

## Education

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University of California, Santa Cruz

Sep 2023 – June 2025

Master of Science in Computer Science

CGPA: 3.88/4

Manipal University, Jaipur

July 2017 – May 2021

Bachelor of Technology in Information Technology

## Awards and Certifications

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- **UCSC Kaggle's Competition Winner (2023):** Achieved **first place** in the final project competition of 'Applied Machine Learning: Deep Learning' course with a final score of **88.4%** using **Vision Transformers**, ultimately earning an **A+ grade**.
- **3rd Place at Innocircle 2022, Mercedes-Benz Internal Innovation Forum:** Implemented **micro frontend architecture** to complement the existing process, enabling users to modify their vehicle network topology and review changes, **eliminating previous dependencies and saving more than 50% of the time**.
- **AZ-900 Certification (2022):** Passed the Microsoft Azure Fundamentals (AZ-900) certification with a score of **940/1000**.
- **Gold Medal — Science Olympiad Foundation (2014):** Awarded **Gold Medal (School Topper)** for the 16th National Science Olympiad. Achieved an **International Rank of 633**.
- **Silver Medal — Science Olympiad Foundation (2013):** Awarded **Silver Medal (2nd in School)** for the 15th National Science Olympiad with an **International Rank of 196**.
- **Bronze Medal — Science Olympiad Foundation (2013):** Awarded **Bronze Medal (School Level)** for the 2nd International English Olympiad.
- **Gold Medal — Science Olympiad Foundation (2012):** Awarded **Gold Medal (School Topper)** for the 13th National Science Olympiad.

## Experience

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University of California, Santa Cruz

Santa Cruz, CA

AI Research Assistant & Teaching Assistant

Jan 2024 – Present

- **AI Research Assistant** (July 2024 – Present)
  - \* Conducting research under the supervision of Professor Yi Zhang focusing on advancing AI capabilities in **agent capacity, agentic workflows, and web agents**.
  - \* Prototyping an **AI system** integrating intent-based matching and a **LangChain** agent with **FAISS**-powered **RAG** for context-aware task completion, using **wake word detection** to trigger the flow for seamless query processing.
- **Teaching Assistant** (Jan 2024 – June 2024)
  - \* **CSE-115A Introduction to Software Engineering** - Mentored student groups with an **Agile** focus on software projects.
  - \* **CSE-182 Introduction to Database Management Systems** - Facilitated projects and labs on relational/non-relational data models, SQL, Python database access, **PostgreSQL**, transactions, stored functions, and PL/pgSQL.

Capgemini Technology Services India Limited

Mumbai, India

Associate Consultant & Senior Analyst

July 2021 – Aug 2023

- **Associate Consultant** (Oct 2022 – Aug 2023)
  - \* **Role: Java Backend Developer**
  - \* Performed software analysis, programming, testing, and debugging within **XDIS**, a **monolithic legacy project utilizing a three-tier architecture**, crucial for vehicle diagnostics and automation at **Mercedes-Benz**.
  - \* **Headed the Data Model and Diagnostic Team**, showcasing solid cross-functional leadership.
  - \* Optimized export testing by creating a wrapper around the Autosar framework and implementing an XML file import strategy, **reducing overall testing time by 40%** and speeding up export time for individual modules by 17% on average.
- **Senior Analyst** (July 2021 – Sep 2022)
  - \* **Role: Java Backend Developer**
  - \* Designed, implemented, and maintained features using design patterns and conducting code reviews.
  - \* Enhanced **data models** with new attributes and relationships; led database migration to a new version; Furthermore, I managed data migration and relational schema updates, optimizing table relationships and system integration.
  - \* Dramatically optimized **XML** file migration time by an impressive **66.67%**. Additionally, concurrently implementing indexing strategies for associated IBM Db2 database tables enhanced the tool's robustness.
- **Senior Analyst Intern** (Jan 2021 – May 2021)
  - \* **Role: Java Full Stack Developer**
  - \* Led the development of a Medical Portal a team of 6 interns.
  - \* Developed end-to-end Medical Portal using **Spring Boot** for the backend and **React** for the frontend. Integrated frontend and backend via Axios. Utilized **JUnit** for backend and **Jasmine** for frontend testing.
  - \* Developed a **REST API** to facilitate distinct user roles (Admin, Doctor, Patient) to streamline appointment booking, doctor profile viewing, and medical history management for patients, while enabling doctors to review medical histories.

## Selected Projects

**PgVector+** | *C/C++, PL/pgSQL, Database Systems, Vector Calculation* *Jan 2024- March 2024*

- Developed an advanced **PostgreSQL extension** on top of pgvector for optimizing **vector similarity search** in diversified recommendation systems, significantly **improving system performance and data retrieval accuracy** for machine learning and AI applications.
- Implemented **similarity and dissimilarity constraints** and designed complex query compositions to enhance precision, relevance, and user engagement.
- Achieved an **A** in CSE 215 for excellence in **system design** and problem-solving.

**Enhancing Image Captioning** | *Pytorch, Python Github* *May 2024 - June 2024*

- Developed and implemented a baseline **LSTM** model with **ResNet50** for feature extraction using an **encoder-decoder architecture**. Integrated **attention mechanisms** to significantly enhance model performance with minimal training epochs.
- Conducted extensive experiments, including custom data splits and benchmarks, evaluated using the **BLEU** metric. Addressed irregular validation loss, explored learning rate schedules, and compared results with existing implementations.
- Completed this project as part of the “**Deep Learning for Advanced Computer Vision**” course, securing an **A+** grade.

**Unveiling Glitches in CLIP** | *Hugging Face, Python, pgVector, OpenAI-API Arxiv* *Jan 2024 - March 2024*

- Developed PgVector+, an advanced extension for PostgreSQL (pgvector) that optimized vector similarity search by implementing features like diversified recommendation systems, significantly improving system performance.
- Implemented similarity and dissimilarity constraints to boost the precision and relevance of search results, enhancing data retrieval accuracy and providing tailored recommendations for machine learning and AI applications.
- Designed and implemented low-level composition of multiple queries to support complex search criteria, improving vector data management and user engagement. Successfully achieved a **A grade** in CSE 215: Design and Implementation of Database Systems at UCSC for this project, demonstrating strong system design and problem-solving skills.

**Video to Mp3 Converter Service** | *Flask, Docker, Kubernetes, RabbitMQ, MongoDB Github* *Dec 2023*

- Developed a **microservices**-based system with four services, including an authentication gateway, authorization service, video upload service and converter service.
- The gateway authenticates users via an authorization service, generating **JWT tokens** for valid users and enabling secure video. Video-to-MP3 conversion was facilitated using the Python library “moviepy”.
- Employed asynchronous communication using **RabbitMQ** queue, Utilized **Docker** for containerization, **Kubernetes** for orchestration, and **Minikube** for local development, ensuring consistent and scalable deployment across environments.

## Technical Skills

**Programming Languages:** Java, Python, Node.js, JavaScript, C/C++, TypeScript, Go

**Backend Development:** Core Java, Spring, Spring Boot, REST APIs, GraphQL, Microservices Architecture

**Frontend Development:** React, Redux, JavaScript, Responsive UI Development, Web Fundamentals, DOM Manipulation

**Databases:** RDBMS (Oracle, MySQL, PostgreSQL), NoSQL (MongoDB, Redis), Vector Databases, pgvector, Pinecone

**Software Development Tools:** Git/GitHub, Jenkins (CI/CD), Docker, Kubernetes, Maven, Gradle, Jira

**Testing and Automation:** Test Driven Development (TDD), Behavior Driven Development (BDD)

**Cloud and Distributed Systems:** AWS (EC2, S3, RDS, Lambda, DynamoDB), GCP, Azure, SaaS/PaaS

**Miscellaneous:** Agile/SAFe Development Practices, Debugging, Troubleshooting, Documentation, SDLC Lifecycle

**Selected Coursework:** Advanced Machine Learning Techniques, Data Structures and Algorithms, Artificial Intelligence, Distributed Systems, Design and Implementation of Database Systems, Advanced Computer Vision