF2, RStudio
- **Platforms**: Linux, macOS, Windows, Web, AWS, Google Cloud Platform (GCP), Arduino